Since 1881

The American College

Re-accredited (2nd cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4 – point scale
(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Madurai – 625 002.

MEETING OF THE ACADEMIC COUNCIL

Saturday, April 08, 2017
10:00 AM

Venue
Main Hall

APPENDIX – AL

AGENDA

1. Prayer

2. Welcome Address – Dr. M. Davamani Christober, Principal & Secretary

3. Confirmation of the minutes of the meeting of the Academic Council held on Wednesday, June 08, 2016

4. Departmental Resolutions: Undergraduate Programmes (Aided)
   Resolutions 1 to 14

5. Departmental Resolutions: Postgraduate Programmes (Aided))
   Resolutions 15 to 16

6. Departmental Resolutions: Undergraduate Programmes (SF)
   Resolutions 17 to 32

7. Departmental Resolutions: Postgraduate Programmes (SF)
   Resolutions 33 to 34

8. Departmental Resolutions: Undergraduate Programmes (SF) Satellite Campus
   Resolutions 35

9. Special Resolutions

10. Other Matters, if any

11. Vote of Thanks

THE AMERICAN COLLEGE, MADURAI
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
(Re-accredited [2nd Cycle] by NAAC with Grade 'A' & CGPA of 3.46 on a 4 point scale)

MINUTES OF THE ACADEMIC COUNCIL MEETING HELD ON WEDNESDAY 8 JUNE 2016 IN THE MAIN HALL

Dr. M. Davamani Christober, Principal & Secretary, was in the chair.

The Meeting began with prayer by Chaplain Rev. Dr. S. Joseph Wellington.

The Principal welcomed all the members of the Academic Council on behalf of the college and extended a special word of welcome to the external members from the various institutions. Dr. V. Indhumathi, Joint Director of Collegiate Education, Madurai Region, Madurai, Dr. J. Daniel Chellappa, Senior Scientist, Bhabha Atomic Research Centre (BARC-NRB), Chennai, Mr. I.K. Lenin Tamilkovan, Director-in-Charge, Anna Science Centre Planetarium, Trichy.

He welcomed the Vice Principal, Bursar, Deans, Additional Deans, Controller and Deputy Controller, Heads of the Departments, Members of the faculty for processing the curriculum planning and the proposals for this Academic Council Meeting. He specially welcomed the student representatives who helped the curriculum to be shaped at the BOS meetings in their departments.

He then drew the attention of the House to the fact that each proposal was wetted at four levels and it is for the House to consider them especially the External members of the House. Since all resolutions and descriptive and prescriptive syllabi are shown on the screen, members were requested to refer to course code and title while making suggestions and raising queries.

The Minutes of the previous Academic Council Meeting held on 08.06.2016 was placed before the Academic Council for confirmation. and it was passed unanimously.

Departmental Resolutions: Undergraduate Programmes (Aided)

R.1: RESOLVED to accept the changes in the programme of studies for BA Tamil as presented on pages from TAM and the syllabi for III and IV Semesters as presented on pages from TAM 2 to TAM 14 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. J. Sarojini and seconded by Dr. A. Soma Sundaram.

Resolution was passed unanimously

R.2: RESOLVED to accept the changes in the programme of studies for BA English as presented on pages from ENG 1 to ENG 3 and the syllabi for III and IV Semesters as presented on pages from ENG 4 to ENG 15 with effect from the academic year 2015– 2016.

Resolution was moved by Dr. J. John Sekar and seconded by Dr. J. Paul Jayakar.

N. Elango said that he questioned the very composition of the BOS in English because he was the Head of the Postgraduate and Research Department of English. Mr. M. Rajendra Pandian said that BOS was a statutory body and therefore it should be headed by the statutory PG Head. He solicited the comments of the JDCE. He suggested that the resolution be sent back to the department.

Dr. V. Indhumathy, JDCE, said that she would take official action if her office received any written grievances. She also said that the Academic Council was meant to discuss the resolutions approved by the Boards of Studies in various disciplines and that any personal, faculty, and department issues could be addressed in the appropriate forums. Issues like seniority could not be addressed in the Academic Council.

The Chairman advised Messrs N. Elango and R. Prabakhar Vedamanickam to mind their language when they raised issues in the august body. He reminded Mr R. Prabakar Vedamanickam of his objectionable language against the JDCE on the previous occasion. He told him that such intemperate language would lower the dignity of the House and the image of the College.

Dr. J. Paul Jayakar, Additional Dean for Academic Policies and Administration informed the House that the College under autonomy has evolved a number of practices of decentralization like separate heads for UG and PG for the betterment of academic programmes and in the interest of service to students. These rules are not based on any hard and fast rule and therefore these practices are bound to change as the college grows with new and innovative programmes. Moreover, such practices are being followed in other autonomous colleges and the university itself.

Dr. Barnabas contended that though the issue was discussed in the senatus and the faculty, no conclusion could be reached. He pleaded that the present practice of PG Head heading the BOS in UG until a conclusion was reached.

Dr. R. Benjamin Robson expressed that the government recognized only one head and that is the PG Head and that if this new practice was extended to all departments, then there would not be a problem, but it is introduced only in English.

The Chairman wound up the discussions with his reply that the headship had been contested only in English department and that he took all efforts to find an amicable solution. Unfortunately both heads could not agree to my efforts, the Governing Council created four separate Heads in English for UG, PG, Research, and SF programmes.

The Chairman said that the issue was thoroughly addressed in other forums and that he consulted the university. The university orally ruled that autonomous colleges have their own system of constituting BOS and that the university could not intervene unless the persons concerned gave it in writing.

The Principal said that he would not send the resolutions back to the department since it had been a year long academic exercise at the department sub-committee, department meetings, BOS, Senatus, and the Faculty.

The Chairman asked if anyone would like to register their dissent and the following eight members expressed their dissent by raising their hands: Messrs N. Elango, S. Premsingh, S. Chandra Singh, M.G. Rethan, M. Rajendra Pandian, D. Winfred Thomas, Anburaj Daniel Barnabas, and R. Prabahar Vedamanickam.

Resolution was then passed unanimously.

R.3: RESOLVED to accept the changes in the programme of studies for B.Sc Mathematics as presented on pages from MAT 1 to MAT 2 and the syllabi for III and IV semesters presented on pages from MAT 3 to MAT 11 with effect from the academic year 2015 – 2016.

Resolution was moved by Mr. P. Jeyakodi Balan Premkumar and seconded by Mr. M. Jeyakumar.

Resolution was passed unanimously

R.4: RESOLVED to accept the changes in the programme of studies for B.Sc Physics as presented on pages from PHY 1 to PHY 2 and the syllabi for III and IV semesters as presented on pages from PHY 3 to PHY 13 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. K. Gnanasekar and seconded by Dr. Rachael Malini.

Resolution was passed unanimously

R.5: RESOLVED to accept the changes in the programme of studies for B.Sc Chemistry as presented on pages from CHE 1 and the syllabi for III and IV semesters as presented on pages from CHE 2 to CHE 17 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. K. John Adaikalasamy and seconded by Dr. J. Helen Ratna Monica.

Resolution was passed unanimously

R.6: RESOLVED to accept the changes in the courses CHE 1463 Chemistry for Botanists – I and CHE 1464 Chemistry for Botanists – II for I Year Botany as presented on pages from CHE 15 to CHE 17 with effect from the academic year 2016 – 2017.

Resolution was moved by Dr. K. John Adaikalasamy and seconded by Dr. J. Helen Ratna Monica.

Resolution was passed unanimously.

R.7: RESOLVED to accept the changes in the programme of studies for B.Sc Botany as presented on pages from BOT 1 to BOT 2 and the syllabi for the programme for III and IV semesters as presented on pages from BOT 3 to BOT 15 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. Anburaj Daniel Barnabas and seconded by Mr. D. Winfred Thomas.

Resolution was passed unanimously.

R.8: RESOLVED to accept the changes in the programme of studies for B.Sc Zoology as presented on pages from ZOO 1 to ZOO 3 and the syllabi for III, IV, V, and VI semesters as presented on pages from ZOO 4 to ZOO 25 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. A. Joseph Thatheyus and seconded by Dr. E. Joy Sharmila.

Resolution was passed unanimously.

R.9: RESOLVED to accept the changes in the programme of studies for B.A Economics (Tamil and English medium) as presented on pages from ECO 1 to ECO 2 and the syllabi for III and IV semesters as presented on pages from ECO 3 to ECO 26 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. A. Gunamalai and seconded by Dr. G. Kannabiran.

Resolution was passed unanimously.

R.10: RESOLVED to accept the changes in the programme of studies for Religion, Philosophy, and Sociology for the course VAL 3230, SOCIAL ISSUES AND VALUE STAND as presented on pages from RPS 1 to RPS 2 with retrospective effect from the academic year 2014 – 2015.

Resolution was moved by Dr. M.G. Rethan and seconded by Dr. C. Premkumar Immanuel.

Resolution was passed unanimously.

Departmental Resolutions: Undergraduate Programmes (SF)

R.11: RESOLVED to accept the changes in the programme of studies for BA English (Self-financed) as presented on pages from ENS 1 to ENS 3 and the syllabi for III and IV Semesters as presented on pages from ENS 4 to ENS 15 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. J. Paul Jayakar and seconded by Mr. J. Jehoson Jiresh.

Resolution was passed unanimously.

R.12: RESOLVED to accept the changes in the programme of studies for B.Sc Mathematics (Self-financed) as presented on pages from MAS 1 to MAS 4 and the syllabi for III and IV Semesters as presented on pages from MAS 4 to MAS 24 with effect from the academic year 2015 – 2016.

Resolution was moved by Mr. J. Jesupaul Thangaraj and seconded by Mr. P. Jeyakodi Balan Premkumar.

Resolution was passed unanimously.

R.13: RESOLVED to accept the changes in the programme of studies for B. Sc Physics (Self-financed) as presented on pages from PHS 1 to PHS 2 and the syllabi for III and IV Semesters as presented on pages from PHS 3 to PHS 17 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. S. Paul Mary Deborrah and seconded by Mrs. P. Sujanah.

Dr. A. Robson Benjamin suggested that the course contents of PHS 2473 be recast. Dr. Deborrah defended it on the ground that the course was meant for computer students. The chairman ruled that Dr. K. Gnanasekar assisted Dr. Robson and Dr Deborrah in carrying out the suggestions made.

Resolution was passed unanimously.

R.14: RESOLVED to accept the programme of studies for B. Sc Chemistry (Self-financed) as presented on pages from CHS 1 and the syllabi for III and IV Semesters as presented on pages from CHS 2 to CHS 13 with effect from the academic year 2015 – 2016.

Resolution was moved by Dr. K. John Adaikalasamy and seconded by Dr. C. Dorothy Sheela.

Resolution was passed unanimously.

R.15: RESOLVED to accept the changes in the programme of studies for B.Sc Bio-Chemistry (Self-financed) as presented on pages from BCH 1 to BCH 4 and the syllabi for the courses as presented on pages from BCH 5 to BCH 9 with retrospective effect from the academic year 2015 – 2016.

Resolution was moved by Mr. C. Caleb Johnson and seconded by Mr. R. Jeyapandi.

Resolution was passed unanimously.

R.16: RESOLVED to accept the changes in the programme of studies for B.Sc Microbiology (Self-financed) as presented on pages from MIC 1 to MIC 4 and the syllabi for III, IV, V, and VI Semesters on pages from MIC 5 to MIC 23 with effect from the academic year 2015-2016.

Resolution was moved by Dr. K. Navaneethakannan and seconded by Mr. Andrew Pradeep.

Resolution was passed unanimously.

R.17: RESOLVED to accept the changes in the programme of studies for B.Sc Visual Communication (self-financed) presented on pages from BVC 1 to BVC 2 and the syllabi for the programme as presented on pages from BVC 3 to BVC 32 with effect from the academic year 2015-2016.

Resolution was moved by Dr. T. Shylaja and seconded by Mrs. S. Shanmuga @ Mohana.

Resolution was passed unanimously.

R.18: RESOLVED to accept the programme of studies for B.Sc (Information Technology) as presented on pages from BIT 1 to BIT 2 and the syllabi for the programme for III and IV Semesters as presented on pages from BIT 3 to BIT 11 with effect from the academic year 2015-2016.

Resolution was moved by Mr. J. Frank Ruban Jebaraj and seconded by Mrs. J. Christy Jeeva Ratna Devi.

Resolution was passed unanimously.

R 19: RESOLVED to accept the changes for the course BIT 1408, Data Structures using C (TL) instead of BIT 1406, Data Structures using C ++ (TL) and syllabus as presented on page BIT 12 with effect from the academic year 2016 – 2017.

Resolution was moved by Mr. J. Frank Ruban Jebaraj and seconded by Mrs. J. Christy Jeeva Ratna Devi.

Resolution was passed unanimously.

Departmental Resolutions: Postgraduate Programmes (SF)

R.20: RESOLVED to accept the programme of studies for MA English (Self-financed) as presented on page PSE 1 and the syllabi for III and IV semesters as presented on pages from PSE 2 to PSE 17 with effect from the academic year 2015-2016.

Resolution was moved by Dr. J. Paul Jayakar and seconded by Mr. J. John Rajkumar.

Resolution was passed unanimously.

R.21: RESOLVED to accept the programme of studies for M.Sc Physics as presented on page PSP 1 and the syllabi for III and IV semesters as presented on pages from PSP 2 to PSP 15 with effect from the academic year 2015-2016.

Resolution was moved by Dr. S. Paul Mary Deborrah and seconded by Mr. K. Moorthy.

Dr. A. Robson Benjamin suggested that 8255 be removed from the course PSP 5311since it has no relevance to mircro-controller. Chairman requested Dr. K. Gnanasekar to coordinate to carry out the suggestion made by the member.

Resolution was passed unanimously.

R 22: RESOLVED to introduce the programme of studies for M.Sc Food Science (self-financed) as presented on page PFS 1 and the syllabi for the programme M.Sc Food Science as presented on pages from PFS 2 to PFS 23 with effect from the academic year 2016 -2017.

Resolution was moved by Dr. J. Helen Ratna Monica and seconded by Dr. K. Navaneethakannan.

Resolution was passed unanimously.

R 23: RESOLVED to accept the programme of studies for M.Phil Mathematics (Self-financed) as presented on page MPM 1 and the syllabi for the programme M.Phil Mathematics as presented on pages from MPM 2 to MPM 11 with effect from the academic year 2016-2017.

Resolution was moved by Mr. M. Jeyakumar and seconded by Mr. P. Jeyakodi Balan Premkumar.

Dr. M. Rajendra Pandian objected to the principal nominating himself as chairperson of the BOS in MPhil Maths since his educational qualifications were under the court's scrutiny and he said that it was therefore highly objectionable. The Chairman ruled that the matter was sub-judice and that Madurai Kamaraj University itself was a party to the case. Moreover, the programme was subject to affiliation from the university.

Resolution was passed unanimously.

R 24: RESOLVED to accept the programme of studies for M.Phil Management (self-financed) as presented on page MMB 1 and the syllabi for the programme M.Phil Management as presented on pages from MMB 2 to MMB 20 with effect from the academic year 2016-2017.

Resolution was moved by Dr. Raju and seconded by Mr. A. Arul Jeevaraj.

Resolution was passed unanimously

Community College

R 25: RESOLVED to accept the programme of studies for Diploma in Food Processing and Preservation (Self-financed) as presented on page DFP 1 and the syllabi for the programme Diploma in Food Processing and Preservation as presented on pages from DFP 2 to DFP 5 with retrospective effect from the academic year 2015 -2016.

Resolution was moved by Dr. K. Navaneethakannan and seconded by Ms. Ameena Beevi.

Resolution was passed unanimously.

R.26: RESOLVED to accept the programme of studies for Advanced Diploma in Food Processing and Preservation (Self-financed) as presented on page AFP 1 and the syllabi for the programme Advanced Diploma in Food Processing and Preservation as presented on pages from AFP 2 to AFP 4 with effect from the academic year 2016 - 2017.

Resolution was moved by Dr. K. Navaneethakannan and seconded by Ms. J. Nithya Kamalam.

Resolution was passed unanimously.

Special Resolutions

R 27: RESOLVED to accept the proposal to give attendance concession to NCC cadets/NSS volunteers/SLP students who represent the College at national level and players who represent the college in various sports and games at Zone/Inter-zone/University/District/State/National levels provided NCC, NSS, SLP officers, and Physical Education Directors undertake the responsibility to make such students attend regular classes on other days.

Resolution was moved by Dean for Academic Policies and Administration Dr. J. John Sekar and seconded by Additional Dean for Academic Policies and Administration Dr. J. Paul Jayakar.

Resolution was passed unanimously.

R 28: RESOLVED to accept that NCC cadets/NSS volunteers/SLP students and players representing the college teams shall attend a minimum of one test, one quiz, and one assignment in each course and that the marks secured thereof shall be proportionately doubled for the consolidation of Continuous Internal Assessment.

Resolution was moved by Dean for Academic Policies and Administration Dr. J. John Sekar and seconded by Additional Dean for Academic Policies and Administration Dr. J. Paul Jayakar.

Resolution was passed unanimously.

R 29: RESOLVED to accept the proposal to award a bonus of 10% of the maximum marks in each course in the End-of-Semester Examinations conducted in November, April, and June to NCC cadets, NSS volunteers, SLP students, and Players who represent the College at the University, State, National, and International level tournaments.

Resolution was moved by Dean for Academic Policies and Administration Dr. J. John Sekar and seconded by Additional Dean for Academic Policies and Administration Dr. J. Paul Jayakar.

Dr. A. Robson Benjamin observed that marks are awarded on the basis of students' performance on exams and tests and objected to awarding 10% of bonus marks. Dr. S. Israel requested for the inclusion of the term 'camps' at the end of the resolution. Dr. M. Rajendra Pandian said that he was not particularly against the move, but caution be taken so that it may not be misused. He also suggested that the term 'bonus' be changed. Mr. Jeyakodi Balan suggested that 10 marks be awarded if only a candidate failed. The Principal said that EMC will evolve rules for the implementation of the resolution.

Resolution was passed unanimously.

R 30: RESOLVED to accept the proposal to conduct a special End-of-Semester Examination for those students who miss regular End-of-Semester Examination conducted in November, April, and June on account of their selection for student exchange programmes abroad with retrospective effect from the academic year 2015-2016.

Dr. S. Israel requested that students of NCC, NSS, and PED be included in the resolution. Dr. Helen Ratna Monica explained that the resolution was meant to facilitate only those students who would be selected for Study Abroad Programme at institutions with which the College has entered into MOU in the case of clash of timings of the programme. Dr. Anburaj Daniel Barnabas suggested that all credits earned by students in foreign universities be converted into marks at the College and that students need not be made to take the examination again. Dr. A. Gunamalai pleaded for internal test as well. Dr. R. Prabahar Vedamanickam endorsed the explanation offered by Dr Barnabas. Dr. Helen Ratna Monica said that students selected have completed their programme of study but could not take examination after attending more than 75% of classes. Dr. J. Paul Jayakar said that students take extra courses under exchange programme category and the credits they would earn for a particular course could not be treated on par with the courses taken by students back in the College. Principal explained that the academic calendar of the universities in

the West and India is different. The Chairman responded to Dr Israel that he should bring a resolution from the BOS in NSS through the proper channel.

Resolution was moved by Dean for Academic Policies and Administration Dr. J. John Sekar and seconded by Additional Dean for Academic Policies and Administration Dr. J. Paul Jayakar.

Resolution was passed unanimously.

Other Matters

The Chairman invited the members to raise other matters related to the agenda.

Dr. A. Robson Benjamin suggested that since PG students of Physics opt for language course under CBCS, their score in them shall not be added to the overall percentage. He also wanted to know the reason for inordinate delay in the issue of mark statements.

Dr. S. Premsingh observed that though it is good that the college introduced new courses, the administration has not provided large classroom. On the other hand, the maximum student strength in each class stands at 75 or 80. As a result, personal attention and quality of instruction had to be sacrificed.

Dr. M. Rajendra Pandian requested that the administration did not classify PhD programmes as SF programmes.

Chairman reacted to Dr Robson that his suggestion related to clubbing of marks secured in optional courses with major subjects. Replying to Dr Premsingh, the principal said that the college admits students as per the university norms.

Dr. Daniel Chellappa addressed the House. He appreciated the hard academic work that is evident from the proceedings of the meeting. He wanted to share some of his thoughts. He wanted to know how departments shined in society for the past five years and how they fulfill parents' dreams and expectations. He wanted to know if students could compete at the national level in science areas. BARC is conducting summer programme for MSc Physics and Chemistry, but none from the American College attended them whereas students from Andra Pradesh and Bengal attend them in large numbers. He said that PG students of Physics, Chenistry, and Botany ought to know the benefits of scientists jobs in national laboratories.

Dr. Lenin Tamilkovan suggested that Ordino-board be added to Physics courses where microprocessor has been included. He suggested that a Science Centre be created in Madurai though it had one in the 1970s and that a Planetarium in the American College. He requested the faculty to include reference books in all courses. He mentioned a few titles for the consideration of science faculty members and he was ready to share them in pdf form. He also insisted on English language proficiency of science students. He also insisted that science students as much as other students ought to acquire a basic knowledge of finance.

Principal's Response

The principal said that the present day students concentrate on scoring marks and clearing the NET/SET exams, but they lack knowledge of opportunities in science fields. He requested the faculty to motivate students for positions in science fields other than teaching. He also observed that students are enamoured of IT field because positions in the field appear to be lucrative. He thanked Dr Lenin Tamilkovan for his suggestion to re-establish a science centre in Madurai and to start a Planetarium at the College. He assured that the College would take initiative for the establishment of a Science Centre at the College.

Vote of thanks

Vice Principal Dr. G.C. Abraham thanked the principal and all the external members for their presence, support and their valuable suggestions and also placed on record appreciations for Dean Dr. J. John Sekar and Additional Dean Dr. J. Paul Jayakar and the other Deans and Additional Deans for taking up the responsibilities to scrutinize all the proposals presented in the meeting. He also thanked all the Heads for the Departments, faculty members and student members for their contribution and cooperation. He also thanked the Bursar for the financial sanction to accomplish this mammoth academic exercise. He also made a special mention about contributions rendered by support staff Mr. K. Rajendran, Mr. Ravi, and Mr Edward John of the Principal's office.

After inviting all the members to join for lunch at the auditorium, the Chairperson adjourned the meeting.

Dr. J. John Sekar
Dean, Academic Policies & Administration

DR. J. JOHN SEKAR
MA, MPhil, PGDTE (CIEFL), PGDHE (IGNOU), PGDCE (UH), PhD
Head & Associate Professor
Guide & Supervisor
Research Department of English
Dean, Academic Policies & Administration
The American College,
MADURAI 625 002

Dr. M. Davamani Christober
Principal & Secretary

Dr. M. DAVAMANI CHRISTOBER
Principal & Secretary
The American College
Madurai-625 002

CONTENTS

RESOLUTIONS

Departmental Resolutions: Undergraduate Programmes (Aided)

R.1: As recommended by the Board of Studies in Tamil, RESOLVED to accept the changes in the programme of studies for BA Tamil as presented on page TAM 1 and the syllabi for V and VI Semesters as presented on pages from TAM 2 to TAM 13 with effect from the academic year 2015 – 2016.

R.2: As recommended by the Board of Studies in Hindi, RESOLVED to accept the changes in the programme of studies for Part-I Hindi as presented on page HIN 1 and the syllabi for Part-I as presented on pages from HIN 2 to HIN 5 with effect from the academic year 2017–2018.

R.3: As recommended by the Board of Studies in French, RESOLVED to accept the changes in the programme of studies for Part-I French as presented on page FRE 1 and the syllabi for Part-I as presented on pages from FRE 2 and FRE 3 with effect from the academic year 2017–2018.

R.4: As recommended by the Board of Studies in English, RESOLVED to accept the changes in the programme of studies for BA English as presented on pages from ENG 1 to ENG 4 and the syllabi for V and VI Semesters as presented on pages from ENG 5 to ENG 17 with effect from the academic year 2015– 2016.

R.5: As Recommended by the Senatus, RESOLVED to accept the proposal that the course code ENG 2467 (Fiction II) be changed into ENG 2477 (Fiction II) with retrospective effect from 2015-16, since the same number has already been assigned to an existing course.

R.6: As recommended by the Board of Studies in Mathematics, RESOLVED to accept the changes in the programme of studies for B.Sc Mathematics as presented on pages from MAT 1 to MAT 2 and the syllabi for V and VI semesters presented on pages from MAT 3 to MAT 15 with effect from the academic year 2015 – 2016.

R.7: As recommended by the Board of Studies in Mathematics, RESOLVED to effect the changes in the general grid of study for B.Sc Mathematics as in the following table.

Subject Name	Course Code	
	Old	New
Operations Research-II	MAT 3512 5hrs & 5 credits	MAT 3616 6 hrs & 6 credits
Fuzzy Mathematics	MAT 3616 6 hrs & 6 credits	MAT 3512 5hrs & 5 credits

R.8: As recommended by the Board of Studies in Physics, RESOLVED to accept the changes in the programme of studies for B.Sc Physics as presented on page PHY 1 and the syllabi for V and VI semesters as presented on pages from PHY 2 to PHY 13 with effect from the academic year 2015 – 2016.

R.9: As recommended by the Board of Studies in Chemistry, RESOLVED to accept the changes in the programme of studies for B.Sc Chemistry as presented on pages from CHE 1 & CHE 2 and the syllabi for V and VI semesters as presented on pages from CHE 3 to CHE 15 with effect from the academic year 2015 – 2016.

R.10: As recommended by the Board of Studies in Chemistry, RESOLVED to change of the following courses with new course numbers as the old numbers already exist with retrospective effect from the academic year 2015 – 2016.

Current course number	New course number	Title of the course
CHE 1511	CHE 1521	Physical Chemistry - I
CHE 1512	CHE 1522	Organic Chemistry - I
CHE 2511	CHE 2521	Organic Chemistry - II
CHE 2512	CHE 2522	Organic Chemistry - III
CHE 2514	CHE 2524	Inorganic Chemistry - IV
CHE 2411	CHE 2441	Chemistry for Physicist - I
CHE 2412	CHE 2442	Chemistry for Physicist - II

R.11: As recommended by the Board of Studies in Botany, RESOLVED to accept the changes in the programme of studies for B.Sc Botany as presented on pages from BOT 1 to BOT 2 and the syllabi for the programme for V and VI semesters as presented on pages from BOT 3 to BOT 19 with effect from the academic year 2015 – 2016.

R.11A: As Recommended by the Senatus, RESOLVED to change courses numbers and course titles of the following with retrospective effect from 2015-16.

Current course number	New course number	Title of the course
BOT 2532	BOT 2552	Mycology and Pathology
BOT 2534	BOT 2444	Cell Biology
BOT 2336	BOT 2436	Anatomy and Reproductive Biology of Angiosperms (ARBA)
BOT 3241	BOT 3200	Environmental Studies

Course number	Old Title	New Title
BOT2439	General Botany I	Botany for Chemists-I
BOT2440	General Botany II	Botany for Chemists-II

R.12: As recommended by the Board of Studies in Economics, RESOLVED to accept the changes in the programme of studies for B.A Economics (Tamil and English medium) as presented on page ECO 1 and the syllabi for V and VI semesters as presented on pages from ECO 2 to ECO 22 with effect from the academic year 2015 – 2016.

R.13: As Recommended by the Senatus, in Commerce RESOLVED to introduce the change in the course number from COM 2532 to COM 2542 for the course titled Corporate Accounting, as it come to effect for the students who have joined from the academic year 2015-2016.

.

R.14: As recommended by the Board of Studies in Religion, Philosophy and Sociology, RESOLVED to accept the changes in the programme of studies for Religion, Philosophy, and Sociology for the course VAL 3232, Social Issues and Value Stand as presented on page RPS 1 with retrospective effect from the academic year 2014–2015.

R.14A: As Recommended by the Senatus, RESOLVED to change courses numbers and course titles of the following with retrospective effect from 2015-16.

1. RPS 2436 Philosophy of Religion	changed to RPS 2435 Philosophy of Religion
2. RPS 2510 Social and Political Philosophy	changed to RPS 2430 Social and Political Philosophy

1. RPS 2533 Classical Indian Philosophy – II	modified to RPS 2533 Classical Indian Philosophy
2. RPS 3635 Sociological Theory – I	modified to RPS 3635 Sociological Theories – I
3. RPS 3636 Sociological Theory – II	modified to RPS 3636 Sociological Theories - II

Departmental Resolutions: Postgraduate Programmes (Aided)

R.15: As recommended by the Board of Studies in English, RESOLVED to change the course code for Literary Criticism and Theories-II from PGE 5422 to PGE 5434 with retrospective effect from the academic year 2015-2016.

R.16: As recommended by the Board of Studies in Zoology, RESOLVED to accept and introduce the following project papers as presented on page MPZ 1 and the syllabi for courses as presented on pages MPZ 2 to MPZ 7 retrospectively from the academic year 2015-2016.

Departmental Resolutions: Undergraduate Programmes (SF)

R.17: As recommended by the Board of Studies in Tamil, RESOLVED to accept the changes of the codes of the following courses with new course numbers with effect from the academic year 2017 – 2018.

ஏற்கனவே உள்ள பாட எண்கள் (பழைய எண்கள்)		புது எண்கள்
TAM 1201	பொதுத்தமிழ் - I	TAS1201
TAM 1202	பொதுத்தமிழ் - II	TAS1202
TAM 2201	பொதுத்தமிழ் - III	TAS 2201
TAM 2202	பொதுத்தமிழ் - IV	TAS 2202
TAM 1213	அடிப்படைத் தமிழ் - I	TAS 1213
TAM 1214	அடிப்படைத் தமிழ் - II	TAS 1214
TAM 1225	சிறப்புத் தமிழ் - I	TAS 1225
TAM 1226	சிறப்புத் தமிழ் - I	TAS 1226

R.18: As recommended by the Board of Studies in Hindi, RESOLVED to accept the changes in the programme of studies for B.A.Hindi as presented on pages from HIS 1 to HIS 4 and the syllabi for I and II Semesters as presented on pages from HIS 5 to HIN 12 with effect from the academic year 2017–2018.

R.19: As recommended by the Board of Studies in French, RESOLVED to accept the changes in the programme of studies for Part-I French as presented on page FRS 1 and the syllabi for Part-I as presented on pages from FRS 2 and FRS 3 with effect from the academic year 2017–2018.

R.19A: As recommended by the Senatus, RESOLVED to accept the proposal that the Course code FRS 2408 Cinéma français (French Cinema) be changed into FRS 2410 with retrospective effect from the academic year 2015-2016.

R.20: As recommended by the Board of Studies in English (Self-financed), RESOLVED to accept the changes in the programme of studies for BA English (Self-financed) as presented on pages from ENS 1 to ENS 4 and the syllabi for V and VI Semesters as presented on pages from ENS 5 to ENS 16 with effect from the academic year 2015 – 2016.

R.21: As recommended by the Senatus RESOLVED to accept the proposal that the course code ENS 2468 (Advanced Grammar) be changed into ENS 2478 with retrospective effective from 2015-2016 since the same number has been assigned to the existing course New Literatures in English (ENS 2468) in the 2014 Batch.

R.22: As recommended by the Board of Studies in Mathematics (Self-financed), RESOLVED to accept the changes in the programme of studies for B.Sc Mathematics (Self-financed) as presented on pages from MAS 1 to MAS 3 and the syllabi for V and VI Semesters as presented on pages from MAS 4 to MAS 16 with effect from the academic year 2015 – 2016.

R.23: As recommended by the Board of Studies in Mathematics (Self-financed), RESOLVED to effect the changes in the general grid of study for B.Sc Mathematics as in the following table.

Subject Name	Course Code	
	Old	New
Operations Research-II	MAS 3512 5hrs & 5 credits	MAS 3616 6 hrs & 6 credits
Fuzzy Mathematics	MAS 3616 6 hrs & 6 credits	MAS 3512 5hrs & 5 credits

R.24: As recommended by the Board of Studies in Mathematics (Self-financed), RESOLVED to implement the changes of the course codes for the following courses for B.Sc Mathematics with effect from 2016-2017.

Subject Name	Course Code	
	Old	New
Graph Theory & OR	MAS 2432	MAS 2465
Business Statistics	MAS 2435	MAS 2475
Business Mathematics	MAS 2436	MAS 2466
Bio-Statistics	MAS 2452	MAS 2472

R.25: As recommended by the Board of Studies in Physics (Self-financed), RESOLVED to accept the changes in the programme of studies for B. Sc Physics (Self-financed) as presented on pages from PHS 1 to PHS 2 and the syllabi for V and VI Semesters as presented on pages from PHS 3 to PHS 16 with effect from the academic year 2015 – 2016.

R.26: As recommended by the Board of Studies in Chemistry (Self-financed), RESOLVED to accept the programme of studies for B. Sc Chemistry (Self-financed) as presented on pages from CHS 1 & CHS 2 and the syllabi for V and VI Semesters as presented on pages from CHS 3 to CHS 16 with effect from the academic year 2015 – 2016.

R.27: As recommended by the Board of Studies in Chemistry (Self-financed), RESOLVED to interchange of *lab component* in major supportive course CHS 1425 & CHS 1426 for B.Sc. Bio Chemistry, between the ODD and EVEN semesters.

R.28: As Recommended by the Senatus, in B.Com. with Computer Application (SF) RESOLVED to introduce the change in the course number from CMC 2533 to CMC 2543 for the course titled Business Law, as it come to effect for the students who have joined from the academic year 2015-2016.

R.29: As recommended by the Board of Studies in Information Technology, RESOLVED to accept the programme of studies for B.Sc (Information Technology) as presented on pages from BIT 1 to BIT 2 and the syllabi for the programme for V and VI Semesters as presented on pages from BIT 3 to BIT 13 with effect from the academic year 2015-2016.

R.30: As recommended by the Board of Studies in Physical Education, RESOLVED to accept the programme of studies for B.Sc. Physical Education as presented on pages from BPE 1 to BPE 3 and the syllabi for the programme as presented on pages from BPE 4 to BPE 33 with effect from the academic year 2017-2018.

R.31: As recommended by the Board of Studies in Psychology, RESOLVED to accept the programme of studies for B.Sc. Psychology as presented on pages from PSY 1 to PSY 3 and the syllabi for the programme for I and II Semesters as presented on pages from PSY 4 to PSY 14 with effect from the academic year 2017-2018.

R.32: As recommended by the Board of Studies in Food Science and Nutrition, RESOLVED to accept the programme of studies for B.Sc. Food Science and Nutrition as presented on pages from FSN 1 to FSN 3 and the syllabi for the programme for I and II Semesters as presented on pages from FSN 4 to FSN 13 with effect from the academic year 2017-2018.

Departmental Resolutions: Postgraduate Programmes (SF)

R.33: As recommended by the Board of Studies in M.Sc. Food Science, RESOLVED to replace the **Unit I: Sensory Science** in the course PFS 4505 Food Science with the new **Unit 'Introduction to food science'** as presented on page PFS 1.

R.34: As recommended by the Board of Studies in Immunology & Microbiology (Self-financed), RESOLVED to accept the changes in the programme of studies for M.Sc. Immunology & Microbiology(Self-financed) as presented on page on MIM 1 and the syllabi for I and II Semesters as presented on pages from MIM 2 to MIM 15 with effect from the academic year 2017 – 2018.

Departmental Resolutions: Undergraduate Programmes (SF) Satellite Campus

R.35: As recommended by the Board of Studies in English (Self-financed), RESOLVED to adopt the syllabi of B.A. English (Self-financed) programme in the Satellite Campus with effect from the academic year 2017-2018.

SPECIAL RESOLUTION:

R.36: As recommended by the Senatus, RESOLVED to accept the recommendations of the Sub-Committee on Examination Reforms as presented in the Addendum with effect from the academic year 2017-2018.

DEPARTMENT OF TAMIL (UG)

Choice Based Credit System 2015 -2016

Programme for B.A. Degree in Tamil

SEM	PART	COURSE CODE	COURSE TITLE	Hrs\Wk	Cr.	MARKS
V	IIIC	TAM 3621	நம்பியகப் பொருளும் புறப்பொருள் வெண்பாமாலையும்	6	6	90
V	IIIC	TAM 3623	சிற்றிலக்கியம்	6	6	90
V	III C	TAM 3625	இக்கால மொழியியல்	6	6	90
V	III C	TAM 3527	நாடகம் : அடிப்படை	5	5	75
V	IV LS	TAM 3209	போட்டித் தேர்வுத் தமிழ்	3	2	30
V	VAL	XXX XXXX	Value Education	4	2	30
			Total	30	27	405

SEM	PART	COURSE CODE	COURSE TITLE	Hrs\Wk	Cr.	MARKS
VI	IIIC	TAM 3622	யாப்பும் அணியும்	6	6	90
VI	IIIC	TAM 3624	காப்பியம்	6	6	90
VI	III C	TAM 3626	இலக்கியக் கோட்பாடுகள்	6	6	90
VI	III C	TAM 3528	நாடகம் - அரங்கியற்கூறுகள்	5	5	75
VI	IV LS	TAM 3210	தமிழ்ச் சமுதாய வரலாறு	3	2	30
VI	EVS	TAM 3200	சுற்றுச்சூழலும் தமிழ் இலக்கியமும்	4	2	30
			Total	30	27	405

C :Major Core LS : Life Skill NME; Non- Major Electives EVS: ENVIRONMENTAL STUDIES

TAM 3621 நம்பியகப் பொருளும் புறப்பொருள் வெண்பாமாலையும் 6 Hrs./Cr.6

நோக்கம்: எழுத்திலக்கணத்தையும் சொல்லிலக்கணத்தையும் கற்ற மாணவர்கள் தொடர்ச்சியாக, அகம், புறம் என்னும் பொருளிலக்கணத்தைக் கற்பது இப்பாடத்தின் நோக்கமாகும்.

அலகு–1: அகத்திணையியல் - ஐந்திணை – திணைக் கட்டமைப்பு – முப்பொருள் பாகுபாடு.

அலகு–2: களவியல் - இயற்கைப் புணர்ச்சி, இடந்தலைப்பாடு முதலியன - களவுக்காலப் பிரிவின் வகைகள் - கைக்கிளை.

அலகு–3: வரைவியல் - வரைவு - அறத்தொடு நிற்றல் - உடன்போக்கு - கற்பியல் கற்புக்காலப் பிரிவுகள் - பெருந்திணை.

அலகு–4: புறத்திணையியல் - வெட்சித் திணையும் துறைகளும் - கரந்தைத் திணையும் துறைகளும் - வஞ்சித் திணையும் துறைகளும் – காஞ்சித் திணையும் துறைகளும்.

அலகு–5: நொச்சித் திணையும் துறைகளும் – உழிஞைத் திணையும் துறைகளும் - தும்பைத் திணையும் துறைகளும் – வாகைத் திணையும் துறைகளும் - பொதுவியல் திணையும் துறைகளும்.

பாடநூல்

1. தமிழண்ணல், புறப்பொருள் வெண்பாமாலை, மீனாட்சி புத்தக நிலையம், மதுரை, 2013.

2. வித்துவான் எம். நாராயண வேலுப்பிள்ளை, நம்பியகப்பொருள், பாரி புத்தகப் பண்ணை, சென்னை, 2001.

TAM 3623 சிற்றிலக்கியம் 6 Hrs./Cr.6

நோக்கம்: பெருங்காப்பியத்தினின்று வேறுபடும் சிற்றிலக்கிய அமைப்பை அறிந்து கொள்ளுதலும் இலக்கிய வளர்ச்சியில் சிற்றிலக்கியம் பெறுமிடத்தை வெளிப்படுத்துதலும் உள்ளடக்கத்திற்கேற்ப அமைந்த வடிவமைப்பினைச் சுட்டிக்காட்டுதலும் சிற்றிலக்கியங்களின் தனித்தன்மை பற்றி அறிதலும் இப்பாடத்திட்டத்தின் நோக்கங்களாகும்.

அலகு 1: சிற்றிலக்கியம் - விளக்கம் - தோன்றியதற்கான காலச்சூழல் - அமைப்பும் உள்ளடக்கமும் - வகைகள் - இலக்கண, இலக்கியங்கள் சுட்டும் அகப்பொருள் புறப்பொருள் கூறுகள் சிற்றிலக்கியமாக உருப்பெறுதல் - இவற்றை விளக்குதல்.

அலகு 2: அகத்துறைக் கூறுகள் சிற்றிலக்கியமாக உருப்பெற்றதை எடுத்துக்கூறுதல், அழகர் கிள்ளை விடுதூது (தலைவி காதல் கொள்ளுதலும் தூதுரைக்க வேண்டுதலும் 190-239 கண்ணிகள்) குலோத்துங்கச் சோழன் உலா (உலாக் காட்சி 200-207இ217-232இ240-280)

அலகு3: புறத்துறைக் கூறுகள் சிற்றிலக்கியமாக உருப்பெற்றதை எடுத்துக் கூறுதல், கலிங்கத்துப்பரணி – (போர் பாடியது 405-411இ 420-422இ 426இ 427இ 429இ 430இ 441இ 446இ 449இ 450இ 460இ 471) நந்திக்கலம்பகம் (மறம், புயவகுப்பு 9இ 11இ 18இ -21இ 30இ 31இ 31இ 35இ 53இ 65இ 72இ 82இ 96-99).

அலகு4: நாட்டுப்புறக்கூறுகள் இலக்கிய வகையாதல் - வெவ்வேறு நிலவியல் சார்ந்த வாழ்வியல் வெளிப்பாடு – அவற்றின் வழியே அமைந்த சமூகத்தை அறிதல். குற்றாலக் குறவஞ்சி – குறத்தி குறி கூறுதல் (61-79), முக்கூடற்பள்ளு – நாட்டு வளம், நகர் வளம் (16-28).

அலகு5: சமயக்கூறுகள் சிற்றிலக்கிய உருவாக்கத்தில் இடம்பெறுவதைக் கிறித்துவ, இஸ்லாமியச் சிற்றிலக்கியங்பளின் வழிக்காட்டுதல், அமலகுரு சதகம் (விசுவாச வாழ்க்கை நல்வாழ்க்கை 2இ 6இ 7இ 9இ 11இ 12இ 15இ 17இ 20இ 28) ஆயிஷா நாச்சியார் பிள்ளைத்தமிழ் - அம்புலிப் பருவம் (முழுவதும்).

பாடநூல்கள்

1. அழகர்கிள்ளை விடு தூது, கழக வெளியீடு, சென்னை, 1977.
2. குலோத்துங்கச் சோழன் உலா, கழக வெளியீடு, சென்னை, 1976.
3. கதிர் முருகு (ப.ஆ.), கலிங்கத்துப்பரணி மூலமும் உரையும், சாரதா பதிப்பகம், சென்னை, 2015.
4. நந்திக் கலம்பகம், கழக வெளியீடு, சென்னை, 1955.
5. கதிர் முருகு (ப.ஆ.) குற்றாலக் குறவஞ்சி மூலமும் உரையும், ,சாரதா பதிப்பகம், சென்னை, 2015.
6. கதிர் முருகு (ப.ஆ.) முக்கூடற்பள்ளு மூலமும் உரையும், சாரதா பதிப்பகம், சென்னை, 2015.
7. ஜி.எஸ். வேதநாயகர், அமலகுரு சதகம், கிறிஸ்தவ இலக்கியச் சங்கம், சென்னை 1982.
8. கவிஞர் மு.ஷெரிப், ஆயிஷா நாச்சியார் பிள்ளைத்தமிழ், சீதக்காதி நூல் வெளியீட்டகம், சென்னை 1979.

TAM 3625 **இக்கால மொழியியல்** **6 Hrs./Cr.6**

நோக்கம்: எழுத்து, சொல் என்னும் இரு நிலைகளில் மரபிலக்கணத்தைக் கற்ற மாணவர்கள், அவ்விலக்கணக் கூறுகளை மொழியியல் நோக்கில் கற்பது இப்பாடத்தின் நோக்கமாகும்.

அலகு1: மொழியியல் வரலாறு – மொழியியல் வகைகள் - ஒலியியல்: ஒலி நெடுங்கணக்கு – ஒலியியற் கழகம் - ஒலியுறுப்புகள்.

அலகு2: ஒலி வகைகள் - உயிரொலிகள் - மெய்யொலிகள் - ஒலிப்பு முறைகள் - ஓசை இயல்புகள்.

அலகு3: ஒலியனியல் - ஒலியன் - மாற்றொலி – துணைநிலை வழக்கு – வேற்றுநிலை வழக்கு.

அலகு4: உருபனியல் - உருபு – உருபன் - மாற்றுருபு – உருபனைக் கண்டறியும் நைடாவின் விதிகள்.

அலகு5: உருபன்களின் வகையும் வருகையும் - தொடரனியல் அறிமுகம் - அண்மை உறுப்புக் கோட்பாடு - மூவகைத் தொடரனியல்.

பாடநூல்கள்

1. முத்துச்சண்முகம் - இக்கால மொழியியல், முல்லை நிலையம், சென்னை, 2012.
2. பரசிவம். கு. - இக்கால மொழியியல் ஓர் அறிமுகம், அடையாளம் பதிப்பகம், திருச்சி, 2016.

TAM 3527 **நாடகம் : அடிப்படை** **5Hrs./Cr.5**

நோக்கம்: நாடகக் கலையின் தோற்றத்தையும் அதன் வளர்ச்சிப் படிநிலைகளையும் சுருக்கமாக அறிமுகப்படுத்துவது இப்பாடத்தின் நோக்கமாகும். மனித நாகரிகத்தில் நாடகக்கலை உருக்கொண்ட விதத்தினையும், உலக அளவில் இன்று வரையிலான குறிப்பிடத் தகுந்த போக்கினையும் வகைகளையும் மேலோட்டமாக விளக்குவதாகவும் இப்பாடம் அமையும்.

அலகு 1: நாடகக் கலையின் தோற்றம் - சடங்குகளிலிருந்தும் விளையாட்டுக்களிலிருந்தும் நாடகம் உருவான தொடக்க வரலாறு - கிரேக்க, ரோமானிய நாடகத் தோற்றம், அதன் அமைப்பு மற்றும் வீழ்ச்சி.

அலகு 2: தமிழ் நாடகம் பற்றிய இலக்கியப் பதிவுகள் - சங்க காலம் - சங்கம் மருவிய காலம் - குறிப்பாக, சிலம்பு கூறும் நாடகச் செய்திகள் - குறவஞ்சி, பள்ளு நாடக அறிமுகம்.

அலகு 3: தமிழ் இசை நாடகத் தோற்றம் - சங்கரதாஸ் சுவாமிகள் - பம்மல் சம்பந்த முதலியார் - ஏனைய முக்கிய சில நாடக ஆளுமைகள் - தேசிய, திராவிட இயக்க நாடகங்கள்.

அலகு 4 இப்சன் முதலிய உலகநாடக ஆளுமைகள் - மறுமலர்ச்சிக் காலமும் சேக்ஸ்பியரின் குளோப் அரங்கும் - உலகளவிலான நவீன நாடக முன்னெடுப்புகள் - ஸ்தானிஸ்லாவ்ஸ்கி - பெர்டோல்ட் ப்ரக்ட் - குரோட்டோவ்ஸ்கி - அகஸ்டோ போவல் - ஷெக்னர் போன்றோரைப் பற்றிய சுருக்கமான அறிமுகம்.

அலகு 5: தமிழில் நவீன நாடகத்தின் தோற்றமும் போக்குகளும் - பாதல்சர்க்காரின் பயிலரங்குகள் - மு.ராமசாமி - ந.முத்துசாமி -பரீக்ஷா ஞாநி - பிரளயன் - முருகபூபதி மற்றுமானவர்களின் பங்களிப்புகள்.

துணைநூற்கள் மற்றும் பரிந்துரைக்கப்படும் நூற்கள்

1. அஸ்வகோஷ்: அரங்க ஆட்டம், , மங்கை பதிப்பகம், 2015.
2. ஏ.என். பெருமாள்: தமிழ்நாடக வரலாறு, உலகத் தமிழாராய்ச்சி நிறுவனம், 1980.
3. முனைவர். பகவதி: தமிழ்நாடகம் - நேற்றும் இன்றும், உலகத் தமிழாராய்ச்சி நிறுவனம், 2000.
4. பிரளயன்: இலக்கம்4 பிச்சுப்பிள்ளைத் தெருவிலிருந்து,வாசல் பதிப்பகம், 2006.
5. முனைவர் கு. பகவதி. தமிழ்நாடகம் - நேற்றும் இன்றும், உலகத் தமிழாராய்ச்சி நிறுவனம், 2000.

TAM 3209 போட்டித் தேர்வுத் தமிழ் 3 Hrs./Cr. 2

நோக்கம்: அரசுப் பணி போட்டித் தேர்வு எழுதும் மாணவர்களுக்குப் பயன்படும் வகையில் கொள்குறி நிலையில் (objective type) கற்றலே இப்பாடத்தின் நோக்கமாகும்.

அலகு1: தமிழ் இலக்கிய வரலாறு (நூல்களும் ஆசிரியர்களும், அடைமொழியால் குறிக்கப்பெறும் நூல்கள், புலவர்கள், இலக்கியவாதிகள், தமிழ் இலக்கிய நூலின் புகழ் பெற்ற மேற்கோள்கள், விருது பெற்ற ஆசிரியர்கள், நூல்கள்)

அலகு2: அகரவரிசைப்படி சொற்களைச் சீர் செய்தல், பிரித்து எழுதுதல், சேர்த்து எழுதுதல், எதிர்ச்சொல், பொருந்தாச் சொல், உவமைக்கேற்றப் பொருளைக் கண்டறிதல்.

அலகு3: வாக்கிய வகைகளை அறிதல், (தன்வினை, பிறவினை, செய்வினை, செயப்பாட்டு வினை) விடைக்கேற்ற வினாவைத் தேர்வு செய்தல், எதுகை, மோனை இயைபுத் தொடர்களைக் கண்டறிதல்.

அலகு4: சந்திப்பிழை நீக்கம், பிறமொழிச் சொற்கள் நீக்கம், ஒருமை - பன்மை அறிதல், ஆங்கிலச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைத் தருதல் , பொருத்துதல், சரியா? தவறா? என அறிதல்.

அலகு5: இலக்கணக் குறிப்பு அறிதல், ஓரெழுத்து ஒருமொழி, வேர்ச் சொல் அறிதல், சொற்களை ஒழுங்குபடுத்திச் சொற்றொடரைக் கண்டறிதல், ஒலி வேறுபாடு அறிந்து சொற்களுக்கேற்ப பொருள் காணுதல்.

பார்வை நூல்கள்

1. மு.வரதராசானார் - தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாடமி வெளியீடு, முதற்பதிப்பு – 1990.
2. மது.ச.விமலானந்தன், தமிழ் இலக்கிய வரலாற்றுக் களஞ்சியம் I,II, ஐந்திணைப் பதிப்பகம், சென்னை – 05. முதற்பதிப்பு – 1987.
3. அ.கா. பெருமாள், எஸ். ஸ்ரீகுமார், தமிழ் இலக்கிய வரலாறு, நிர்மால்யம் பதிப்பகம், நாகர்கோவில் - 629 001. நான்காம் பதிப்பு - 2003.
4. சொ.பரமசிவம், நற்றமிழ் இலக்கணம், கவிக்குயில் பிரிண்டர்ஸ், சென்னை, 2000.
5. எம்.ஏ.நு.ஃமான், அடிப்படைத் தமிழ் இலக்கணம், அடையாளம், திருச்சி, 2007.
6. ஜே.ப.குமரன், தமிழ் இலக்கணம் ஓர் எளிய அறிமுகம், சந்தியா பதிப்பகம், சென்னை, 2003.
7. மருதூர் அரங்கராசன், தமிழில் மரபுத் தொடர்கள், ஐந்திணைப் பதிப்பகம், சென்னை, 1998.
8. ஆ.இராமகிருட்டிணன், தமிழக வரலாறும் தமிழர் பண்பாடும், சர்வோதய இலக்கியப் பண்ணை, மதுரை,2012
9. மா.ராசமாணிக்கனார், தமிழக வரலாறும் பண்பாடும், NCBH வெளியீடு, சென்னை, 1998.
10. கா.மீனாட்சி சுந்தரம் ஐரோப்பியர்களின் தமிழ்ப்பணி, சென்னைப் பல்கலைக்கழக வெளியீடு, 1998
11. மயிலை சீனி வேங்கடசாமி, பத்தொன்பதாம் நூற்றாண்டுத் தமிழிலக்கியம், மெய்யப்பன் தமிழாய்வகம், சிதம்பரம், 1994.
12. 6-12 வரையிலான சமச்சீர் தமிழ் பாடநூல்கள், தமிழ்நாடு பாடநூல் நிறுவனம், சென்னை, 2012.

TAM 3622 **யாப்பும் அணியும்** **6 Hrs./Cr.6**

நோக்கம்: தமிழின் யாப்பு, அணி இலக்கண வகைகளை மாணவர்கள் கற்றுத்தெளிவது இப்பாடத்தின் நோக்கமாகும்.

அலகு 1: யாப்பு அறிமுகம் -எழுத்து - குறில், நெடில் - உயிர் எழுத்து - குற்றியலிகரம் - குற்றியலுகரம் - ஐகாரக்குறுக்கம் - ஆய்தம் - மெய் - உயிர்மெய் - அசை - நேரசை -நிரையசை.

அலகு 2: சீர் : சீரின் வகைகள் - தளை: தளையின் வகைகள் - அடி: அடிகளின் வகைகள் - தொடை: தொடையின் வகைகள்.

அலகு 3: செய்யுளியல் - பா வகைகள்: வெண்பா - ஆசிரியப்பா - கலிப்பா - வஞ்சிப்பா - பாக்களின் தாழிசை - துறை - விருத்தம்.

அலகு 4: அணியிலக்கணம் அறிமுகம் - தண்டியலங்காரம் வரலாறும் அமைப்பும் -செய்யுள் வகைகள் - பொருளணியியல்.

அலகு 5: சொல்லணியியல் அணிகளின் இயல்பு: தேர்ந்தெடுத்த சில அணிகளை எடுத்துக்காட்டுகளுடன் விளக்குதல்.

பாட நூல்கள்

1. பொ. வே. சோமசுந்தரனார், யாப்பருங்கலக்காரிகை, கழக வெளியீடு, 1940.
2. பொ. வே. சோமசுந்தரனார், தண்டியலங்காரம், கழக வெளியீடு, 1943.

TAM 3624 **காப்பியம்** **Hrs. 6/cr.6**

நோக்கம்: தமிழிலக்கியப் பரப்பில் நீண்ட செய்யுள் வழியே கதை கூறும் காப்பிய மரபினை அறிமுகம் செய்வதும், காப்பியங்கள் தோன்றிய பின்னணியில் அவற்றின் தனித்தன்மைகளை இனங்காணுதலும், இலக்கிய வகைகளில் காப்பியம் பெறுமிடத்தைப் புலப்படுத்தலும், காப்பியக் கொள்கைகளைக் கண்டறிதலும் இப்பாடத்திட்டத்தின் நோக்கங்களாகும்.

அலகு 1: காப்பியம் - சொல் உருவாக்கம் - தமிழ்க் காப்பிய மரபு – தனிநிலைச் செய்யுள் - தொடர்நிலைச் செய்யுள் - காப்பிய வளர்ச்சியாதல் - காப்பிய இலக்கணம் - பெருங்காப்பியங்கள் - சிறு காப்பியங்கள் - கட்டமைப்பு இவற்றை விளக்குதல்.

அலகு 2: சிலப்பதிகாரக் காப்பியச் சிறப்பினை விளக்குதல் - காப்பியக்கரு – கதைப்போக்கு, உள்ளடக்கம், ஆகியவற்றை எடுத்துக் கூறுதல், சிலப்பதிகாரம் - வழக்குரைகாதை

அலகு 3: சமய, தத்துவ நோக்கில் காப்பியங்களை அறிதல் - தத்தம் சமயக்கொள்கைகளை இலக்கியத்தினூடாக எடுத்துரைக்கும் போக்கினைப் புலப்படுத்துதல் - (மணிமேகலை – ஊரலருரைத்த காதை (64-69), பாத்திரம் பெற்ற காதை (76-98), பவத்திறமறுகென பாவைநோற்ற காதை (82-103), சீவகசிந்தாமணி - (662, 666, 740, 742, 746, 753, 760, 761, 767, 770, 771, 807, 812, 814, 815, 819, 821, 827, 829).

அலகு4: புராண, இதிகாச மரபுகளை உள்வாங்கியும் தமிழ் மரபுகளை அடியொற்றியும் புனையப்பட்ட காப்பியங்களின் சிறப்புக்களை எடுத்துக் கூறுதல். கம்பராமாயணம் - ஆரண்யகாண்டம்- சடாயு உயிர்நீத்தபடலம் - (813, 815, 817, 823, 824, 827, 830-837, 840, 846-848, 851, 862, 865, 867, 871, 873, 875, 876, 880, 883, 885, 886), பெரியபுராணம் - கண்ணப்ப நாயனார் புராணம் (662, 666, 674, 742, 746, 753, 760, 761, 766, 767, 770, 771, 807, 812, 814, 815, 819, 821-827, 829)

அலகு5: தமிழ்க் காப்பிய மரபைப் பின்பற்றி எழுந்த கிறித்தவ, இஸ்லாமியக் காப்பியங்களை அறிமுகம் செய்தல். இரட்சண்ய யாத்திரிகம் - சிலுவைப்பாடு (305, 311, 314, 316, 318, 328, 340, 342, 375) சீறாப்புராணம் - மானுக்குப் பிணைநின்ற படலம் - (2053-2055, 2057, 2060, 2070, 2073, 2074, 2077, 2078, 2081, 2085, 2088-2091, 2096, 2099, 2012, 2116, 2120).

பாடநூல்கள்

1. ந.மு.வேங்கடசாமி நாட்டார் (ப.ஆ.) சிலப்பதிகாரம் மூலமும் உரையும், தஞ்சை பல்கலைக்கழக வெளியீடு, 1998
2. உ.வே.சாமிநாதையர், (ப.ஆ.) மணிமேகலை மூலமும் உரையும், உ.வே.சா நூல் நிலையம் சென்னை, 1981.
3. உ.வே.சாமிநாதையர், (ப.ஆ.) சீவக சிந்தாமணி மூலமும் உரையும், கழக வெளியீடு சென்னை, 1959.
4. வை.மு.கோ., உரை கம்பராமாயணம் - ஆரண்யகாண்டம் மூலமும் உரையும், உமா பதிப்பகம் சென்னை, 2006.
5. அ.மாணிக்கம், - பெரியபுராணம் - மூலமும் தெளிவுரையும், வர்த்தமானன் பதிப்பகம், சென்னை, 2010.
6. பொன்னு ஆ. சத்தியசாட்சி (உ.ஆ.) இரட்சண்ய யாத்திரிகம், கிறிஸ்தவ இலக்கியச் சங்கம், சென்னை, 1977.
7. ஹாஜி எம். முகம்மது யூசுப் (ப.ஆ.) சீறாப்புராணம், மாஹின் பிரின்டர்ஸ், சென்னை, 1999.

TAM 3626 இலக்கியக் கோட்பாடுகள் 6 Hrs / 6 Credits

நோக்கம்: பழந்தமிழ் இலக்கியக் கோட்பாடுகள் மற்றும் மேலை இலக்கியக் கோட்பாடுகளின் அடிப்படைகளை மாணவர்களுக்கு அறிமுகம் செய்து, அவற்றைத் தமிழ்ச் சூழலுக்குத் தக்கவாறு பயன்படுத்தும் திறனை வளர்த்தல் இப்பாடத்தின் நோக்கமாகும்.

அலகு1: விமரிசனம், திறனாய்வு, கொள்கை, கோட்பாடு ஆகிய கலைச் சொற்களின் அடிப்படை விளக்கங்கள். திறனாய்வின் நோக்கம் மற்றும் அணுகுமுறைகள். திறனாய்வாளருக்கான தகுதிகள். திறனாய்வாளர் செய்யக்கூடியன, செய்யக் கூடாதன.

அலகு2: தொல்காப்பிய இலக்கியக் கோட்பாடு – பொருளதிகாரம். அகம், புறம் வேறுபாடு. திணை, துறை விளக்கங்கள். முதற்பொருள், கருப்பொருள், உரிப்பொருள், களவு, கற்பு, கூற்று ஆகியன குறித்த விளக்கங்கள். மெய்ப்பாடு, உள்ளுறை, இறைச்சிக் கோட்பாடுகள் குறித்துத் தொல்காப்பியம் மற்றும் உரையாசிரியர்கள் தரும் விளக்கங்கள்.

அலகு3: திறனாய்வில் காணப்படும் பிரிவுகள் - ஒப்பீட்டு முறை, ரசனை முறை ஆகியன குறித்த அடிப்படைகள். திறனாய்வு அணுமுறைகளாக அறியப்படுபவை - சமுதாயவியல், வரலாற்றியல், உளவியல், உருவவியல், மார்க்சியம், விளிம்புநிலைக் கருத்தாடல் ஆகியன குறித்த அடிப்படை அறிமுகம்.

அலகு4: திறனாய்வில் மொழி பெறும் இடம் குறித்த கருத்துக்கள், சசூர் மற்றும் சார்லஸ் பியர்ஸ் ஆகிய இருவரின் சிந்தனைப் போக்குகள். அமைப்பியல் - மொழிக்குள் இயங்கும் அமைப்புக் குறித்து எழுந்த சிந்தனைகள், சிந்தனையாளர்கள். பின்னை அமைப்பியல் - சொல்லாடல் - பனுவல் குறித்து எழுந்த கொள்கைகள்.

அலகு5: கீழைத்தேயவியல் - மேலை – கீழை நாடுகள் என்கிற பகுப்பு. மொழி, பனுவல் ஆகியவை அதிகாரத்திற்கான சாதனங்களாக மாறியமை பற்றிய சிந்தனைகள்.

பார்வை நூல்கள்:

1. ஞானசம்பந்தன், அ. ச., *இலக்கியக் கலை*, தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை: 1993.
2. சுப்புரெட்டியார், ந., *அகத்திணைக் கொள்கைள்*, Selvi Mirunalini, Selvi AnuRatha Publication, Chennai: 1981.
3. சுப்புரெட்டியர். *தொல்காப்பியம் காட்டும் வாழ்க்கை*, பழனியப்பா பிரதர்ஸ், சென்னை: 1988.
4. தமிழண்ணல், *தொல்காப்பியரின் இலக்கியக் கொள்கைள் - பாகம் - 1*, மீனாட்சி புத்தக நிலையம், மதுரை: 2004.
5. தமிழண்ணல், *தொல்காப்பியரின் இலக்கியக் கொள்கைள் - பாகம் - 2*, செல்லப்பா பதிப்பகம், மதுரை: 2012.
6. நடராசன், தி. சு., *திறனாய்வுக் கலை: கொள்கைகளும் அணுகுமுறைகளும்*, NCBH, சென்னை: 2016.
7. நு.ஂமான், எம். ஏ., *திறனாய்வுக் கட்டுரைகள்*, அன்னம் வெளியீடு, சிவகங்கை: 1985.
8. நு.ஂமான், எம். ஏ., *மொழியும் இலக்கியமும்*, காலச்சுவடு, சென்னை: 2006.
9. ரகுநாதன், தொ. மு. சி., *இலக்கிய விமரிசனம்*, மீனாட்சி புத்தக நிலையம், மதுரை: 1980.
10. ரகுநாதன் தொ.மு.சி., *சமுதாய இலக்கியம்*, மீனாட்சி புத்தக நிலையம், மதுரை: 1980.
11. Barry, Peter, *Beginning Theory: An introduction to literary and cultural theory*, Third edition, Manchester University Press, Manchester and New York: 2009
12. Dobie, Ann B., *Theory into Practice: An introduction to literary criticism*, Wadsworth, USA: 2012.
13. Loomba, Ania, *Colonialism/Postcolonialism*, Second edition, Routledge, London and New York: 2005.
14. McLeod, John, *Beginning Postcolonialism*, Manchester University Press, Manchester and New York: 2000.

TAM3528 நாடகம் - அரங்கியற்கூறுகள் 5 Hrs./Cr.5

நோக்கம்: நாடகம் அடிப்படைக்கூறுகள் எனும் பாடத்தின் தொடர்ச்சியாக அமையும் இப்பாடம், நாடகம் தயாரிப்பதற்கான பயிற்சிகளைக் கற்று குறுநாடகங்களைத் தயாரிப்பதை நோக்கமாகக் கொள்ளும்.

அலகு1: நாடக விளையாட்டுகள் மூலம் நடிகனுக்கான பயிற்சிகள் - குரலின் சாத்தியப்பாடுகள் - பேச்சுப் பயிற்சியும் உரையாடல் வகைகளும்.

அலகு2: அரங்கப் பொருட்களைக் கையாள்தலும் மேடைத் தளத்தினைப் பயன்படுத்தலும்.

அலகு3: நாடகப்பிரதியைத் தேர்ந்தெடுத்தல் - வாசித்தல் - பாத்திரங்களுக்குப் பொருத்தமான நடிகர்களை முடிவு செய்தல் - ஒத்திகை.

அலகு4: ஒப்பனை, உடை வடிவமைப்பு ஒளி & ஒலி ஆகிய அரங்கியற்கூறுகளை தங்கள் நாடகத்திற்குப் பொருத்தமாகத் தேர்வு செய்தலும் பயன்படுத்தலும்.

அலகு5: அரங்கேற்றத்திற்கு முந்தைய தயாரிப்புகள் - நாடகக் கலைச் சொற்கள் - இறுதி அரங்கேற்றம்.

- இப்பாடத்தின் அகமதிப்பீட்டுத் தேர்வுகள் அனைத்தும் , தனிநபர் மற்றும் குழுவாக நிகழ்த்தும் செய்முறைப் பயிற்சிகளாக அமையும் . இறுதிப் புறமதிப்பீட்டுத் தேர்வு மாணவர்களின் குறு நாடகத் தயாரிப்பாக அமையும்.

துணைநூல்கள்

1. அம்ஷன் குமார்: மனசில் படிஞ்ச காலடிச் சுவடுகள், 1990.
2. ஸ்தானிஸ்லாவ்ஸ்கி, ஒரு நடிகன் உருவாகிறான், கண்ணதாசன் பதிப்பகம், 2010.
3. எஸ்.பி. ஸ்ரீனிவாசன், நாடகக் கலையில் வண்ண அலைகள், லலிதாம்பிகா பதிப்பகம், 2004.
4. அஸ்வகோஷ், அரங்க ஆட்டம், மங்கை பதிப்பகம், 2015.

TAM 3210 தமிழ்ச் சமுதாய வரலாறு 3 Hrs./Cr.2

நோக்கம் : தமிழக வரலாற்றுப் போக்கில் முக்கியத்துவம் வாய்ந்தனவாக கருதப் பெறும் சமூக நிகழ்வுகளையும் எண்ணங்களையும் அறிவதோடு, அவற்றால் சமூகத்தில் ஏற்பட்ட வளர்ச்சிப் படிநிலைகளை அறிவது இப்பாடத்தின் நோக்கமாகும்.

அலகு1: மனித இனத்தோற்றம் - பழைய புதிய கற்காலங்கள் - இனக்குழு வாழ்வு - விவசாய உருவாக்கம் - வாய்மொழி, எழுத்து, இலக்கியம்.

அலகு2: சங்க காலம் - அற இலக்கியங்களின் தேவை - இயற்கை, உருவ, தத்துவ வழிபாடுகள் - பக்தி இலக்கியங்கள் - சமண, பௌத்த மரபுகள் - வைதீக மரபுகள் ஆகியவற்றிடையேயான சமயக் கலப்பு.

அலகு3: அரசுருவாக்கம் - களப்பிரர்கள் - பல்லவர் காலம் - சோழர் காலம் - நாயக்கர் காலம் - இத்தகைய அரசுகளின் ஊடாக மாறிவந்த நிலவுடைமை உள்ளிட்ட சமூகப் போக்குகள்.

அலகு4: ஐரோப்பியர் வருகை - அரசின் வடிவ மாற்றம் - நவீன கல்வி - சட்டங்கள் - சீர்திருத்தக் கண்ணோட்டங்கள் - இலக்கியங்கள் அச்சேறல் - தமிழ் அடையாள உருவாக்கம்.

அலகு5: 20-ஆம் நூற்றாண்டு தமிழக அரசியல், பண்பாட்டுப் போக்குகள் - இதழ்கள் - இலக்கிய இயக்கங்களின் வருகை - இந்தியச் சுதந்திரம் - மக்களாட்சிமுறை - இட ஒதுக்கீடு - மக்களாட்சி முறைமையில் தமிழ் அடையாளங்கள்.

பாட நூல்கள்

1. தங்கவேலு. கோ, தாய் நில வரலாறு - 1, 2, தமிழ்மண் பதிப்பகம், 2001.

பார்வை நூல்கள்

1) சுப்பிரமணியன். கா, சங்ககாலச் சமுதாயம், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 1998.
2) கைலாசபதி. க, பண்டைத்தமிழர் வாழ்வும் வழிபாடும், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 1996.
3) சிவத்தம்பி. கா, சங்ககாலம், ஒரு புரிதலை நோக்கி. நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 2002.
4) வேலுப்பிள்ளை. ஆ, தமிழிலக்கியத்தில் காலமும் கருத்தும், குமரன் பதிப்பகம், சென்னை - 1998.
5) வேங்கடசாமி. சீனி. மயிலை, களப்பிரர் ஆட்சியில் தமிழகம் . நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2004.
6) தங்கவேலு. கோ, தமிழகப் பண்பாட்டு வரலாறு - 1, 2, தமிழ்மண் பதிப்பகம், 2001.
7) நீலகண்ட சாஸ்திரி. கே.ஏ., சோழர் காலம், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2005.
8) செல்லம். வி.டி., தமிழக வரலாறும் மக்களும் பண்பாடும், மணிவாசகர் பதிப்பகம், சென்னை, 1990.
9) வேங்கடசாமி. சீனி. மயிலை, பத்தொன்பதாம் நூற்றாண்டுத் தமிழிலக்கியம், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2005.
10) வேங்கடசாமி. சீனி. மயிலை, கிறித்தவமும் தமிழும் . நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2005.
11) மீனாட்சி சுந்தரம்.கா, ஐரோப்பியர் ஆற்றிய தமிழ்ப்பணிகள், சென்னைப் பல்கலைக்கழக வெளியீடு, 1998.
12) கனகசபை. வெ (அப்பாதுரையார் மொழிபெயர்ப்பு), 1800 ஆண்டுகளுக்கு முற்பட்ட தமிழகம், பூம்புகார் பதிப்பகம், சென்னை, 2011.

TAM3200 **சுற்றுச்சூழலும் தமிழ் இலக்கியமும்** **4Hrs/cr.2**

நோக்கம்: சுற்றுப்புறச் சூழலியலை அறிமுகப்படுத்தி, அதன் அடிப்படைகளைப் பன்முகக் கோட்பாடுகள் மற்றும் பல்வேறு இலக்கியப் பதிவுகளின் வழியாக விளங்கிக் கொள்ளல் இப்பாடத்தின் நோக்கமாகும்.

அலகு1: சுற்றுச்சூழல் அறிமுகம். சூழலியல் விளக்கம் - வரையறை - சூழலியலின் தோற்றம் - வளர்ச்சி - பரவல் - சூழலியலின் பிரிவுகள் - சூழல் கூட்டமைப்பு - சூழல் மாசுபாடு (காற்று, நீர், மண், கடல், ஒலி, அணுக்கதிர், திடக்கழிவு) - சமூகப் பிரச்சினைகளும் சுற்றுச்சூழல் பாதுகாப்புச் சட்டம் - சுற்றுப்புறச்சூழல் கல்வியின் அவசியம்.

அலகு2: தமிழரின் சுற்றுப்புறச் சூழல் சிந்தனைகள், தொல்காப்பியரின் நிலம், திணை பற்றிய கருத்துகள் - சங்க இலக்கியம்: அக, புறப்பாடல்களில் சூழலியல் வெளிப்பாடு - குறுந்தொகை: 317,355, புறநானூறு :109,237., - நீதி இலக்கியம்: திருக்குறள்: 14, 15,16,17., காப்பியம்: சிலம்பு: மங்கல வாழ்த்துப் பாடல் (1-25),. பக்தி இலக்கியம்: திருஞானசம்பந்தர் - 'கடல்முயங்குகழி' – சிற்றிலக்கியம்: பள்ளு: வித்து வகை, ஏர்க்கால்கள்.

அலகு3: தற்காலத் தமிழிலக்கியங்களில் சுற்றுப்புறச் சூழலியலின் தாக்கம், தற்காலத் தமிழிலக்கியங்களில் இழையோடுகிற சுற்றுச்சூழலியல் குறித்தான பல்வேறு கருத்தாக்கங்கள்:

I. புதுக்கவிதை: வைகைச் செல்வி (தொ.ஆ.) - நிற்பதுவே நடப்பதுவே பறப்பதுவே, 2. ஈரோடு தமிழன்பன் - காவேரியைக் காப்போம், 3. க்ருஷாங்கினி- விதைநீர்க்கொலை, 4.தேவேந்திரபூபதி- மாசு., 5.வைரமுத்து - ஓசோன், 6.இரா.மீனாட்சி - தோல்மாற்று, 7.ஞானக்கூத்தன் - அறியாமல் இறந்தமரம், 8.பாட்டாளி - ஈரப்பதம், 9.அறிவுமதி - குறுங்கவிதை, 10.பழனிபாரதி - பிளாஸ்டிக் கவிதை, 12. கே.ரவிச்சந்திரன் - பிளாஸ்டிக்பை, 13.நீலமணி - கடலைத் திருடியவர்கள்.

II. சிறுகதை: 1.சு.வேணுகோபால் - உயிர்ச்சுனை, 2. சோ.தர்மன் - சோகவனம்.

III. கட்டுரை இலக்கியம்: 1.தியோடர் பாஸ்கரன் - சோலை எனும் வாழிடம், 2. சுப்பிரபாரதி மணியன் - கானுயிர்.

அலகு4: சூழலியலும் பன்முகக் கோட்பாட்டு ஆக்கங்களும் மார்க்சியச் சூழலியல் அறிமுகம் - தொல்சமூகங்களில் சூழலியல் சிக்கல்கள் - காலநிலை மாற்றத்திற்கும் முதலாளித்துவ உற்பத்தி முறைக்குமான தொடர்பு.

சூழலியல் பெண்ணியம் அறிமுகம் - இயற்கைக்கு எதிரானவையாகவுள்ள தொழில் நுட்பத்தின் மீது சூழல் பெண்ணியம் ஆற்றுகின்ற எதிர்வினை.

அலகு5: சுற்றுச்சூழலியல் மேம்பாடும் கலைகளின் பங்களிப்பும், திரைப்படம்: காக்காமுட்டை, ஹோம் - நாட்டுப்புறக்கலைகள்: - பெண்ணுக்கும் இயற்கைக்குமான உறவு, முளைப்பாரிச் சடங்கு(மழை நடனம்), ஆகியவற்றில் சூழலியல் சிந்தனைகள் பதிவுற்றுள்ள விதங்களை அடையாளம் காணுதல்.

பார்வைநூல்கள்:

1. தங்கமணி, 'சுற்றுச்சூழலியல்'.,பிரணங் சிண்டிகேட் பதிப்பகம், சிவகாசி, 2003.
2. சுசீலா அப்பாத்துரை, 'சுற்றுச்சூழல் கல்வி' நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. 2013,
3. மங்கையர்க்கரசி, சிவ., 'சூழலியல் தமிழ்' உமா பதிப்பகம், சென்னை, 2004.
4. மகிழேந்தி, சுற்றுச்சூழலியல் நோக்கில் சங்கத் தமிழகம், தி பார்க்கர், சென்னை, 2003,
5. அருண் நெடுஞ்செழியன், 'மார்க்சிய சூழலியல் -ஓர் ஆய்வு' பூவுலகின் நண்பர்கள், சென்னை, 2013.
6. கமலக்கண்ணன், (ப.ஆ.), 'நவீன இலக்கியக் கோட்பாட்டு நோக்கில் செவ்வியல் இலக்கியங்கள், ஈரோடு, 2014.
7. தனஞ்செயன்.ஆ., 'பண்பாட்டுச் சூழலியல்'. நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2010.

DEPARTMENT OF HINDI

Syllabus For UG Programme Under Part-I (Aided)
(Academic Year 2017-Onwards)

Objectives:

- To make the students proficient in Hindi language.
- To help them invest knowledge of Hindi in their career.
- To develop their communication skills.
- To enhance their ability in speaking, reading and writing Hindi.
- To acquire good pronunciation and to speak fluently.

Course structure: Prose, grammar, applied grammar, Official Correspondence, History of Hindi Literature, Short stories, Drama and Poetics
No of Papers: One per Semester
No of Lectures: One hour per day; Three hours per week.

Language Courses offered Under Part-I
(For 2017- onwards)

Sem	Part	Code	Course Title	Hr/wk	Credit	Marks
1	I	HIS1203	हिन्दी गद्य और व्याकरण Hindi Prose & Grammar	3	2	30
2	I	HIS1204	कार्यालय हिन्दी और अनुवाद Official Hindi and Translation	3	2	30
3	I	HIS2201	हिन्दी साहित्य का इतिहास Hindi Literature	3	2	30
4	I	HIS2202	लघुकथा, नाटक और काव्यशास्त्र Short stories, Drama and Poetics	3	2	30
			Total	**12**	**8**	**120**

Eligibility: This course is open to all students who have interested in learn Hindi.

Evaluation Pattern

Ratio of Marks awarded:

Internal: 100 Marks
Test-1(30 Marks) + Quiz-1(10 Marks) +Assignment-1(10 Marks) =50Marks
Test-2(30 Marks) + Quiz-2(10 Marks) +Assignment-2(10 Marks) =50Marks
Duration of the Internal Test: 1 Hour.
External: 60 Marks
Duration of External Examination: 2 Hours.
Total Marks: Internal + External.

- Two Academic years/Four semesters
- The course curriculum is divided into 3 Modules.
- Each Module for 15 Hours classroom teaching.

HIN 1203 **हिन्दी गद्य और व्याकरण** **3Hrs/2Crs**

Hindi Prose & Grammar

Objectives:

- To make the students learn from words to sentences.
- To impart Basic Hindi Grammar Knowledge.
- The course aims at helping the students converse in Hindi.
- It provides the learners in with conversations so that they can fluently use Hindi.

इकाई -1 : गद्य(Prose)

लोभ– आचार्य महावीर प्रसाद दिवेदी

हार की जीत - सुदर्शन

अब्दुल कलाम

इकाई -2 : बोलचाल हिन्दी (Bhol chal Hindi)

शरीर के अंग

फल

तरकारीयाँ

सप्ताह के नाम

महिनों का नाम

इकाई -3 : व्याकरण (Grammar)

लिंग

वचन

गिनती

काल

इकाई -4: संवाद लेखन (Dialog writing)

कक्षा में (In the class)

बाजार में (In the market)

आस्पताल में (In the Hospital)

बैंक में (In the Bank)

इकाई -5 गंद्यांश (Comprehension)

भाग - 1 किताब से पाँच अभ्यास (From Translation Book Part _ I)

References :

1 VyakaranPradeep, Ram Dev, Logbharati Publication, Allahabad, 2008
2 Naveen Gadya Chayanika-1, Dhakshin Bharat Hindi Prachar Sabha, Chennai, 2009
3 Kavya Kusum-2, Dhakshin Bharat Hindi Prachar Sabha, Chennai, 2009
4 Hindi Vatayan Dr. K.M. Chandramohan V.V. Prakashan, Varanasi, 2011
5 Hindi Vatayan Dr. K.M. Chandramohan V.V. Prakashan,Varanasi, 2010.
6 Naveen Gadya Chayanika-1, Dhakshin Bharat Hindi Prachar Sabha, Chennai.2013.

HIN 1204 कार्यालय हिन्दी और अनुवाद 3Hrs/2Crs

Official Hindi and Translation

Objectives:

- Make the students practice the sentences through spoken Hindi.
- The course aims to provide students to write letter promptly.
- Develop their ideas in written forms.
- To make them know about the importance of Terminology.
- The students shall be able to understand the purpose Terminology.

इकाई 1: वाक्य रचना (Sentence making)

शब्द - बनावट के अनुसार, आकार के अनुसार

उच्चारण के नियम

सम्युक्ताक्षर

वाक्य

इकाई 2 : व्याकरण (Grammar)

संज्ञा

सर्वनाम

विशेषण

क्रिया विशेषण

इकाई 3: पत्र लेखन (Letter Writing)

मित्र को पत्र

आदेश पत्र

छुट्टी पत्र

इकाई 4: पारिभाषिक शब्दावली (TECHNICAL TERMS)

तकनीकि शब्दावली

मंत्रालयों का नाम

सरकारी कार्यालयों का नाम

इकाई 5: अनुवाद (Translation)

भाग - 2 किताब से पाँच अभ्यास

References :

1 Vyakaran Pradeep, Ram Dev.logbharati publication, Allahabad,2008
2 Hindi Vatayan Dr. K.M. Chandramohan, V.V. Prakashan, Varanasi.2011
3 Hindi AnuvadhAbhyas Part-1Dhakshin Bharat Hindi PracharSabha chennai.2008

HIN 2201 हिन्दी साहित्य का इतिहास 3Hrs/2Crs

Hindi Literature

Objectives:

- To make the students appreciate the history of Hindi literature.
- To develop their art of writing essays.
- To enhance the students to know literature.
- The students shall be able to understand the purpose of literature.

इकाई 1: आदि काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Aathi Kaal)

इकाई 2: भक्ति काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Bakthi Kaal)

इकाई 3: रीतिकाल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Reethi Kaal)

इकाई 4: आधुनिक काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ(Adhunik kaal)

इकाई 5: संक्षिप्तकरण (Precis Writing)

References :

1 Hindi Sahithya ka Saral Itihas, Rajnath Sharma.Vinod Pushtak Mandir Agra.2009.
2 Shivanee Books, Ansari Road, Dariyaganj, New Delhi.2008.
3 Hindi sahithya ka vasthunist Ithihas, kusum Rai, vesvavidyalaya prakashan, Varanasi - 2011

HIN 2202 लघुकथा, नाटक, और काव्यशास्त्र 3Hrs/2Crs

Short stories, Drama and Poetics

Objective:

- To have an idea of poetic words.
- To promote the students to express their understanding and writing skill.
- To develop the reading, spoken and writing skills in Hindi.
- Create the poem writing skills.

इकाई 1: प्राचिन काव्य **(Ancient Poem)**

कबिर के दोहे -5

तुलसी के दोहे -5

इकाई 2: लघुकथा (Short Stories)

वापसी - उषा प्रियंवता

कफ़न - प्रेमचन्द

पुरस्कार - जयशंकर प्रसाद

जीफ की दावत - भीष्म साहनी

इकाई 3: नाटक (Drama)

स्वर्ग की झलक

इकाई 4: आधुनिक कविता (Modern Poem)

पुष्प की अभिलाषा - माखनलाल चतुर्वेती

खिलौना - सियाराम शरण गुप्त

राजा रानी - दिनकर

सन्धया सुन्दरी - निराला

इकाई 5:काव्य शास्त्र (Poetics) - रस, छंद, अलंकार

References :

1 Hindi Sahityaka Saral Ithihas, Rajnath Sharma, Vinod Pushtak Mandir, Agra.2010
2 Kavya Prakasan, Purushottam Das Modi. V.V. Prakashan, Chowk, Varanasi.2009
3 Hindi Vatayan Dr. K.M. Chandramoh, V.V. Prakashan, Varanasi.2008
4 Bharathiya kavya sasthra, Dr. Udhaya banu, Thathabi prakashan, Dehli. 2009.
5 kavya sasthra, Dakshini Bharat Hindi Prachar sabha Chennai, 2014

DEPARTMENT OF FRENCH (UG)
French – Part - I
Study plan for UG students (Aided) (2017 batch onwards)
Courses offered for UG Programme under Part I

Semester	Category	Code	Course Title	Hr/ wk	Cr.	Marks
I	**Part I**	FRE 1203	**General French - I**	**3**	**2**	**30**
II	**Part I**	FRE 1204	**General French - II**	**3**	**2**	**30**

EVALUATION PATTERN

Distribution of Marks for both I semester & II Semester

Internal = 20 + 60 + 20 = 100
External = 60 (Duration of Examination: 2 Hrs)

Section A:	Comprehension	10 Marks
	Translation (English to French)	5 Marks
	Dialogue	5 Marks
Section B:	Grammar exercises	25 Marks
Section C:	Civilization	15 Marks
		---
		60 Marks

FRE 1203 GENERAL FRENCH – I 3hr / wk: 2cr

This course aims to develop the students' proficiency in the four basic skills of listening, speaking, reading and writing French, with equal thrust on vocabulary building and cultural awareness.

Objectives:

Upon successful completion of this course the students will be able to

i. Acquire the four basic language skills of speaking, reading, writing and listening.
ii. Become familiar with the sound pattern of French Language
iii. Improve their vocabulary and grammar skills by understanding the structures of the language
iv. Appreciate the beauty of the language learning to speak and write with fluency and accuracy in every day situation.
v. Have an exposure to French culture and the society.

Unit I	Bonjour : Saluer - Épeler en français - Se présenter- La Francophonie
Unit II	Bonne journée : Demander et dire l'identité - Fiche d'inscription
Unit III	Bon weekend : Parler de ses goûts - Décrire quelqu'un - Une famille française
Unit IV	Bonne fête : Prendre rendez-vous - Donner des conseils - se situer -localiser- Les fêtes françaises
Unit V	Bon appétit : Situations pratiques au restaurant - Les repas français

Manual:

A. Chinnadurai Pandian, B. Vijaya, G. Victor Packiyaraj, A. Josephine Dheena, S. Sountharya, **Les Bons Pas**, Department of French, The American College, Madurai, 2017.

Grammar book for reference :

1. Évelyne SIRÉJOLS, Giovanna TEMPESTA, *Grammaire 450 nouveau exercices*. (niveau débutant), CLE International, 2012.

Dictionaries:

1. Bilingual: **The Concise Oxford-Hachette French Dictionary**
2. Monolingual French: **Le Petit Robert**.

FRE 1204 GENERAL FRENCH –II 3hr / wk: 2cr

This course aims to develop communicative competence of the students in French, to create cultural awareness, to promote autonomy in learning French

Objectives:

Upon successful completion of the course, the students will be able to

i. Enhance their linguistic skills by a deeper understanding of the language structure and the vocabulary.
ii. Apply the language skills on a range of everyday situations.
iii. Understand routine information and get a grasp of the practical life in France.
iv. Get an insight into the cultural background of France
v. Understand the difference between formal and informal writing using appropriate format

Unit I	Bonne soirée : Proposer une sortie - Accepter, refuser la proposition – Le divertissement – Jeu de rôle
Unit II	Bons achats: Faire les courses - Demander le prix – Commander - Payer- Les grands magasins, Raconter un souvenir – Conversation.
Unit III	Bon voyage : Réserver des billets - Demander des renseignements - Les villes importantes en France, Raconter au passé (Expression écrite)
Unit IV	Bon courage : Raconter la vie quotidienne – Les jeux et les sports – Expression orale
Unit V	Bonne chance : Le système de l'éducation, Parler de ses études.

Manual:
A. Chinnadurai Pandian, B. Vijaya, G. Victor Packiyaraj, A. Josephine Dheena, S. Sountharya, **Les Bons Pas**, Department of French, The American College, Madurai, 2017.

Grammar book for reference :

1. Évelyne SIRÉJOLS, Giovanna TEMPESTA, *Grammaire 450 nouveau exercices*. (niveau débutant), CLE International, 2012.

Dictionaries:

1. Bilingual: **The Concise Oxford-Hachette French Dictionary**
2. Monolingual French: **Le Petit Robert**.

Undergraduate Department of English (UG) Aided

Proposed Curriculum for Semesters V & VI for students admitted from 2015 – 2016 onwards

Sem.	Part		Code	Title	Hr/ Wk	Cr.	Marks
I	Part I		TAM/FRE/HIN		3	2	30
	Part II		ENG 1201	Conversational Skills	3	2	30
	Part III Major	Core	ENG 1461	Prose I:	4	4	60
			ENG 1463	Short Story	4	4	60
			ENG 1565	One Act Play	5	5	75
		Supportive	ENG 1467	Literary Terms and Forms	5	4	60
	Part IV	Non-Maj. Elect.	TAM / ENG 1221	Basic Tamil / Advance Tamil / Film Appreciation	3	2	30
		Life Skill I	ENG 1223 ENG 1225	Word Power/ Pronunciation Skills	3	2	30
				Total	**30**	**25**	**375**
II	**Part I**		**TAM/FRE/HIN**		3	2	30
	Part II		ENG 1202	Reading & Writing Skills	3	2	30
	Part III Major	Core	ENG 1562	Poetry I: Chaucer to Arnold	5	5	75
			ENG 1464	Fiction I:	4	4	60
			ENG 1466	Drama I: Elizabethan to Augustan	4	4	60
		Supportive	ENG 1468	History of English Literature	5	4	60
	Part IV	Non-Maj. Elect.	TAM / ENG 1222	Basic Tamil / Advance Tamil / Science Fiction	3	2	30
		Life Skill II	ENG 1224	Spoken English	3	2	30
	Part V	Extension	XXX 0000	Extension Activity (PED/NSS/NCC/SLP)	2	1	
				Total	**30+2**	**25+1**	**375**
III	**Part I**		**TAM/FRE/HIN**		3	2	30
	Part II		ENG 2201	Study Skills	3	2	30
	Part III Major	Core	ENG 2561	Indian Literature in English	5	5	75
			ENG 2563	Poetry II: Modern English Poetry	5	5	75
			ENG 2565	Drama II: Modern British Drama	5	5	75
			ENG 2477	Fiction II:	4	4	60
		Supportive	ENG 2469	Critical Reading & Writing	5	4	60
			Total		**30**	**27**	**405**

Sem.	Part		Code	Title	Hr/ Wk	Cr.	Marks
IV	**Part I**		**TAM/FRE/HIN**		3	2	30
	Part II		ENG 2202	Career Skills	3	2	30
	Part III Major	Core	ENG 2562	American Literature	5	5	75
			ENG 2564	Translation	5	5	75
			ENG 2566	Prose II:	4	4	60
		Innovative	ENG 2568	21st Century Bookers	5	5	75
		Supportive	ENG 2470	Modern Grammar & Usage	5	4	60
	Part V	Extension		Extension Activity (NSS/NCC/SLP)	2	1	
				Total	**30+2**	**27+1**	**405**
V	III	Core	ENG 3671	New Literatures in English	6	6	90
			ENG 3673	Criticism and Approaches	6	6	90
			ENG 3675	Fiction III: Modern British Fiction	6	6	90
		Innovative	ENG 3577	English for Media	5	5	75
	IV	Life Skill III	ENG 3279	Creative Writing in English	3	2	30
	IV	VAL	XXX xxxx	Value Education	4	2	30
				Total	**30**	**27**	**405**
VI	III	Core	ENG 3672	Introduction to Modern Linguistics	6	6	90
			ENG 3674	Contemporary English Literature	6	6	90
			ENG 3676	English Language Education	6	6	90
		Innovative	ENG 3578	Contemporary Tamil Fiction in Translation	5	5	75
	IV	*EVS*	ENG 3200	Environmental Studies	4	2	30
	IV	*Life Skill IV*	ENG 3280	English for Placement	3	2	30
				Total	**30**	**27**	**405**
				Grand Total for semesters I-VI	**180+4**	**158+2**	**2370**

Life Skills Courses

SEM	Course No	Course Title	Hrs/Wk	Cr	Marks
I	ENG 1223	Word Power/Pronunciation Skills	3	2	30
II	ENG 1224	Spoken English	3	2	30
V	ENG 3279	Creative Writing in English	3	2	30
VI	ENG 3280	English for Placement	3	2	30
Total			**12**	**8**	**120**

Non-Major Electives

SEM	Course No	Course Title	Hrs/Wk	Cr	Marks
I	ENG 1221	Film Appreciation	3	2	30
II	ENG 1222	Science Fiction	3	2	30
Total			**6**	**4**	**60**

Self-Supportive Courses

Sem	**Code**	**Title**	**Hrs**	**Cr**	**Marks**
I	ENG 1467	Literary Terms & Forms	5	4	60
II	ENG 1468	History of English Literature	5	4	60
III	ENG 2469	Critical Reading & Writing	5	4	60
IV	ENG 2470	Modern Grammar & Usage	5	4	60
Total			**20**	**16**	**240**

Proposed Changes in the Nomenclature of titles of Courses in V & VI Semesters in the Grid

S.No	**Approved**		**Proposed**	
	Course No	**Title**	**Course No**	**Title**
1	ENG 3279	Creative Writing	ENG 3279	Creative Writing in English
2	ENG 3557	English and Media	ENG 3557	English for Media
3	ENG 3675	Fiction:	ENG 3675	Fiction III: Modern British Fiction
4	ENG 3578	Film and Literature	ENG 3578	Contemporary Tamil Fiction in Translation
5	ENG 3673	Literary Criticism	ENG 3673	Criticism and Approaches
6	ENG 3280	English for Competitive Exams	ENG 3280	English for Placement

Internal and External Evaluation Pattern

1. **Poetry & Drama**
    i. Annotation with three specific questions: 4/7x5 (1+2+2) = 20
    ii. Paragraph 5/7x6=30
    iii. Essay 5/7x10=50
2. **Prose & Fiction, Linguistics, Survey, Literary Forms & Terms, ELE, Criticism**
    i. Short Answer Questions 10x2 = 20 OR Multiple Choice
    ii. Paragraph 5/7x6=30
    iii. Essay 5/7x10=50
3. **Three hour courses of two hour exam duration**
    i. Short answer questions 10x2=20
    ii. Paragraph 2/3x5=10
    iii. Essay 3/5x10=30
4. **Conversational Skills, Spoken English, Pronunciation Skills**
    100% Oral
5. **Word Power & English for Competitive Exams**
    Different types of objective questions such as match-the-following, mcq, fill-in-the-blanks, rewrite-the-following…
6. **Creative Writing**
    Questions on application and creativity can be asked.
7. **National Literatures**
    i. Annotations from poetry & drama with three specific questions: 4/7x5 (1+2+2) = 20
    ii. Short answer questions from Prose & fiction 10x2 = 20
    iii. Paragraph 4/7x5=20
    iv. Essay 4/7x10=40

Internal and External Examiners are expected to set both objective and descriptive questions that test students' knowledge, comprehension, application, analysis, evaluation, and creativity.

ENG 3671 **New Literatures in English (NLE)** **6Hr./6Cr.**

This course will introduce students to the literatures in English which have emerged outside the Anglo-American world. It will focus on the literatures produced in nations that have undergone the experience of colonialism, particularly the literatures from the ex-colonies of Britain. A diverse selection of texts- poetry, fiction and drama- will initiate students to critically engage with the issues of political decolonization and the contemporary socio-cultural concerns affecting these nations.

At the end of this course students shall be able

i. to understand and problematize the historical forces of imperialism and colonialism, and their positive/negative impact on the erstwhile colonies
ii. to recognize and analyze the major themes reflected in these literature
iii. to identify the literary influences of writers and literary techniques employed in the texts
iv. to acquire critical vocabulary needed for the analysis of postcolonial texts
v. to do close reading of texts

Unit-I: **Introduction**

Background and Key Concepts-Colony, Imperialism, Colonialism, Postcolonial, Settler Colony, Invaded Colony, Decolonization, Centre and Margin, Orient and Occident, Eurocentric, Race/Racism and Ethnicity, Apartheid, Hybridity, indigeneity, Aborigine, Creole, Negritude, Diaspora, Immigration, Neo-Colonialism. Definition and scope of the labels- Commonwealth Literature, Third World Literature, Postcolonial Literature, New literatures in English

Unit –II **Invaded Colonies (i) - Africa**

Chinua Achebe - "The Nature of the Individual and His Fulfillment"
Chinua Achebe - Things *Fall Apart*
Wole Soyinka - *The Lion and the Jewel*
Nadine Gordimer - "Six Feet of the Country"

Unit- III **Invaded Colonies (ii)- Caribbean/South &South East Asia**

Derek Walcott - "A Far Cry From Africa"
Edward Braithwaite - "Limbo"
Sam Selvon - "Johnson and Cascadura"
Alistair Clarke - "Griff"
Sadat Haasan Manto - "Toba Tek Singh
Zulfikar Ghose - "The Savage Mother of Desire"
Romesh Gunasekera - "Road Kill"
Shirley Geok-Lin Lim- "Shame"

Unit – IV **Settler Colonies (i)- Australia/ New Zealand**

Patrick White - "The Prodigal Son"
Judith Wright - "At Cooloolah"
A.D. Hope - "The Wandering Islands"
David Malouf - "The Only Speaker of His tongue"
Witi Ihimaera - "The Life is Weary"

Unit – V **Settler Colony (ii) - Canada**

A.M. Klein	- "Indian Reservation: Caughnawagha"
Margaret Atwood	- "True Trash"
Alice Munro	- "The Love of a Good Woman"
Alstair MacLeod	- "As Birds Bring Forth the Sun"
Thomas King	- "The One About Coyote Going West"

`Self-Study

Chinua Achebe	- "The Nature of the Individual and His Fulfillment"
Patrick white	- "The Prodigal Son"

References:

Ashcroft, Bill, Gareth Griffiths and Helen Tiffin. *Postcolonial Studies: The Key Concepts*, 3rd Edn. London and New York: Routledge, 2013

King, Bruce *The Internationalization of English Literature*, Vol.13 1948-2000. Oxford: OUP, 2004

King, Bruce (Ed.) *New national and Post-Colonial Literatures: An Introduction*. Oxford: Clarendon Press, 1996.

Narasimhaiah, C.D. (Ed.). *Essays in Commonwealth Literature: Hierloom of Multiple Heritage*. Delhi: Pencraft International, 1995.

Walsh, William. *Commonwealth Literature*. London: OUP, 1973

ENG 3673 **Criticism and Approaches (CA)** **6 Hrs./6 Cr.**

This course aims at familiarizing students with literary criticism helping them to identify a prescriptive grammar for literary works based on the expressed opinions of author-critics starting from Plato up to T.S. Eliot. This course further deals with some critical approaches and their application to literary texts.

Objectives

At the end of the course the students will be able to

i. critically view literary artifacts with the help of concepts offered by Classical and Renaissance thinkers.
ii. acknowledge restraint as a virtue under Neoclassicism and reason giving way to emotion under Romanticism
iii. apply 'high seriousness' and disinterestedness as guiding principles in appreciating literature as during Victorian and Modern periods
iv. analyse psychologically works of art through Freud's theories
v. appreciate myths and archetypes while reading literary works through Jungian principles

Unit 1: **Classical & Renaissance Criticism**
Plato, Aristotle, Sidney, Ben Jonson

Unit 2: **Neo-Classical & Romantic Criticism**
John Dryden, Samuel Johnson, William Wordsworth and S.T. Coleridge

Unit 3: **Victorian & Modern Criticism**
Mathew Arnold & T.S.Eliot

Unit 4: **Psychological approach**
Uses, abuses and misunderstandings of the psychological approach and Freud's theories
Application: Hamlet: The Oedipus complex; "Young Goodman Brown": Id vs. superego

Unit 5: **Mythological and archetypal approaches**
Images, archetypal motifs or patterns, and archetypes as genres
Application: Jungian shadow, persona, and anima in "Young Goodman Brown"; myth criticism and the American Dream: Huckleberry Finn as the American Adam

Self Study

Touchstone Method: Excerpts from Dante's *The Divine Comedy*
Objective Correlative: Shakespeare's *Macbeth*

Recommended Texts

Enright, D.J. and Ernst De Chickera. (eds.). English Critical Texts. Delhi: OUP, 2005.
Habib, M.A.R. A History of Literary Criticism. Oxford: Blackwell, 2006.
Guerin, Wilfred L. et al. A Handbook of Critical Approaches to Literature. Delhi: OUP, 1999.

References

Bloom, Harold. The Western Canon: The Books and School of the Ages. London: Papermac, 1995.
Drabble, Margaret (ed.). The Oxford Companion to English Literature. Oxford: OUP, 1995.
Macey, David. The Penguin Dictionary of Critical Theory. London: Penguin, 2001.
Rollason, Christopher and Rajeshwar Mittapalli (ed.). Modern Criticism. New Delhi: Atlantic Publishers, 2002.
Wolfreys, Julian (ed.). Introducing Literary Theories: A Guide and Glossary. New Delhi: Atlantic Publishers, 2005.

ENG 3675 **Fiction III: Modern British Fiction (MBF)** **6Hr./6Cr.**

This course aims to introduce students to the development of the novel from the late 19th century to the middle of the 20th century through an in-depth study of select novels by prominent writers of that time. It will explore the ways in which the modernist writing broke away from the earlier literary models of the Victorian Realist Fiction. Through the prescribed texts students will learn to problematize the concepts, modernism and modernity and analyze the 'dis-contents' of modern man and woman depicted in them.

At the end of the course the students shall be able

i. to understand how the context of early 20th century shaped the literary texts
ii. to define main trends and avant-garde movements in the 20th century: Symbolism, impressionism, Cubism, Dadaism, Surrealism, Expressionism
iii. to identify themes such as fragmentation, alienation, gender and sexuality, empire, war, art and problem of perception, human psyche, the double, the nature of evil
iv. to analyze the texts and understand the modernist techniques in the narratives
v. to develop critical thinking and close reading of texts

Unit- I	**Naturalism and Realism**	
	Thomas Hardy	*Far From the Madding Crowd* (1874)
Unit – II	**Quest/Colonial Literature**	
	Joseph Conrad	*Heart of Darkness* (1899)
Unit – III	**Autobiographical/Psychological**	
	D.H. Lawrence	*Sons and Lovers* (1913)
Unit- IV	**Stream of Consciousness**	
	Virginia Woolf	*Mrs. Dalloway* (1925)
Unit – V	**Political Satire/Allegory/Fable**	
	George Orwell	*Animal Farm* (1945)
Self-Study		
	Thomas Hardy	*Far From the Madding Crowd* -

References:

Bradbury, M. *The Modern British Novel 1878-2001*. London: Penguin Books, 2001.

Hewitt, Douglas. *English Fiction of the Early Modern Period 1890-1940*. New York: Longman, 1988.

Stevenson, Randall. *The British Novel Since the Thirties: An Introduction*. Great Britain: University of Georgia Press, 1986.

ENG 3577 **English for Media** **3 Hrs./2 Cr.**

(EM)

This innovative course aims at developing the students' ability to use the English language for different forms of Media. This course introduces the key concepts in Language and Media.

Objectives

At the end of the course, students will be able to

i. understand and identify the concept and types of mass communication
ii. become familiar with the key concepts in language and media
iii. appreciate media language
iv. analyze the media language
v. engage themselves in media reading.

Unit 1: Introduction to Communication and its Types

Personal Conversation, Group Discussion, Mass Communication, Role of Mass Communication in the present day world

Unit 2: English Language and Media

Mediated Communication, Media Discourse, Media Rhetoric, Media Vocabulary, Web Communication

Unit 3: The Print Media

Writing Headlines, Analyzing Newspaper articles, Planning and Writing Newspaper Articles, Composing Magazine Cover, Planning and writing a cover story

Unit 4: The Broadcast Media

The language of Radio and Television programmes, Writing Screen Plays, Writing Film Reviews, Writing Jingles for Advertisements

Unit 5: Internet English

Mobile Assisted Language Learning (MALL), English and Social Media, Communication through Social Media, Writing Content for Web Pages, Using Blogs and Webinars

Self-Study

Mobile Assisted Language Learning (MALL)

References

Ahuja, B.N. (2005). *Audio visual journalism*. Delhi: Surjeet Publications.
Ceramella, N. & Lee, E. (2008). *Cambridge English for the media*. Cambridge: CUP.
Durant, A. & Lambrou, M. (2009**).** *Language and media***.** London: Routledge
Marshall, J. & Werndly, A. (2005). *The language of television*. London: Routledge
Reah, D. (2008). *The language of newspapers*. London: Routledge.

ENG 3279 Creative Writing in English (CWE) 3 Hr. / 2 Cr.

This course will help develop a keen sense of observation, lateral thinking, creative imagination and effective communication. The course material would help demonstrate the flexibility of the English language and show how language can accommodate diverse cultural elements. The students would do individual and group exercises with the teacher as facilitator. They would attempt creative writing based on each kind of writing as part of the course requirement.

Objectives

At the end of the course, students shall be able to

i. understand the concept of creativity and techniques in writing
ii. attempt different forms of poetry
iii. develop plot and distinguish it from story, and characters
iv. appreciate the role of observation in feature and travel writings
v. edit and revise writings for better readability

Unit 1: **The Art and Craft of Writing**
Inspiration, Imagination, Creativity, Figures of Speech

Unit 2: **Poetry & Prose**
Lyrics, songs, free verse, memoir, diary writing and literary prose

Unit 3: **Drama & Fiction**
Character, Plot, Point of View, Milieu, Verbal and Non-Verbal Elements, Screenplay

Unit 4: **Feature & Travel Writing**
Concepts, Elements and Characteristics

Unit 5: **Substantive Content Editing**
Revising and Rewriting, Proof Reading, and Editing

Self Study:

Michael Mack	Small Pain in My Chest
Jawaharlal Nehru	Tryst with Destiny
Eugene O'Neil	Emperor Jones
Ernest Hemingway	Old Man and the Sea
Kathryn Schulz	The Really Big One
Pico Iyer	Hyderabad in Five Colors

References

Dev, Anjana Neira, Anuradha Marwah, Swati Pal. Creative Writing: A Beginner's Manual. New Delhi: Pearson Longman, 2009.

Brooks, Cleanth and Robert Penn Warren. *Modern Rhetoric*. New York: Harcourt Brace Jovancvich, 1979.

Simms, Norman. *Creative Writing*. Allahabad: New Horizon Publication, 1986.

ENG 3672 Introduction to Modern Linguistics 6Hr./6Cr.
(IML)

The course aims at offering students a set of basic tools and a framework which will enable them to understand the basic concepts in language and Linguistics. It also aims at introducing various branches of Applied Linguistics.

Objectives

After the completion of this course the students shall be able to

i. learn the chief theories of human speech
ii. gain knowledge in various branches of linguistics
iii. recognize the acceptable system of sound and pronunciation
iv. differentiate the patterns of sounds
v. understand the concepts of linguistics

Unit 1: **Origins of Language**
Origin and development of human language, the bow-wow theory, the ding-dong theory, the pooh-pooh theory, the gesture theory.

Unit 2: **Definition and Branches of Linguistics**
Methods of Applied Linguistics: Synchronic, Diachronic and Panchronic studies of language, Paradigmatic and Syntagmatic relationship, Linguistics Analysis

Unit 3: **Phonetics**
The production of speech sounds, vowels, and consonants, transcriptions

Unit 4: **Phonology**
Introduction, Phoneme and allophone, syllable, stress, intonation

Unit 5: **Modern Concepts in Theoretical & Applied Linguistics**
Words and Morphemes, Morphophonemics, Syntax, Semantics, Stylistics

Self Study
Unit 1: Origins of Language

Recommended Texts

Verma, S.K. and N. Krishnaswamy. *Modern Linguistics: An Introduction*. Delhi: OUP, 2000.
Jeyalakshmi, G. 2007. *A Text Book on the English Sounds: Vowels and Consonants*. Madurai: Tharvas.2007
Wood, Frederick, T. An Outline History of the English Language. Delhi: Macmillan. 1984.

ENG 3674 **Contemporary English Literature (CEL)** **6hr/6 Cr**

The course aims to introduce students to contemporary literature written after 1980. It exposes students to representative contemporary texts, and provides them with a multi-cultural perspective by English authors who come from different national, cultural and ethnic backgrounds

Objectives
At the completion of the course, students shall be able to

i. understand and appreciate the aesthetic, moral and cultural sensibilities of English literature written after 1980
ii. gain an insight into the relative values and unique aspects of contemporary literature
iii. identify the predominant themes of contemporary literature
iv. analyse the multi-dimensional experiments in subject matter, form and style in the literatures written after 1980.
v. critically appreciate the representative literary pieces of contemporary writers

Unit 1:	**Poetry**	
	Maya Angelo	On the Pulse of Morning (1993)
		Phenomenal Woman (1995)
	Carol Ann Duffy	Orion (1993)
		Thrown Voices (1983)
	Amy Clampitt	Kingfisher (1983)
		Archaic Figure (1987)
	Seamus Heaney	Station Island (1984)
		North (1998)
	Derek Walcott	White Egrets (2010)
		Piano Practice (1981)
	Bob Dylan	Things have Changed (2006)
		Most of the Time (1989)
Unit 2:	**Drama**	
	Caryle Churchill	Top Girls (1982)
	David Hare	A Map of the World (1983)
Unit 3:	**Prose**	
	Nadine Godimer	Writing and Being (Nobel Prize Acceptance Speech)
	Shashi Tharoor	India from Midnight to the Millennium (1997)
Unit 4:	**Novel**	
	McEwan	The Children Act (2014)
	Martin Amis	Money (1984)
Unit 5:	**Short Stories**	
	Julian Barnes	Cross Channel (1996)
	Hilary Mantel	The Assassination of Margret Atwood (2000)
Self Study		
	Unit 3 Prose	

References

King , Bruce. *The New English Literatures:Cultural Nationalism in a Changing World*. London: Macmillan,1980

Ashcroft, Bill.Et.Al. *The Empire Writes Back: Theory and Practice in Post-Colonial Literatures*. London: Routledge, 2002

Bell, Michael. *Gabriel Gracia Marquez: Solitude and Solidarity*.Hampshire:Macmillan, 1993

Walsh,William (ed.) *Readings in Commonwealth Literature*. Oxford: Clarendon Press, 1973

ENG 3676 English Language Education 6 Hrs/6 Cr.
[ELE]

Course aims at introducing some of the salient features of English language education so that students can meaningfully contextualize English language education both as a medium and as a subject of study. It includes the colonial history of ELE in India, place of English in Indian Educational Reports, paradigm shifts in English language curriculum, approaches, methods, and techniques, testing and evaluation, and concepts.

At the end of the course, students shall be able to

i. analyze the colonial English language policies
ii. critically review the observations and recommendations of the various educational reports in Independent India
iii. relate the various macro-skills and micro-skills to today's needs and contexts
iv. synthesize various approaches and methods of teaching, learning, and assessment; and
v. become familiar with the recent ELT concepts

Unit 1: **History of English Language Education**
Charles Grant, Macaulay's Minutes, Charles Wood's Despatch, Calcutta University Report

Unit 2: **Place of English in Educational Reports**
From Secondary Education Report of 1950-52 to Knowledge Commission Report of 2007

Unit 3: **English Language Curriculum**
Macro-Skills: Listening, Speaking, Reading, & Writing; Micro-Skills, Grammar, Role of Literature

Unit 4: **Teaching-Learning Approaches, Methods, & Techniques, and Assessment**
Grammar Translation, Direct, Communicative Language Learning, Task-based Instruction, Content-based Instruction, Project-based, Journals,

Unit 5: **ELT Concepts**
Learner strategies, Learning Styles, Fluency vs. Accuracy, Scaffolding, Motivation, Learner Autonomy, Teacher Cognition, Cooperative & Collaborative Learning, Learner-Centred,

Self-Study
Unit 1

Books for Reference

Krishnaswamy, N. & Krishnaswamy, L. 2006. *The story of English in India*. Delhi: Foundation Books.

Aslam, M. 2003. *Teaching of English: A practical Course for B.Ed. Students*. Delhi: Foundation Books.

ENG 3578 Contemporary Tamil Fiction in Translation (CTFT) 5 Hr./5 Cr.

The course aims at introducing students to the rich contemporary literary fiction in Tamil literature translated into English. An appreciation of these fictions will help rediscover their own social and cultural milieu. It also reflects the sensibilities in human values and morals undergoing a change amidst a predominantly conservative society. Further, it demonstrates how modernization influences relationships, patriarchal and feminine sensibilities and Tamil identity.

Objectives

At the end of the course, students shall be able to

i. identify regional novels and themes related to their regions
ii. understand the issues confronting human beings in urban areas
iii. perceive the effects of modernity and change on any given place
iv. read the voice of the marginalized and their quest for dignified life
v. value the rich output in the form of short stories

Unit 1: **Regional Novel**

C.S. Chellapa *Arena*

Unit 2: **Urban Milieu**

Ashokamitran *Water*

Unit 3: **Changing Landscape**

Sundara Ramaswamy *Tale of a Tamarind Tree*

Unit 4: **Resurgent Voice**

Imayam *Arumugam*

Unit 5: **Short Story**

Devibharathi "The Curse of Resurrection" Trans. N. Kalyan Raman
Vannnadasan "The Chariot Comes to Rest" Trans. Vasantha Surya
Ambai "A Kitchen in the Corner of the House" Trans. Lakshmi Holmstrom

Self Study

C.S. Chellapa *Arena*

Texts

Kalyanaraman, N (Trans.), *Vaadivasal: Arena*. Delhi: OUP India. 2013
Holmstrom, Lakshmi (Trans.) *Water*. New Delh: Katha. 2002
Krishnan, M (Trans.) *Tale of a Tamarind Tree*. New Delhi: Penguin Books India.1995
Ayyar, Krishna (Trans.) *Arumugam*. New Delhi: Katha. 2002
Kumar, Dilip (Ed.) *A Place to Live: Classic Tamil Stories*. New Delhi: Penguin India, 2004

References

Parthasarathy, Indira, "Tamil Fiction: Old Morality and the New," Indian Literature, Vol. 21, No. 4 (July-August 1978), pp. 6-9
Chellappan, K., "Modern Trends in Tamil Fiction," Indian Literature, Vol. 25, No. 3 (May-June 1982), pp. 27-39
Swaminathan, Venkat, "The Dalit in Tamil Literature - Past and Present," Indian Literature, Vol. 43, No. 5 (193) (Sept.-Oct., 1999), pp. 15-30
Kennedy, Richard, "A Comparison of Two Literary Renaissances in Madras," Journal of South Asian Literature, Vol. 25, No. 1, The City in South and Southeast Asian Literature (Winter, Spring 1990), pp. 33-54

ENG 3200 Environmental Studies 4Hr./2Cr.
(ES)

This course aims to create and promote environmental awareness in students. It defines the scope and importance of the discipline. The course material will help students understand the basic concepts relating to renewable/non-renewable resources, ecosystems, environmental pollution, and biodiversity. The course also focuses on people in the environment, social issues relating to development, environmental degradation, control measures and ethics. Literary texts are introduced to sensitize the students to the urgent ecological concerns that threaten everyday life. The course would stress the role of an individual in the conservation of natural resources.

Objectives

At the end of the course, students shall be able to

i. identify and understand environmental literary studies as a genre
ii. apply environmental ethics in literature
iii. locate deep ecology in nature writing
iv. connect women with nature
v. read texts eco-critically

Unit 1: Environmental Literary Studies

Cheryll Glotfelty "Literary Study in an Age of Environmental Crisis"
Rachel Carson Excerpts from *Silent Spring*

Unit 2: Environmental Ethics

John Muir "God's First Temples: How Shall We Preserve Our Forests"
Tom Regan "Animal Rights, Human Wrongs"
Suketu Mehta "Bhopal Lives"
Arundhati Roy *The Greater Common Good*

Unit 3: Deep Ecology

Nissim Ezekiel "Poet, Lover, Birdwatcher"
John Steinbeck "Chrysanthemums"
Salim Ali "Stopping by the Woods on a Sunday Morning"
D.H. Lawrence "Snake"
Alexander Frater Excerpts from *Chasing the Monsoon*

Unit 4: Eco Feminism

Vandana Shiva Women's Indigenous Knowledge and Biodiversity Conservation

Unit 5: Eco-Criticism

Select Essays from *The Living Plant: A Collection of Writing on the Environment*

Self Study

Arundhati Roy *The Greater Common Good*

References

Bharucha, Erach. *Environmental Studies for Undergraduate Courses*. Hyderabad: UGC Universities Press, 2005.
Garrard, Greg. *Ecocriticism* (New Critical Idiom). New York: Routledge, 2004.
Glotfelty, Cheryll and Harold Fromm (ed.) *The Ecocriticism Reader: Landmarks in Literary Ecology*. London: University of Georgia Press, 1996.
Graham Jr., Frank. *Since Silent Spring*. Boston: Houghton Mifflin Co., 1970.
Green, Mary. *The Living Planet: A Collection of Writing on the Environment*. Cambridge: CUP, 2011.

ENG 3280 **English for Placement (EP)** **3 Hrs./2 Cr.**

This course aims to familiarize students with the distinctive ways in which nonverbal and verbal communicative skills could be developed in preparation for competitive exams and careers in professional organizations. It would also prepare students through training in speed and accuracy, fluency and competence in English. It also trains them in the modalities of test of English.

At the end of this course students shall be to

i. understand the various types and channels of communication
ii. develop the skill to effectively approach reading passages in exams
iii. identify common errors in English and to make error free sentences
iv. communicate professionally in a work environment
v. write different forms of writing

Unit 1: **Dyadic Communication**
Face to face Conversation, and Telephonic Conversation

Unit 2: **Oral Communication**
Group Discussion and Interviews

Unit 3: **Reading Comprehension**
Strategies for reading comprehension and enhancing word power, cloze reading, analogy and rearranging jumbled sentences

Unit 4: **Spotting errors**
Concord, verb, causative, tense, adjective, conditional, subjunctive, passive, preposition, determiner, conjunction, parallel structure, redundancy

Unit 5: **Written Communication**
Mechanics of Writing**,** Formal Reports, Memo, Minutes, Resume Writing, and Business letters

Independent Practice: Face to Face Communication
Telephonic Conversation
Listening to speeches

Texts

Mohan, Krishna and Meera Banerji. *Developing Communication Skills*. Madras: Macmillan, 2009.

Gopalan, R and Rajagopalan, V. *English for Competitive Examinations*. Noida: McGraw Hill Education.2nd Edition, 2007

References

Hannah, Michael and Gerald C.Wilson. *Communicating in Business and Professional Settings*. Singapore: Mc-Graw-Hill International Editions, 1998.

Mohan, Krishna and N. P. Singh. Speaking English Effectively. New Delhi: Macmillan, 1995.

Pease, Allan. *The Definitive Book of Body Language*. London: Orion, 2004.

Ray, Reuben. *Communication Today*. Mumbai: Himalaya Publishing House, 1997.

Bhatnagar, R.P. and Rajul Bhargava. *English for Competitive Examinations*. New Delhi: Macmillan, 1994.

Prasad, Hari Mohan and Uma Rani Sinha. *Objective English*. New Delhi: Tata McGraw-Hill, 1999.

Swan, Michael. *Practical English Usage*. ELBS, 1994.

DEPARTMENT OF MATHEMATICS

Program for B.Sc. Degree in Mathematics

(w.e.f 2015-2016)

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
1	I	XXX xxxx	TAM/FRE/HIN	3	2	30
1	II	ENG 1202	Conversational Skills	3	2	30
1	III C	MAT 1511	Classical Algebra	5	5	75
1	III C	MAT 1411	Analytical Geometry -3D	4	4	60
1	III C	MAT 1413	Differential Calculus	4	4	60
1	III S	MAT 1421	Programming in C	5	4	60
1	IV LS	XXX xxxx	Life Skill - I	3	2	30
1	IV NME	XXX xxxx	Non-major Elective - I	3	2	30
			Total	**30**	**25**	**375**
2	I	XXX xxxx	TAM/FRE/HIN	3	2	30
2	II	ENG xxxx	Reading & Writing Skills	3	2	30
2	III C	MAT 1512	Algebra- I	5	5	75
2	III C	MAT 1412	Analysis -I	4	4	60
2	III C	MAT 1414	Integral Calculus	4	4	60
2	III S	MAT 1422	Object Oriented Programming in C++	5	4	60
2	IV LS	XXX xxxx	Life Skill - II	3	2	30
2	IV NME	XXX xxxx	Non-major Elective - II	3	2	30
2	V	XXX xxxx	Ext. Activity NCA/NCN/ NSS/PED/SLP		1	15
Total				**30**	**26**	**390**

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
3	I	XXX xxxx	TAM/FRE/HIN	3	2	30
3	II	ENG 2201	Study Skills	3	2	30
3	III C	MAT 2511	Algebra -II	5	5	75
3	III C	MAT 2513	Analysis -II	5	5	75
3	III C	MAT 2515	Differential Equations	5	5	75
3	III C	MAT 2411	Statistics- I	4	4	60
3	III S	PHY xxxx	Physics for Mathematics -I	5	4	60
			Total	**30**	**27**	**405**
4	I	XXX xxxx	TAM/FRE/HIN	3	2	30
4	II	ENG 2202	Career Skills	3	2	30
4	III C	MAT 2512	Algebra- III	5	5	75
4	III C	MAT 2514	Analysis- III	5	5	75
4	III C	MAT 2516	Vector Calculus & Trigonometry	5	5	75
4	III C	MAT 2412	Statistics- II	4	4	60
4	III S	PHY xxxx	Physics for Mathematics - II	5	4	60
4	V	XXX xxxx	Ext. Activity NCA/NCN NSS/PED/SLP		1	15
			Total	**30**	**28**	**420**

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
5	III C	MAT 3611	Mechanics	6	6	90
5	III C	MAT 3613	Graph Theory	6	6	90
5	III C	MAT 3615	Operations Research- I	6	6	90
5	III C	MAT 3511	Combinatorics	5	5	75
5	IV LS	XXX xxxx	Life Skill- III	3	2	30
5	IV	MAT 3200	Environmental Studies	4	2	30
			Total	**30**	**27**	**405**
6	III C	MAT 3612	Number Theory	6	6	90
6	III C	MAT 3614	Complex Analysis	6	6	90
6	III C	MAT 3616	Operations Research- II	6	6	90
6	III C	MAT 3512	Fuzzy Mathematics	5	5	75
6	IV LS	XXX xxxx	Life Skill - IV	3	2	30
6	IV	VAL xxxx	Value Education	4	2	30
Total				**30**	**27**	**405**

Courses offered to Non-major students by the Department of Mathematics (UG)

Supportive

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	III	MAT 1431	Maths for Physics-I	5	4	60
1	III	MAT 1433	Maths for Economics (ECE & ECO)	5	4	60
2	III	MAT 1432	Maths for Physics-II	5	4	60
2	III	MAT 1434	Fundamentals of Computer Applications (ECE & ECO)	5	4	60
3	III	MAT 2431	Maths for Chemistry - I	5	4	60
3	III	MAT 2433	Business Statistics (COM)	5	4	60
4	III	MAT 2432	Maths for Chemistry - II	5	4	60
4	III	MAT 2434	Business Mathematics (COM)	5	4	60

Non-Major Elective

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	IV	MAT 1221	Arithmetic & Mathematical Logic	3	2	30
2	IV	MAT 1222	Recreational Mathematics	3	2	30

Life Skill Courses

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	IV	MAT 1231	Mathematics for Life	3	2	30
2	IV	MAT 1232	Mathematical Reasoning	3	2	30
5	IV	MAT 3231	Mathematics for Competitive Exam.	3	2	30
6	IV	MAT 3232	Developing Quantitative Aptitude	3	2	30

MAT 3611 **MECHANICS** **6 h/6Cr**

Objectives:

The course mainly deals with two major areas of applied mathematics namely Statics and dynamics. Statics is the branch of mechanics that is concerned with the analysis of loads (force and torque, or "moment") acting on physical systems that do not experience an acceleration (a=0), but rather, are in static equilibrium with their environment. Whereas the dynamics is a branch of applied mathematics (specifically classical mechanics) concerned with the study of forces and torques and their effect on motion. Brief introduction to central forces to the learners becomes essential as we live in the era of satellites, missiles and space explorations.

On successful completion of the course the student will be able to

- develop mathematical models for statical and dynamical systems.
- appreciate the tools that were developed and apply in the relevant context.
- convert mathematical conclusions in to physical realities.
- inculcate the scientific temper among the learner.
- appreciate the contemporary scientific developments.

Unit I: Introduction – Forces acting at a point – Lami's theorem – Components of force – Parallel forces and moments – Moment of a force.

Unit II: Couples– Equilibrium of three forces acting on a rigid body.

Unit III: Coplanar forces – Friction.

Unit IV: Collision of elastic bodies – Principles of conservation of momentum– Direct impact– Oblique impact.

Unit V: Motion under the action of central forces– Law of inverse squares–Moment of inertia.

References:

1. Venkatraman. M.K, Statics, Agasthiar publications, 2002.
2. Venkatraman. M.K, Dynamics, Agasthiar publications, 2002.
3. Loney. S.L, Dynamics, Mac Millan India Edition, 1998.
4. Rajeshwari. I, Mechanics, Sarah's publications, 2016.
5. Vasistha and Agarwal, Dynamics of a particle, Krishna prakash mandir, Meeret, 2001.

MAT 3613 GRAPH THEORY 6 h/6Cr

Objectives:

A graph is a symbolic representation of a network and of its connectivity. It implies an abstraction of the reality so it can be simplified as a set of linked nodes.

Graph theory is a branch of mathematics concerned about how networks can be encoded and their properties measured. It has been enriched in the last decades by growing influences from studies of social and complex networks. The origins of graph theory can be traced to Leonhard Euler who devised in 1735 a problem that came to be known as the "Seven Bridges of Konigsberg".

On successful completion of the course the student will be able to

- demonstrate knowledge of the syllabus material
- write precise and accurate mathematical definitions of objects in graph theory
- use mathematical definitions to identify and construct examples and to distinguish examples from non-examples
- validate and critically assess a mathematical proof
- use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory
- construct mathematical proofs
- write about graph theory in a coherent and technically accurate manner.
- hone the ability to communicate mathematics.

Unit I: Graphs– Sub graphs– Isomorphism and degrees – Degree sequence – Walks and connected graphs – Cycles in graphs – Cut vertices and cut edges – Connectedness – Ramsay number – Matrices associated with the graph – Operations on graphs.

Unit II: Eulerian graphs – Hamiltonian graphs –Properties.

Unit III: Bipartite graph – Trees.

Unit IV: Colouring – Vertex colouring – Edge colouring – Five colour theorem and Four colour conjecture – Chromatic number and chromatic polynomials.

Unit V: Independence number – Covering number – Planar graph–Dual graph of planar graph –Directed Graph.

References:

1. Choudum .S.A., A First Course In Graph Theory, McMillan India Ltd, 1987.
2. Arumugam. S and Ramachandran. S, Invitation to Graph Theory, New Gamma Publishing House, 1996
3. John Clarke & Derek Allan Holton, A first Look at Graph Theory, World Scientific Publishing Co. Ltd., 1995.
4. Murugan. M, Graph Theory, Muthali Publications, 2000.

MAT 3615 OPERATIONS RESEARCH – I 6 h/6Cr

Objectives:

Operations research- I and II are the courses that deal with the application of advanced analytical methods to help make better decisions. It was initially used in military operations to obtain better solutions which would otherwise give bad solutions. In the recent years it is adopted to management sciences and decision making. This course aims to introduce students to use quantitative methods and techniques for effective decisions–making; model formulation and applications that are used in solving real life problems.

On successful completion of the course the student will be able to

- convert real life problems into mathematical models by making use of inequalities
- use Mathematical tools to solve problems in the analytical form and will be able to interpret in the common man's language
- understand the limitations of solving by graphical method and will appreciate the simplex method
- appreciate the two-phase method or Big-M method, an alternate for overcoming the problem of surplus variable
- appreciate the nexus between the dual problem and its primal
- able to build and solve transportation and assignment problems, and interpret such solutions.
- appreciate the theory of game as it is ever prevalent in every environment.
- hone the ability to do reality checks on calculations.

Unit I: Introduction– Formulation of L.P.P. – Graphical solution of L.P.P. and its special cases – Canonical form, Standard form and Basic solution – Basic feasible solution – Reduction of feasible solution to a basic feasible solution.

Unit II: The Simplex method – Introduction – Simplex method – Big M method – Two phase Method.

Unit III: Duality in Linear Programming – Concept of duality – Formulation of dual linear problem – Formulation of primal-dual pairs – Dual simplex method – Revised simplex method.

Unit IV: The Transportation Problem - Introduction- Mathematical formulation- Loops in a transportation table- Finding IBFS- moving towards optimality – Degeneracy – Unbalanced transportation problems. The Assignment problem – Introduction – Hungarian method - Variations of the Assignment problem – Multiple optimal solutions – Maximization case - Travelling salesman problem –Unbalanced assignment problem- Restrictions.

Unit V: Introduction to theory of Games – Saddle Point – Graphical solution for 2 x m, n x 2 – Dominance property – Solution of game by linear programming method.

References:

1. Kantiswarup, Gupta P.K. & Manmohan, Operations Research, Sultan Chand & Sons, 2010.
2. Hadley.G, Linear Programming, Narosa Book Distributors Private Ltd. ,1963.
3. Taha.H.A. Operations Research – An Introduction (8th Edition) Prentice Hall of India, New Delhi. 2007
4. Bronson.R, Operations Research 2nd Edition, Schaum's Outline Series, 1997.
5. Sharma.J.K. Operations Research, Theory and applications, Macmillan, New Delhi, 2003.
6. Wagener.H.M., Principles of Operations Research 2nd Edition, Prentice – Hall of India, 1975
7. Hillier.F.S and Lieberman.G.J. Operations Research, CBS Publishers and Distributors, New Delhi. 1998
8. Goel. B.S. and Mittal, S.K. Operations Research, Pragati Prakashan, Meerut, 2000
9. Kapoor. V.K., Operations Research (Quantitative techniques for Management) 9th Edition, Sultan Chand & Sons. 2014.
10. Sharma S.D., Operations Research, 11th Edition, Kedarnath, Ramnath Company, 2002.
11. Vohra N.D., Quantitative Techniques in Management 4th Edition, Tata McGraw Hill co. 2009.
12. Aditham B. Rao, Operations Research, Jaico Publishing House, Mumbai, 2008.

MAT 3511 COMBINATORICS 5 h/5Cr

Objectives:

Combinatorics is a branch of mathematics concerning the study of finite or countable discrete structures. Aspects of combinatorics include counting the structures of a given kind and size (enumerative combinatorics), deciding when certain criteria can be met, and constructing and analyzing objects meeting the criteria. Many combinatorial questions have historically been considered in isolation, giving an ad hoc solution to a problem arising in some mathematical context. In the later twentieth century, however, powerful and general theoretical methods were developed, making combinatorics into an independent branch of mathematics in its own right. Combinatorics is used frequently in computer science to obtain formulas and estimates in the analysis of algorithms.

On successful completion of the course the student will be able to

- apply algorithms taught in the course
- understand the fundamental combinatorial structures that naturally appear in various other fields of mathematics and computer science
- use these structures to represent mathematical and applied questions

- use the combinatorial tools that are used to analyze such structures
- know how to prove the existence or non-existence of the object, compute the number of such objects, and understand their underlying structure
- use generating functions to solve a variety of combinatorial problems.

Unit I: Two basic principles – Simple arrangement and selections with or without repetition – Distributions – Binomial coefficients.

Unit II: Generating functions - Calculating coefficients of generating functions – Exponential generating function – Summation method – Partitions.

Unit III: Recurrence relations – Divide and conquer relations – Dearrrangement – Solution of linear recurrence relation.

Unit IV: Fibonacci number - Stirling number of first and second kind – Catalan number– Ménage number.

Unit V: Inclusion and Exclusion principle – Pigeon hole principle – Ramsey theorem.

References:

1. Tucker A.W., Applied Combinatorics, Wiley, 2000.
2. Cohen D., Combinatorics, Wiley, 1978.
3. Hall M., Combinatorial Mathematics, McGraw Hill, 1968.
4. Liu C.L., Introduction to Combinatorial Mathematics, McGraw-Hill, Newyork, 1994
5. Ryser H.J., Combinatorial Mathematics, Carus Mathematical monograph, 1965.
6. Krishnamurthy, Combinatorics, PHI, 1998.
7. Balakrishnan V.K., Combinatorics, Schaum's outline series, Tata McGraw Hill, 2005

MAT 3612 NUMBER THEORY 6 h/6Cr

Objectives:

The study of number theory inevitably includes knowledge of the problems and techniques of elementary number theory, however the tools which have evolved to address such problems and their generalizations are both analytic and algebraic, and often intertwined in surprising ways. This course covers topics from classical number theory including discussions of mathematical induction, prime numbers, division algorithms, congruences, and quadratic reciprocity.

On successful completion of the course the student will be able to

- state fundamental results in number theory and prove rigorously mathematical statements concerning prime numbers and modular arithmetic
- determine greatest common divisors by prime factorizations or Euclid's algorithm
- solve linear Diophantine equations and linear congruences

- describe properties of common arithmetical functions, including the Euler phi function
- apply methods and techniques of number theory to a range of applications
- hone the ability to do reality checks on calculations.

Unit I: Divisibility– Euclidean algorithm – Primes – Fundamental theorem of arithmetic.

Unit II: Congruences – Fermat, Euler and Wilson theorem – Lagrange theorem – Chinese remainder theorem – Solution of congruences.

Unit III: Quadratic residues – Euler's criterion – Gauss lemma – Quadratic reciprocity law.

Unit IV: Arithmetic functions – Number of divisors– Sum of divisors – Euler's phi function –Mobius function – Mobius inversion formula – Greatest integer function – Related problems.

Unit V: Numbers of special form – Perfect Numbers – Mersenne primes and amicable numbers – Fermat numbers – Pepin's test – Diophantine Equation – Pythagorean triplets.

References:

1. Andrews. G. E, Number theory, Hindustan Publishing Corporation, 1994.
2. Apostol. T. M, Introduction to analytic number theory, Narosa publishing house, 1998.
3. Burton. D. M, Elementary Number theory, Universal book stall, 2012.
4. Niven. I and Zuckerman.H.S, An introduction to the theory of numbers, Wiley eastern, 2015.
5. Narayanan. K.S and Manicavachagom Pillay. T.K, Algebra, Vol. I, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1982.

MAT 3614 COMPLEX ANALYSIS 6 h/6Cr

Objectives:

Complex analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex numbers. It is useful in many branches of mathematics, including algebraic geometry, number theory, analytic combinatorics, applied mathematics; as well as in physics, including hydrodynamics and thermodynamics and also in engineering fields such as nuclear, aerospace, mechanical and electrical engineering.

On successful completion of the course the student will be able to

- understand how complex numbers provide a satisfying extension of the real numbers;
- appreciate how throwing problems into a more general context may enlighten one about a specific context (e.g. solving real integrals by doing complex integration;

Taylor series of a complex variable illuminating the relationship between real function that seem unrelated -- e.g. exponentials and trig functions);
- learn techniques of complex analysis that make practical problems easy (e.g. graphical rotation and scaling as an example of complex multiplication);
- continue to develop proof techniques;
- appreciate how mathematics is used in design (e.g. conformal mapping);
- unlearn (if ever learned) the notion that mathematics is all about getting "the right answer";
- hone the ability to do reality checks on calculations.
- hone the ability to communicate mathematics.

Unit I: Geometry of complex numbers – Elementary transformations – Bilinear transformations – Cross Ratio – Fixed points of bilinear transformation.

Unit II: Analytic function – Differentiability – The Cauchy Riemann equation – Conformal mappings.

Unit III: Definite Integral – Cauchy's Theorem – Cauchy's Integral formula – Cauchy's Inequality – Morera's theorem – Liouville's theorem and fundamental theorem of Algebra – Maximum modulus theorem.

Unit IV: Taylor's and Laurent's theorem – Zeros of an analytic function.

Unit V: Singularities – Cauchy Residue theorem – Arguments Principle – Rouche's theorem – Contour Integration.

References:

1. Arumugam.S, Thangapandi Issac.A , Somasundaram. A**,** Complex Analysis , SCITECH publications private limited, 2007.
2. Shanti Narayanan, Complex Analysis, S. Chand & Co, 1999.
3. Duraipandian.P, Lakshmi Duraipandian and Muhilan.D**,** Complex Analysis, Emerald Publishers, 1994.
4. Ponnuswamy.S, Foundations of Complex Analysis, Narosa Publishing House, 2004.
5. Karunakaran.V , Complex Analysis, Narosa Publishing House, 2006.

MAT 3616 OPERATIONS RESEARCH - II 6 h/6Cr

Objectives:

Student will be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type. To build and solve Transportation Models and Assignment Models. To design new simple models, like CPM to improve decision-making and develop critical thinking and objective analysis of decision problems.

On successful completion of the course the student will be able to

- convert real life problems into mathematical models by making use of inequalities
- communicate effectively and to function well on multi-disciplinary teams.
- appreciate post optimal analysis/sensitivity of the optimal solution for small changes in the initial parameters
- design new simple models, like: PERT, CPM to improve decision –making and develop critical thinking and objective analysis of decision problems.
- describe the scope of project planning, and use appropriate techniques to represent and analyse projects with a view to managing resources, minimising costs, and coping with uncertainty.
- solid understanding of the many ways applied mathematics can be used to extract data information and for making decisions.
- learn and understand the types of Inventories and objectives of Inventory Control. This would help them to understand the major reasons for holding inventories and also to differentiate between independent and dependent demand.
- recognise the basic types of queuing model, derive and calculate steady state system performance characteristics for these types.
- get an understanding of the factors and restrictions involved in building and using models for planning and management problems.

Unit I: Introduction to sensitivity Analysis – Changes in the cost vector, requirement vector – Coefficient matrix – Addition and deletion of variables - related problems.

Unit II: Introduction to Integer programming – Gomary's all-IPP Method – construction of Gomary's cut – fractional cut method-all Integer and mixed Integer - related problems.

Unit III: Network Scheduling by PERT/CPM- Introduction – Network and Basic components – Rules of network construction – Time calculations in networks – Critical Path Method (CPM)- PERT:PERT calculations - Negative float and Negative slack – advantages of network (PERT/CPM)

Unit IV: Inventory Control- Introduction – Reasons for carrying inventory – Types of inventory – The inventory decisions – Economic Order Quantity- Four EOQ models – EOQ problem with price breaks- Multi item deterministic problem.

Unit V: Queueing Theory- Introduction – Queueing system – Characteristics of Queueing Systems - Classification of Queueing models – Solution of Queueing models- {(M/M/1): (∞/FIFO)}**,** {(M/M/1): (N/FIFO)},{(M/M/C): (∞/FIFO},{(M/M/C): (C/FIFO)}.

References:

1. Kantiswarup, Gupta P.K. & Manmohan, Operations Research, Sultan Chand & Sons, 2010.
2. G. Hadley, Linear Programming, Narosa Book Distributors Private Ltd. ,1963.

3. Taha, H.A. Operations Research – An Introduction (8th Edition) Prentice Hall of India, New Delhi. 2007
4. Bronson R, Operations Research 2nd Edition, Schaum's Outline Series, 1997.
5. Sharma, J.K. Operations Research, Theory and applications, Macmillan, New Delhi, 2003.
6. Wagener H.M., Principles of Operations Research 2nd Edition, Prentice – Hall of India, 1975
7. Hillier, F.S and Lieberman, G. J. Operations Research, CBS Publishers and Distributors, New Delhi. 1998
8. Goel, B.S. and Mittal, S.K. Operations Research, Pragati Prakashan, Meerut. 2000
9. Kapoor V.K., Operations Research (Quantitative techniques for Management) 9th Edition, Sultan Chand & Sons. 2014.
10. Sharma S.D., Operations Research, 11th Edition, Kedarnath, Ramnath Company, 2002.
11. Vohra N.D., Quantitative Techniques in Management 4th Edition, Tata McGraw Hill co. 2009.
12. Aditham B. Rao, Operations Research, Jaico Publishing House, Mumbai, 2008.

MAT 3512 FUZZY MATHEMATICS 5 h/5Cr

Objectives:

Fuzzy mathematics forms a branch of mathematics related to fuzzy set theory and fuzzy logic. It started in 1965 after the publication of Lotfi Asker Zadeh's seminal work Fuzzy sets. The quest for imitating human brain (artificial intelligence) since the invention of computers has propelled this area of Mathematics to a large extend as the human brain does not see things in black and white but rather in rainbow colors.

On successful completion of the course the student will be able to

- distinguish between the crisp set and fuzzy set concepts through the learned differences between the crisp set characteristic function and the fuzzy set membership function
- draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions respectively
- define fuzzy sets using linguistic words and represent these sets by membership functions
- know how to perform mapping of fuzzy sets by a function and also use the α-level sets in such instances
- know fuzzy-set-related notions; such as α-level sets, convexity, normality, support, etc.
- know the concept of a fuzzy number and how it is defined

- understand the extension principle, its compatibility with the α-level sets and the usefulness of the principle in performing fuzzy number arithmetic operations (Additions, multiplications, etc.)
- know the fuzzy relations and the properties of these relations
- analyze the distinction between binary logic and fuzzy logic at the conceptual.

Unit I: Crisp sets and fuzzy sets– basic concepts of fuzzy set – classical and fuzzy logic.

Unit II: α-cuts – properties of α-cuts – representations of fuzzy sets – Extension principle of fuzzy sets.

Unit III: Operations on fuzzy sets – fuzzy complements – fuzzy union – fuzzy intersection.

Unit IV: Fuzzy numbers – Arithmetic operation on intervals – Arithmetic operation on fuzzy numbers – fuzzy equations.

Unit V: Crisp and fuzzy relations – Binary fuzzy relations – Binary relation on a single set – Equivalence and similarity relation – Fuzzy relation equation.

References:

1. Klir.G.J and Folger T.A, Fuzzy sets Uncertainty and information, Prentice Hall of India, 1995.
2. Klir G.J and Bo Yuan, Fuzzy Sets, Fuzzy Logic, Theory and Applications, Prentice Hall of India, 1997.

MAT 3200 ENVIRONMENTAL STUDIES 4 h/2Cr

Objectives:

An environmental study is a multidisciplinary academic field which systematically studies human interaction with the environment in the interests of solving complex problems. Environmental study brings together the principles of sciences, commerce/ economics and social sciences so as to solve contemporary environmental problems. It is a broad field of study that includes the natural environment, built environment, and the sets of relationships between them. The field encompasses study in basic principles of ecology and environmental science, as well as associated subjects such as ethics, geography, policy, politics, law, economics, philosophy, environmental sociology and environmental justice, planning, pollution control and natural resource management.

On successful completion of the course the student will be able to

- locate and comprehend relationships between the natural, social and cultural environment
- create cognitive capacity and resourcefulness to make the students curious about social phenomena, starting with the family and moving on to wider spaces

- nurture the curiosity and creativity of the students particularly in relation to the natural environment (including artifacts and people)
- engage the students in exploratory and hands-on activities to acquire basic cognitive and psychomotor skills through observation, classification, inference, etc.
- create awareness towards environmental issues and their social responsibility as a major stakeholder in the system
- appreciate the eco diversity of the sub continent and its resources
- know the need for sustainable development and optimal utilization of natural resources
- introduce to mathematical tools that may be used solve environmental issues

Unit I: Understanding eco-system –Food chain –Ecological pyramids – Introduction to different eco-system – Bio-geographical classification of India – Hot spots of bio-diversity – Conservation of bio-diversity.

Unit II: Introduction to Environmental Pollution – Causes and effects of air, water, noise, soil, thermal and nuclear pollution – Measures of control and management – Oil slick and its effects on the marine eco system – Global warming and climate change – Acid rain– Ozone layer depletion – Nuclear accident and holocaust.

Unit III: Energy sources – Renewable- Non renewable energy sources – Nuclear energy – Bio fuels – Non conventional energy sources – Pollution free energy.

Unit IV: Social Issues – Urbanization and pollution – Hazard identification – Air quality standards – Major pollutants and their effects in an urban environment – Permissible limits and methods of control – Environmental ethics – Environmental protection act – Environmental auditing (Air, water, wildlife protection, forest conservation acts) – Public awareness on solid waste management – House hold environment and health.

Unit V: Mathematical modeling for environmental issues –Weather/ disaster predictions – mathematical models using differential equations, linear programming and chaos theory.

References:

1. Erach Bharucha, Textbook of Environmental Studies, Universities Press, 2005.
2. Rana, essentials of ecology and Environmental science S.V.S. PHI, 2003.
3. Subramanian,N.S. & Sambamoorthy-A.V.S.S Ecology, Narosa publishing house, 2000.
4. Raman Sivakumar, Introduction to environmental science and energy, 2005.
5. Raman Sivakumar, Introduction to Environmental Science and Engineering, 2005
6. Ravikrishnan.A, Environmental Science and Engineering, Sri Krishna Hitech Publishing Company Pvt. Ltd, 2010
7. Arumugam.N, Kumaresan.V, Environmental studies, Saras Publication,2010.

MAT 3231 MATHEMATICS FOR COMPETITIVE EXAMINATIONS 3h/2Cr

Objectives:

This course is designed for non major students who intent to apply for various competitive examinations . Though, no new concepts in mathematics are introduced whatever the students have learnt till their secondary level are recalled. Adequate training is given so that they will overcome the fear of numbers with the required level of speed and accuracy. This will provide strategies and methods to solve problems in Mathematics section of any competitive examinations.

On successful completion of the course the student will be able to

- appreciate the techniques and tools in mathematics to solve problems in life
- read between the lines and understand the logic behind it
- increase the speed and accuracy in performing problems in competitive examinations
- improve the efficiency in dealing with numbers
- appreciate the techniques and tools in mathematics to solve problems in life

Unit I: Numbers - problems on numbers - H.C.F and L.C.M – Divisibility –Simplification.

Unit II: Arithmetic mean - Geometric mean – Harmonic mean.

Unit III: Mathematical logic – conjunction –disjunction – negation – implications – Equivalence of statements – disjunctive and conjunctive normal forms.

Unit IV: Venn diagram – Inclusion and exclusion principle.

Unit V: Measures of standard geometric objects.

References:

1. Aggarwal R.S , Quantitative Aptitude, S. Chand & company Ltd., 2006.
2. Discrete Mathematics, Schaum's outline series, McGraw Hill, 1996.
3. Set theory and Logic, Schaum's outline series, McGraw Hill, 1996.

MAT 3232 DEVELOPING QUANTITATIVE APTITUDE 3 h/2Cr

Objectives:

This course will enable the students to develop their quantitative skills that strengthen their edge over others in competitive examinations. This course covers the area related to problems on numbers, logical concepts, alligation and mixture.

On successful completion of the course the student will be able to

- appreciate the techniques and tools in mathematics to solve problems in life

- read between the lines and understand the logic behind it
- increase the speed and accuracy in performing problems in competitive examinations
- improve the efficiency in dealing with numbers
- appreciate the techniques and tools in mathematics to solve problems in life

Unit I: Simple equation - simultaneous simple equations - Number of solution - Application on age –fraction – average - partnership.

Unit II: Ratio and proportion- Variation- Profit and loss.

Unit III: Time and work- Pipes and cistern-Time and distance.

Unit IV: Simple interest- Compound interest-Alligation and mixture.

Unit V: Indices - Surds - Logarithms.

References:

1. Aggarwal R.S.Quantitative Aptitude,S.chand & company Ltd., 2006
2. Sundaresan.V & Jeyaseelan.S.D, An Introduction to Business Mathematics, S.Chand & company Ltd., 2003.

DEPARTMENT OF UNDER GRADUATE PHYSICS
B. Sc. – Physics Programme
(w. e. f. 2015-16 batch onwards)

Semester	Part	Course No.	Course Title	Hours	Credits	Marks
V	IIIC	PHY3671	Physics Lab - V	6	6	90
	IIIC	PHY3673	Thermodynamics & Statistical Physics	6	6	90
	IIIC	PHY3575	Solid State Physics	5	5	75
	IIIC	PHY3677	Microprocessor & Communication Systems	6	6	90
	IVLS	LSC32XX	Life Skill Course - III	3	2	30
	IVEVS	EVS3200	Environmental Studies	4	2	30
			Total	**30**	**27**	
VI	IIIC	PHY3672	Physics Project	6	6	90
	IIIC	PHY3674	Atomic Physics & Spectroscopy	6	6	90
	IIIC	PHY3576	Nuclear Physics	5	5	75
	IIIC	PHY3680	Astronomy & Astrophysics	6	6	90
	IVLS	LSC32XX	Life Skill Course - IV	3	2	30
	IVVAL	VAL32XX	Value Education	4	2	30
			Total	**30**	**27**	

Part IVLS Life-Skill Courses:

Semester	Course No.	Course Title	Hours	Credits	Marks
V	PHY3291 / PHY3293	PC Management & Maintenance / Bio-Medical Instrumentation	3	2	30
VI	PHY3292 / PHY3294	HAM Radio & Practice / Consumer Electronics	3	2	30
		Total	**12**	**8**	

PHY 3671 Physics Laboratory – V (6 credits – 6 hrs/wk)

1. Arithmetic Circuit- Half adder and Full adder.
2. Combinational logic circuit design using 74xxICs. (For a given problem using POS or SOP)
3. Design of odd/even parity checkers - using 74180
4. Encoders - using logic gates
5. Decoders -using logic gates
6. Circuits Implementation using Software
7. Multiplexer - using logic gates
8. Demultiplexer. - using logic gates
9. Arithmetic Logic Unit (ALU) using IC 74181.
10. Construction of 1- bit comparator using 74xxICs and study of 4-bit comparator IC 7485.
11. Code converters – Binary to gray and Gray to binary.
12. Verification of basic flip flops using 74xxICs
13. Master- slave JK flip-flop using IC 7476
14. Asynchronous counter design
15. Mod-n counter. using decade counter 7490
16. 3-Bit synchronous counter design
17. Shift register- SIPO/SISO
18. Shift register -PISO/PIPO.
19. Timer 555 - Construction of monostable, astable for a given frequency.
20. Storing and retrieving data (Ex-3code) - using RAM - IC 7489 or 2114.
    (Minimum of 16 Experiments)

PHY 3673 Thermodynamics & Statistical Physics (6 credits – 6 hrs/wk)

Objective: This course enables the students

- To understand the fundamentals of thermodynamics
- To introduce the concepts of entropy and enthalpy
- To gain knowledge in kinetic theory and transport phenomena
- To impart the applications of statistical Physics

Unit: I

Thermodynamic systems - The Zeroth law of thermodynamics – Thermodynamic equilibrium – Measurement of temperature - Equation of state of an ideal gas and real gases – Expansivity and Compressibility - The first law of thermodynamics – Work in a volume change - Configuration work and dissipative work - Internal energy – Heat flow - Heat Capacity - Enthalpy - The energy equation: T and V independent - T and P independent - P and V independent - Joule-Thomson effect - Carnot cycle – The heat engine and refrigerator.

Unit: II

The second law of thermodynamics – Entropy – The Tds equations: T and v independent - T and P independent - P and v independent – Entropy and Enthalpy of a pure substance, of an ideal gas, of a van der Waals gas – Helmholtz function and Gibbs function – thermodynamic potentials – Maxwell Relations - phase transitions – Clausius-Clapeyron equation - The third law of thermodynamics.

Unit: III

Applications of thermodynamics to simple systems: Surface tension – Vapor pressure of a liquid drop – The reversible voltaic cell – Black body radiation - Kinetic theory: The principle of equipartition of energy – Classical theory of specific heat capacity – Transport Phenomena: Coefficient of viscosity - Diffusion.

Unit: IV

Statistical physics: Energy states and energy levels - macrostates and microstates – Thermodynamic probability – The Bose-Einstein statistics – The Fermi-Dirac statistics – The Maxwell-Boltzmann statistics - The statistical interpretation of entropy - BE, FD, and MB distribution functions – Comparison of distribution functions for distinguishable particles –– Comparison of distribution functions for indistinguishable particles – partition function.

Unit: V

Applications of statistical physics: The Monatomic ideal gas - The distribution molecular velocities – Ideal gas in gravitational field – The quantized linear oscillator.

Text Books

1. **F. W. Sears and G. L. Salinger,** Thermodynamics, Kinetic theory, and Statistical Thermodynamics, IIIrd ed., Narosa Publishing House (1998).

References

1. **David Halliday, Robert Resnick and Kenneth S. Krane.** *Physics Vol. II,* Vth ed., John Wiley (2002).
2. **R. P. Feynmann,** Feynmann lectures on Physics Vol.I, Addison-Wesley (Narosa Pub.) (1989).

PHY 3575 Solid State Physics (5 credits – 5 hrs/wk)

Objective: This course enables the students

- To understand the various crystal structures and theory of crystal binding
- To understand the theory of band structure and phonon
- To understand the Physics of semiconductors and superconductivity

Unit: I

Crystal Structure and Reciprocal Lattice: Periodic arrays of atoms – Fundamental types of lattice – Packing fraction - Index system for crystal planes – Simple crystal structures – Diffraction of waves by crystals – Bragg law – Reciprocal lattice vectors – Diffraction conditions – Brillouin zones – Reciprocal lattice to SC, BCC, and FCC lattice – Structure factor of BCC and FCC lattice – Atomic form factor.

Unit: II

Crystal Binding and Phonons: Crystals of inert gases – Ionic crystals – Covalent crystals – Metals – Hydrogen bonds – Atomic radii – Vibrations of crystals with monatomic and diatomic basis – Quantization of elastic waves – Phonon momentum – Inelastic scattering by phonons.

Unit: III

Fermi Gas and Energy Bands: Free electron theory in 1D and in 3D – Fermi-Dirac distribution – Density of states – Heat capacity of the electron gas – Electrical conductivity and Ohm's law – Motion of electrons in magnetic field – Hall Effect - Nearly free electron model – Bloch functions – Kronig-Penney model.

Unit: IV

Semiconductors: Band gap - Effective mass – Silicon and germanium – Classifications of material into semiconductor, metal, and insulator - Intrinsic carrier conduction - Impurity conductivity – Donor states – acceptor states – Thermoelectric effects.

Unit: V

Superconductivity: Experimental survey – Destruction of superconductivity by magnetic field – Meissner effect – Isotopic effect – Type I and Type II superconductors – London equation – Coherence length – BCS theory of superconductivity – Flux quantization – Vortex state – DC and Ac Josephson effect – High temperature superconductors.

Text Books

1. **Charles Kittel**, Introduction to Solid State Physics, Wiley-India, 7th edition, 2011

References

1. **S.O. Pillai**, Solid State physics, New age international (P) limited (1997).
2. **Ali Omar,** Elementary Solid State Physics, Pearson Education India, 1993.

PHY 3677 Microprocessor & Communication Systems (6 credits – 6 hrs/wk)

Objective: This course enables the students

- To understand the architecture of microprocessor
- To gain the knowledge of interfacing techniques
- To understand the basic principle of modulation and demodulation
- To gain knowledge in satellite communication

Unit: I

Internal architecture of 8088 microprocessor software model – pipelining, memory timing diagram - Immediate, Register and Memory Addressing modes - Data transfer instruction - Arithmetic and logic instructions - control instruction - conversion of assembly language to machine language.

Unit: II

8088 hardware – Minimum mode maximum mode systems – system clock – Read and write cycle - memory interfacing circuits - 8 bit addition – 16 bit addition & Subtraction – multiplication – ascending order – descending order – simple programs.

Unit: III

Modulation – Need for modulation – Amplitude modulation theory – Frequency spectrum of AM – Representation of AM – Power relation in the AM wave – Generation of AM wave – Evolution of Single Side Band - Suppression of carrier and unwanted side band - Frequency modulation – Mathematical representation of FM – Frequency spectrum of the FM wave – Phase modulation.

Unit: IV

Receiver type – AM receiver – RF section and characteristics – Frequency changing and tracking – Intermediate frequencies and IF amplifiers – Detection and Automatic gain control – Communication receivers – Extension of super heterodyne principle – FM receivers – Basic FM demodulators – Single and Independent side band receivers.

Unit: V

Satellite communication: Introduction – Types of Satellite orbits – Orbital perturbations – Satellite stabilization – Orbital effects on satellites performance – Eclipses – Satellite altitude and earth coverage area – communication satellite – Frequency bands and Payloads – Satellite Telephony, Radio and Television

Text books

1. **Barry.B. Brey**, Intel Microprocessors – Architecture programming and interfacing – Fourth edition – Prentice Hall of India Pvt Ltd, 1997
2. **Walter. A. Tribal & Avtar Singh**, The 8088 and 8086 microprocessors programming, interfacing, software, hardware and applications – Prentice Hall of India Pvt Ltd, 2005.
3. **George Kennedy, Bernard Davis**, Electronic Communication Systems, Fourth Edition, Tata McGraw – Hill Publishing Company, New Delhi, (2003).
4. **Anil. K.Maini, Varsha Agarwal**, Satellite Communications, Wiley India Pvt. Ltd, New Delhi, (2011).

References

1. **Simon Haykin**, Communication system, Fourth Edition, Wiley India Pvt. Ltd, New Delhi, (2013).
2. **Martin. S. Roden**, Analog and Digital Communication Systems, Third Edition, Prentice Hall, India, 1999
3. **S.P. Chowdhury and Sunetra Chowdhury**, Microprocessors and Peripherals, Chancellor Press 2004.

PHY 3672 Physics Project (6 credits – 6 hrs/wk)

Objective: This course is to train the students so that each student shall have the confidence to carry out the independent work, group work and experience in handling of various equipments.

Implementation

Students are given the freedom of choosing the topic of the project. It may be theoretical or experimental. After getting approval of the proposed project work within 5 sessions, students are supposed to carry out these projects in the department laboratory. They may choose computer or microprocessor interfacing projects also.

Students are encouraged to have hands-on experience in designing, fabricating, and analyzing the observations using fundamental concepts studied in the course of study.

Mark Distribution

	Weightage
Presentation of Project Proposal	5%
Continuous assessment for each session	50%
Progress report	20%
Final report	10%
Hard copy of the Project report	15%

PHY3674 Atomic Physics & Spectroscopy (6 credits – 6 hrs/wk)

Objective: This course enables the students

- To understand the fine structure of atom
- To have greater understanding of atomic spectrum with applied fields
- To gain knowledge in Molecular spectroscopy
- To understand the Raman spectroscopy

Unit: I

Optical spectrum of Hydrogen atom - Bohr's Postulates – Quantitative conclusions –Principal quantum number - Spectra of hydrogen-like atoms – Sommerfeld's extension of the Bohr model –Orbital quantum number –Lifting of orbital degeneracy - Limits of the Bohr-Sommerfeld theory – The Correspondence principle – Rydberg atoms –Lifting of orbital degeneracy in the spectra of Alkali atoms - Magnetic moment of orbital motion – Spin and magnetic moment of electron –Spin-orbit splitting in the Bohr model – Fine structure in Hydrogen atom.

Unit: II

Zeeman effect – Normal and anomalous – Stark effect - Paschen-Back effect – Double resonance and Optical pumping – The spectrum of Helium – Electron repulsion and Pauli principle – Angular momentum coupling – X-ray from outer shell & Bremsstrahlung spectra – Emission line spectra – Fine structure of X-rays – Absorption spectra – Auger effect.

Unit: III

The rotation of molecules – Rotational spectra – Diatomic molecules – Rigid molecule – Intensities of spectral line – isotopic substitution – Non-rigid rotator – Polyatomic molecules – Techniques and Instrumentation – Chemical analysis.

Unit: IV

Vibrating diatomic molecule – Diatomic vibrating rotator –Vibration – Rotation spectrum of Carbon Monoxide – Breakdown of the Born-Oppenheimer approximation – Vibration of Polyatomic molecules – Analysis by infra-red techniques - Techniques and Instrumentation.

Unit: V

Classical theory & Quantum theory of Raman scattering – Pure rotational Raman spectra – Vibrational Raman spectra – Polarization of Light and the Raman effect – Structure determination from Raman and IR spectroscopy - Techniques and Instrumentation – Near IR – FT Raman spectroscopy.

Text Books

1. **Haken, Wolf, Springer-Verlag**, Atomic and Quantum Physics, Second edition (1987).
2. **Colin Banwell & Elaine McCash**, Fundamentals of Molecular spectroscopy, Tata McGraw-Hill Publishing Company, Fourth edition (2005).

References

1. **Arthur Beiser,** Concepts of Modern Physics, Tata McGraw Hill Publishing company, Sixth edition (2005).
2. **Aruldhas**, Molecular structure and Spectroscopy, Prentice-Hall of India, First edition (2004).

PHY 3576 Nuclear and Particle Physics (5 credits – 5 hrs/wk)

Objective: This course enables the students

- To know the properties of nucleus
- To acquire knowledge about radiation detector and nuclear reactors
- To understand the nuclear structure, phenomenon of radioactivity
- To know about the basics of elementary particles

Unit: I

Structure and properties of Nucleus: Nuclear size - Nuclear mass – Bainbridge mass spectrometer – mass defect – binding energy – packing fraction – semi empirical mass formula - stability – isotopes – isobars – nuclear forces – meson theory — Fermi Gas model- liquid drop model –predictions of shell model

Unit: II

Radioactive Decay: Law of radioactive disintegration – law of successive disintegration - transient and secular equilibrium – carbon dating – age of earth – alpha decay: Gamow theory – beta decay: neutrino theory - Fermi theory — gamma decay: internal conversion - nuclear isomerism

Unit: III

Radiation detectors and accelerators: GM counter – Wilson cloud chamber – bubble chamber –photographic emulsion – accelerators: – linear accelerators – cyclotron - synchrocyclotron - betatron

Unit: IV

Nuclear reactors: Types of nuclear reactions - Q value equation for nuclear reaction – nuclear transmutation - nuclear fission – nuclear fusion thermonuclear reactions - chain reaction – nuclear reactor – four factor formula – atom bomb

Unit: V

Elementary particles: Classifications of elementary particles – particle interactions – conservation laws – CPT theorem - elementary particle symmetry — SU(3) - quarks model

Text Books

1. **D.C.Tayal** , Nuclear Physics, Himalaya Publishing House, Mumbai, 2011

References

1. **Herald Enge**, Introduction to nuclear physics, McGraw Hill, 1981
2. **R. R Roy and B. P. Nigam**, Nuclear Physics, New Age International Ltd, 2001.
3. **H.S Hans**, Nuclear Physics, New Age International publishers, 2001.
4. **S. B. Patel**, Nuclear Physics an Introduction, Wiley Eastern Ltd, 2012

PHY 3680 Astronomy & Astrophysics (6 credits – 6 hrs/wk)

Objective: This course enables the students

- To understand the basic concepts of astronomy and solar system
- To understand the birth and evaluation of a star
- To know the principles and working of detector instrument
- To earn knowledge in understanding galaxy
- To know the basis of origin of universe

Unit I:

Positional Astronomy and Gravitation: Birth of modern astronomy- Geocentric and heliocentric – the Copernicus revolution. Celestial phenomena, its connection with established (Kepler's laws - Newtonian Gravitation) and new physics; typical physical scales/conditions in astrophysics; order of magnitude estimation; Celestial sphere – coordinate systems: the ecliptic, RA/DEC coordinates, Galactic coordinates; luminosity/flux, magnitude scale, absolute/apparent magnitude - distance measurement, A.U., parsec; – seasons – Eclipse – Solar, lunar - Tides and precession - solar family – inventor of solar systems – our moon – mariner and mars – Venus and mercury – the jovian planets.

Unit II:

Telescopes and Observational Methods: Astronomical observations – Telescopes: optical and infrared, reflecting, refracting, telescope mounts; telescopes' collecting area, diffraction limit, atmospheric seeing; electronic detectors – spectroscopy; Radio telescope – resolving power of radio telescope – radio interferometry; UV, X-ray, gamma ray telescopes.

Unit III:

Stellar Objects: Stars and constellations. Observed stellar properties: main sequence, luminosity dependence on mass, stellar classification based on spectra, connection with Saha ionization formula, Hertzsprung- Russel diagram - magnitude of star light, stellar distances
Stellar models: hydrostatic equilibrium, gas/radiation pressure; order of magnitude estimates; opacity: Thomson, Kramer's, scattering, opacities (absorption coefficients), energy balance; nuclear energy production in stars: binding energy per nucleon, efficiency of fusion, calculation of nuclear reaction rates, tunneling in Coulomb barrier, Gamow's calculation - important nuclear reactions in stars: pp chain, neutrino production in the Sun & consequences; CNO cycle, triple alpha reaction.
Binary stars - evolutionary stages of stars – birth of stars, main-sequence evolution, and late stages of evolution; white dwarf physics, electron degeneracy pressure, Chandrasekhar mass limit; old age star clusters, white dwarfs as dead stars; supernovae, formation of heavy objects - fate of stars.

Unit IV:

Galaxy and Extragalactic Astronomy: Galaxies; Milky Way galaxy, types of galaxies, spirals, ellipticals and irregulars, Hubble pitchfork classification. Milkyway components: gas, stars, magnetic field and cosmic rays; satellites; 21 cm line, rotation curve, dark matter; Jeans instability and star formation, HII regions; phases and components of interstellar medium; cosmic rays.

Unit V:

Basic Cosmology : Olber's paradox; difficulty with Newtonian cosmology; modern cosmological principles – the big bang the expanding universe- cosmological model – scale of the universe – open, close universe – steady state universe – Hubble's law – maximum age of universe. Brief introduction to Einstein's general theory of relativity, especially the line element - Schwarzschild metric, horizon, orbits - FRW metric as a consequence of cosmological principle; redshift, angular and luminosity distances; evolution of scale factor from Newtonian cosmology; density parameter. Thermal history of the Universe, big bang nucleosynthesis; microwave background.

Text Books

1. **A. Rai Choudhuri**, Astrophysics for Physicists, Cambridge University Press, New York, 2010
2. **Carroll B. W. & Ostle, D. A**, An introduction to Modern Astrophysics, Pearson Education- Addison Wesley, 2007
3. **Shu, F,** The Physical Universe, University of California, 1982
4. **Harwit, M,** Astrophysical Concepts, 3rd ed, Springer-verlag, 2006
5. **Maoz, D**, Astrophysics in a nutshell, Princeton University Press, 2006
6. **Padmanabhan,T**, Invitation to Astrophysics, World Scientific, 2006.

PHY3200 Environmental Studies (2 Credits -4 hrs/wk)

OBJECTIVES: Enable the Students

- to understand the importance of conservation energy
- to know about the physical nature of the eco system
- to get knowledge about biodiversity
- to know about various sources of pollution
- to understand the cause of global warming

UNIT 1:

Renewable energy and non renewable energy sources - Worlds reserve of commercial energy sources and their availability – Various forms of energy –fossil fuel availability – applications – merits and demerits - Solar energy – direct and indirect form (basics about wind, ocean energy, biomass) - thermal applications – photo voltaic generations (basics).

UNIT 2:

Ecosystem / Biodiversity and its conservations – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Energy flow in the ecosystem – food chain, food webs and ecological pyramids. Introduction, types, characteristics features, structure and functions of pond ecosystem, forest ecosystem, Grass land ecosystem and Desert ecosystem.

Bio-geographical classification of India – values of biodiversity – biodiversity at global, national and local levels – India as a mega diversity nation – Hot spots of biodiversity – conservation of biodiversity.

UNIT 3:

Pollution and environmental impacts: Fossil fuels and the environment – impacts due to non conventional energy sources – Green house effect – CFC – global warming and ozone depletion – Air pollution – effects – criteria of pollutants.

Pollution and meteorology – Indoor air quality – water pollution – Noise pollution – Thermal pollution – nuclear hazards – acid rain – solid waste management – role of an individual in prevention of pollution – Disaster management – floods, earthquake, cyclone and landslides.

UNIT 4:

Social issues / Human population and the environment –Water conservation assessment of risks – Environmental ethics – waste land reclamation – Environmental protection Act (Air Act, Water Act, Wildlife protection Act, Forest Conservation Act) – Environmental auditing – Public awareness.

Text Books:

1. *Dr.Raman Sivakumar, Introduction to environmental science and engineering*, 2005.
2. *Erach Bharucha, Text Book of Environmental studies for under Graduate Courses*, Universities Press, 2005.

References:

1. *S.P.Sukhatme, Solar Energy*, 2nd edn, Tata McGraw-Hill Publishing Company Limited, 2004.
2. *M.N.Rao, H.V.N.Rao, Air Pollution*, McGraw-Hill Publishing Company Limited, 1993.
3. *Gilbert. M. Masters, Introduction to Environmental Engineering and Science*, Prentice Hall of India Private Limited, New Delhi, 1994.
4. *P.D.Sharma, Ecology and Environment*, 7th Edn, Rastogi Publications, 2005.

PHY 3291 PC management and maintenance (2 credits – 3hrs/wk)

Objective: This course enables the students

- To understand the various hardware components of PC
- To understand the function of an operating system
- To assemble and properly configure a basic windows PC
- To employ basic techniques to troubleshoot hardware problems.

Unit: I

PC Hardware – I: Different components of a PC- input and output devices-Ports and connectors-CMOS battery- installing power supply, Processor, motherboard, RAM, drives (floppy, HDD and optical), adapter cards and internet cables

Unit: II

PC Hardware – II: BIOS and boot process. Compare and contrast desktop, laptop and tablet- Preventive maintenance- static electricity- identifying beep codes- troubleshooting.

Unit: III

PC Software – I: Installing BIOS Software- installing a windows OS- command line interface- graphical user interface- partition manager- formatting partition- file systems (NTFS, FAT32 and EXT)

Unit: IV

PC Software – II: Device Manager- disk cloning- msconfig- regedit- control panel applets- task manager- system utilities- checkdisk- defragmentation-restore point- control panel applets- preventive maintenance- troubleshooting.

Unit: V

Networking: LAN- WAN- WLAN- peer to peer network- client server network- terminologies:-ip addressing- protocol- bandwidth- DHCP- physical components:- hubs- switches- router- wireless access points- twisted pair cable- fiber optic cable- radio waves- installing a modem- configure NIC driver and modem- attach computer to an existing network- troubleshooting.

Text Books

1. **David Anfinson and Kenneth Quamme**, IT Essentials- PC Hardware and Software Companion Guide, Cisco Press (2008)

References

1. **Ron Gilster** , PC Hardware A Beginner's Guide, 2001

PHY 3293 Bio- medical instrumentation (2 credits – 3 hrs/wk)

Objective: This course enables the students

- To understand the basics of bio-medical instrumentation design
- To understand the various diagnostic principles and instruments

Unit: I

Instrument design: Design of medical instruments - Components of bio medical instrumentation - Electrodes - Transducers - Amplifiers - Isolation amplifier - Instrumentation amplifier - Signal analysis

Unit: II

Diagnostic instruments I: Blood flow meters - Blood cell counters - Radiography - Angiography - Endoscopy

Unit: III

Diagnostic instruments II: X-ray - MRI scan - Ultrasonic imaging - Medical thermography.

Unit: IV
Therapeutic instruments I: Pace maker - Batteries - Artificial heart valves - Heart-lung machine

Unit: V
Therapeutic instruments II: Kidney machine - Physiotherapy and electrotherapy equipment

Text Books
1. **M. Arumugam**, Bio-medical Instrumentation, Ed.2, Anuradha Publications, 2003

References
1. **Willard, Merritt, Dean and Settle**, Instrumental methods of analysis, Ed.6 hill valley, California, 1996.
2. **R.S. Khandpur**, Handbook of Medical Instrumentation, Tata McgrawHill, 1999

PHY 3292 HAM Radio & Practice (2 credits – 3 hrs/wk)

Objective: Enable the students
- To understand the basic principles of radio communication and
- To gain knowledge of the various components involved in radio electronics

Unit: I
Amateur Radio Rules & Regulation: Amateur radio - call-sign-Different grades of licensing examinations and licenses – amateur radio rules & regulations - Radio telephony operating procedure- Radio telegraphy operating procedure- The Indian Wireless Telegraphs (Amateur Service) Rules.

Unit: II
Elementary theory of electricity & magnetism: Elementary theory of electricity, conductors and insulators, units, Ohm's law, resistance in-series and parallel, conductance, power and energy, permanent magnets and electromagnets and their use in radio work; self and mutual inductance; types of inductors used in receiving and transmitting circuits, capacitance; construction of various types of capacitors and their arrangements in series and/or parallel.

Unit: III
Elementary theory of alternating currents: Sinusoidal alternating quantities-peak, instantaneous, RMS, average values, phase; reactance, impedance; series and parallel circuits containing resistance, inductance, capacitance; power factor, resonance in series and parallel circuits; coupled circuits; transformers for audio and radio frequencies.

Unit: IV
Radio Receiver and transmitter: Principles and operation of TRF and superheterodyne receivers, CW reception, receiver characteristics-sensitivity, selectivity, fidelity; adjacent channel and image interference; AVC and squelch circuits; signal to noise ratio, Principles and operation of low power transmitter, crystal oscillators, stability of oscillators.

Unit: V

Radio Propagation, Aerials and other safety measures: Wavelength, frequency, nature and propagation of radio waves; ground and sky waves; skip distance; fading**.** Common types of transmitting and receiving aerials-Measurement of frequency and use of simple frequency meters- Safety measures in a ham radio shack.

Text Books

VigyanPrasar, A Comprehensive Study Material for the Ham Radio Enthusiasts, New Delhi, 2010

PHY 3294 Consumer Electronics (2 credits-3hrs/wk)

Objective: Consumer Electronics comprehensively covers the theory, applications and maintenance of various audio/video systems, communication systems and electronic home/office appliances. This course will be of help troubleshooting and maintenance of electronic gadgets.

Unit: I

Passive devices - Resistors - types - colour coding - capacitors - type - colour coding. – Diodes - ac to dc conversion- chokes – Transformers. Electrical charge - current - potential - units of measuring - Ohm's law

Unit: II

Galvanometer, ammeter, voltmeter and multimeter - Electrical energy - power - watt - kWh - consumption of electrical power. ac and DC - Single phase and three phase connections - RMS and peak values.

Unit: III

House wiring - overloading - earthing - short circuiting - Fuses - colour code for insulation wires - Circuit breaker. Electrical switches. Electrical bulbs- Inverter - UPS - Stabilizer - generator and motor

Unit: IV

Fluorescent lamps-LED lamps - street lighting - flood lighting - electrical fans- electrical room heater - wet grinder - mixer - water heater - storage and instant types, electric iron box, microwave oven - induction cooker - fridge.

Unit: V

Microphones, Headphones, loud speakers and room acoustics - Basic concepts of radio transmitter and receiver - Basic concepts of TV- Transmitter and receiver - Dish antenna - DTH system - Mobile communication system - MODEM.

Text books

1**. B L Theraja & A.K. Thereja**, A text book in Electrical Technology, S Chand & Co., 2005
2. **M G Say**, Performance and design of AC machines, ELBS Edn.
3. **S.P. Bali**, Consumer electronics, Pearson education - 2005

THE AMERICAN COLLEGE, MADURAI

DEPARTMENT OF CHEMISTRY (UG)

Program for Choice Based Credit System – 2015 – 2016

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
1	I	TAM/FRE/HIN		3	2	30
1	II	ENG 1201	Conversational Skills	3	2	30
1	IIIC	CHE 1511	Physical Chemistry – 1	5	5	75
1	IIIC	CHE 1513	Inorganic Chemistry – 1	5	5	75
1	IIIC	CHE 1331	Inorganic Quantitative Analysis	3	3	45
1	IIIS	PHY	Physics	5	4	60
1	IV	XXX	Non Major Elective – 1	3	2	30
1	IV	XXX	Life Skill – 1	3	2	30
1	V		NSS/NCN/NCC/PED/SLP			
			Total	30	27	405
2	I	TAM/FRE/HIN		3	2	30
2	II	ENG 1202	Reading & Writing Skills	3	2	30
2	IIIC	CHE 1512	Organic Chemistry – 1	5	5	75
2	IIIC	CHE 1514	Inorganic Chemistry – 2	5	5	75
2	IIIC	CHE 1332	Organic Analysis and Preparation	3	3	45
2	IIIS	PHY	Physics	5	4	60
2	IV	XXX	Non Major Elective – 2	3	2	30
2	IV	XXX	Life Skill – 2	3	2	30
2	V		NSS/NCN/NCC/PED/SLP			
			Total	30	27	405
3	I	TAM/FRE/HIN		3	2	30
3	II	ENG 2201	Study Skills	3	2	30
3	IIIC	CHE 2511	Organic Chemistry – 2	5	5	75
3	IIIC	CHE 2513	Inorganic Chemistry – 3	5	5	75
3	IIIC	CHE 2515	Physical Chemistry – 2	5	5	75
3	IIIC	CHE 2431	Inorganic Qualitative Analysis	4	4	60
3	IIIS	MAT/BOT	Mathematics / Botany	5	4	60
3	V		NSS/NCN/NCC/PED/SLP			
			Total	30	29	435
4	I	TAM/FRE/HIN		3	2	30
4	II	ENG 2202	Career Skills	3	2	30
4	IIIC	CHE 2512	Organic Chemistry – 3	5	5	75
4	IIIC	CHE 2514	Inorganic Chemistry – 4	5	5	75
4	IIIC	CHE 2516	Physical Chemistry – 3	5	5	75
4	IIIC	CHE 2432	Organic Estimation and Gravimetric Analysis	4	4	60
4	IIIS	MAT/BOT	Mathematics / Botany	5	4	60
4	V		NSS/NCN/NCC/PED/SLP			
			Total	30	29	435

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
5	IIIC	CHE 3611	Organic Chemistry – 4	6	6	90
5	IIIC	CHE 3613	Inorganic Chemistry – 5	6	6	90
5	IIIC	CHE 3615	Physical Chemistry – 4	6	6	90
5	IIIC	CHE 3531	Physical Chemistry Lab	5	5	75
5	IV	CHE 3200	Environmental Studies	4	2	30
5	IV		Life Skill – 3	3	2	30
			Total	30	27	405
6	IIIC	CHE 3612	Organic Chemistry – 5	6	6	90
6	IIIC	CHE 3614	Applied Chemistry	6	6	90
6	IIIC	CHE 3616	Physical Chemistry – 5	6	6	90
6	IIIC	CHE 3532	Special Lab Techniques	5	5	75
6	IV	VAL	Value Education	4	2	30
6	IV		Life Skill – 4	3	2	30
			Total	30	27	405
			Grand Total	180	158	2430

LIFE SKILL COURSES

Sem	**Part**	**Course No**	**Course Title**	**Hours**	**Credits**	**Marks**
1	IV	CHE 1271	Cosmetics and Consumer Products	3	2	30
2	IV	CHE 1272	Chemistry in Crime Investigation	3	2	30
5	**IV**	**CHE 3215**	**Medicinal Chemistry**	**3**	**2**	**30**
6	**IV**	**CHE 3216**	**Dairy and Dairy products**	**3**	**2**	**30**

CHE3611 ORGANIC CHEMISTRY – IV 6 credits/6 hours

The primary objective of this course is to learn and appreciate the role of chemistry in nature. It is designed to systematically study the various biological aspects pertaining to proteins, enzymes, lipids, nucleic acids, carbohydrates, alkaloids and terpenoids.

Unit – I Proteins and Enzymes 15 hrs

Aminoacids – classification, structure and stereochemistry – Zwitter ion – isoelectric point – electrophoresis – preparation and reaction of amino acids – structure and Nomenclature of peptides and proteins – classification – determination of structure of peptide – end group analysis – classical peptide synthesis – solid phase peptide synthesis – protein structure (1^o, 2^o, 3^o and 4^o) – protein denaturation and renaturation.

Enzymes – specificity – prosthetic group – co-enzyme, apoenzyme, holoenzyme, co-factor – nomenclature and classification of enzyme – typical enzymes – sources – mode of enzyme action – enzyme inhibition – application of enzymes.

Unit – II Nucleic acids and Lipids 15 hrs

Constituents of nucleic acids – bases, sugars, nucleotides, nucleosides – laboratory synthesis of nucleosides and nucleotides – DNA, RNA – genetic code and heredity.

Lipids – classification – oils and fats – structure, chemical reactions, physical characteristics, rancidity, acid value, saponification value, iodine value, RM value, hydrogenation of oil

Unit – III Carbohydrates 15 hrs

Classification and nomenclature – monosaccharide and their configuration – erythro and threo – diasteromers – epimers – anomers – cyclic structure of monosaccharides – determination of ring size – mechanism of mutarotation – glycosides and their hydrolysis – formation of ethers and esters – reducing and non – reducing sugars – mechanism of osazone formation – interconversion of aldoses and ketoses – ascending and descending the sugar series – an introduction to disaccharide (sucrose, maltose and lactose) and polysaccharide (starch and cellulose).

Unit – IV Alkaloids 15 hrs

Nomenclature and classification – occurrence and extraction – general methods of structural elucidation of Coniine, Nicotine, Piperine and Atropine.

Unit – V Terpenoids 15 hrs

Occurrence of terpenoids – classification – isoprene rule – structural elucidation of Citral, Limonene, Menthol and Camphor.

Text Book:

M.K. Jain and S.C. Sharma, Textbook of Organic Chemistry, Vishal publishing Co, 2012, IV (Revised edition).

Reference:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemistry, Pearson publication, 7th edition, 2012.
2. B. Mehta and M. Mehta, Organic Chemistry, Prentice – Hall of India Private limited,2007.
3. P.L. Soni and H.M. Chawla,Textbook of Organic Chemistry , Sultan Chand and Sons, 28th edition, 2007.
4. I.L. Finar, Organic Chemistry, Vol.I, ELBS publication, 6th edition, 2002.

CHE 3613 INORGANIC CHEMISTRY – V 6 credits/6 hours

This course exposes the students to the developing areas of organometallic catalysis and bioinorganic chemistry. It also imparts knowledge about the radioactivity and nuclear reactions**.**

Unit – I Organometallic chemistry 15 hrs

Organometallic ligands – types of organometallic compounds – organometallic compounds of group 12 – 15 elements – metal complexes with pi – acceptor ligands – π acidity – metal carbonyls – types – EAN rule – theoretical basis – synthetic methods, reactivities, structure and bonding in $Ni(CO)_4$, $Fe(CO)_5$, $Cr(CO)_6$, $Co_2(CO)_8$ and $Mn_2(CO)_{10}$ – synergism – vibrational spectra – mixed carbonyls – compounds with multinuclear centres – alkene complexes – carbocyclic systems – ferrocene – preparation, properties, structure and bonding (VB explanation).

Unit – II Reactions and mechanism of coordination compounds. 15 hrs

Lability and inertness – interpretation in terms of VBT – acid hydrolysis of octahedral complexes – S_N1 and S_N2 mechanism – factor influencing – base hydrolysis of octahedral complexes – S_N1CB mechanism – evidences – stereochemistry of intermediate of base hydrolysis – trans effect – π-bond theory – applications – transition metal complexes as catalyst – Wilkinson's catalyst – Ziegler-Natta catalyst – their catalytic cycles.

Unit – III Bioinoganic chemistry 15 hrs

Essential and non – essential metals – oxygen carriers – hemoglobin, myoglobin, hemocyanin – metalloenzymes – cyanocobalamine – carbonic anhydrase ,cytochrome P-450 – role of alkali metals – sodium ion pump – alkaline earth metals – toxicity of Hg, Pb, Cr – metals in medicine and diagnosis – chelate therapy, invivo fixation of nitrogen.

Unit – IV f – Block elements 15 hrs

Lanthanide series – occurrence – properties – electronic configuration, oxidation state – ionic radii – lanthanide contraction – colour , spectra, magnetic properties – complexes of lanthanides – separation of lanthanides – Actinide series – transuranic elements – properties – electronic configuration, oxidation state, ionic radii, colour – comparison with

lanthanides – extraction of thorium– extraction of uranium – compounds of uranium – uses of lanthanides – plutonium as source of energy.

Unit – V Nuclear chemistry 15 hrs

Nuclear particles – nuclear forces – packing fraction – mass defects and binding energy of nucleus – stability of nucleus – nuclear models – liquid drop model – nuclear reactions – Q values – spallation – nuclear fission – atomic bomb – the concepts of critical mass – nuclear fusion – Hydrogen bomb – radioactivity – artificial transmutation – half life period – radioactive displacement laws – modes of decay – applications of radioactivity – nuclear reactors – measurement of radioactivity – GM counter – Wilson cloud chamber – nuclear accelerator – cyclotron.

Text book:

B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers (2012)

References:

1. Lee. J.D, Concise Inorganic chemistry, V edition, Chapman and Hall Ltd, London (2000)
2. Cotton F.A., Wilkinson G., Basic Inorganic Chemistry, III Edition, John Wiley and Sons, Singapore (2004)
3. James. E. Huheey., Keiter E.A., Keiter R.L, Inorganic chemistry, IV edition, Pearson Education, (Singapore), Delhi (2005)
4. Gopalan R., Ramalingam V, Concise Coordination Chemistry, Vikas Publishing house, New Delhi, (2006)
5. Hay R.W, Bioinorganic Chemistry, Ellis Horwood (1984)
6. Bertini, Lippard, Gray, Bioinorganic Chemistry, Viva Book Pvt. Ltd (1998)
7. Arniker H .J., Essentials of Nuclear Chemistry, IV Edition, New Age International Ltd., New Delhi (1995)

CHE3615 PHYSICAL CHEMISTRY – IV 5 credits/6 hours

This course provides basic information regarding classical and quantum mechanical treatment of atom and nature and behavior of light. Nano chemistry gives an overall view on the concepts and applications in day today life. Outline on the macromolecule is dealt along with various methods of analysis of the same. Along with introducing phase rule, examples of each system have been covered.

Unit – I Quantum Mechanics – I 15 hrs

Dual nature of light – photoelectric effect, Compton effect – dual nature of electron – de Broglie relationship – Davison and Germer experiment – Heisenberg's uncertainty principle – Electron, Charge, Mass – Milliken's oil drop technique – Rutherford's experiment – Mosley's experiment – Rutherford's model – Radiant energy – electromagnetic spectrum – black body radiation – Plank's distribution law – hydrogen spectrum – Ritz combination

principle – Bohr's model of hydrogen atom and their comparison – Sommerfeld's extension of Bohr theory – failure of Sommerfeld theory.

Unit – II Quantum Mechanics – II 15 hrs

Time independent Schrödinger equation – Postulates of quantum mechanics – Operators in quantum mechanics – interpretation of wave function – operators – eigen values – orthonormal function – discussion of particle in a box problem (1D and 3D) – rigid rotor – simple harmonic oscillator(no derivation) – Bohr's correspondence principle – hydrogen atom problem – Schrödinger equation in polar coordinates – separation of variables – electron spin – Zeeman effect – spherical harmonics – radial distribution curve

Unit – III Macromolecules 15 hrs

Different types of polymers – classification of polymers – molecular weight of polymers – number average and weight averages – determination of molecular weight of polymer – viscosity, osmotic pressure – ultracentrifuge, sedimentation methods and light scattering methods – Conducting polymers: elementary ideas – polyacetylene, poly anilines.

Unit – IV Phase Diagram 15 hrs

Introduction – terminology – Gibb's phase rule and its derivation – one component system – water, sulphur, helium systems – freezing point curves – two component system – simple eutectic systems – Lead-Silver, Potassium Iodide-water system – two component system with compound formation – congruent and incongruent melting points – Zn-Mg, Ferric Chloride-water, sodium sulphate-water systems, Copper sulphate-water systems, industrial applications.

Unit – V Nano Chemistry 15 hrs

Nano and Nature – Nano: The beginning (1D, 2D and 3D) – Fullerenes – introduction – experimental set up to detect C_{60} – Carbon nanotubes – types – physical properties and applications – Difference between Langmuir Blodgett and self assembly techniques – Applications of Self assembled monolayers (SAMs) – Nanomedicines – nanoshells – nanopores – tectodendrimers

Text book:

Principles of Physical Chemistry, B. R. Puri, L. R. Sharma, and M. S. Pathania, 44th edition, Vishal Publishing company, 2010.

References:

1. Principles of Physical Chemistry, Puri, Sharma and Pathania, Vishal Publishing Co., 2014.
2. Textbook of Physical Chemistry, P.L. Soni, O.P. Dharmandam,
3. Essential of Physical Chemistry, Arun Bahl, B.S. Bahl and G.D. Tuli, S. Chand, 2014,
4. Physical Chemistry, G.W. Castellan, 3rd edition, Addison – Wesley, 1983.
5. Physical Chemistry, 8th edition, P.W. Atkins and J.de Paula, Oxford University press, 2008.
6. Inorganic Chemistry, 5th edition, P.W. Atkins, Oxford University press, 2009.
7. Nano: The essentials: Understanding Nanoscience and Nanotechnology, T. Pradeep, Tata McGraw Hill publishing company, 2008.

CHE3531 PHYSICAL CHEMISTRY LAB 5credits/5hrs

This laboratory course imparts knowledge in the various fields of physical chemistry such as adsorption, chemical kinetics, phase equilibria, potentiometric and conductivity measurements etc.

1. Equivalent conductance – verification of Onsager equation
2. Conductometry – i) Titration of strong acid Vs strong base
   ii) Titration of weak acid Vs strong base
3. Potentiometry – redox titrations
4. Validity of Freundlich adsorption isotherm
5. Kinetics of acid catalysed hydrolysis of ester
6. Kinetics of Iodination of acetone
7. Critical solution temperature – phenol – water system
8. Phase diagram – simple eutectic system
9. Transition temperature – Thermometric method
10. Heat of solution – Solubility method

CHE3612 ORGANIC CHEMISTRY – V 6 credits/6 hours

This course is designed to study the application of basic spectroscopic techniques in structural elucidation of organic compounds. Students will be trained in theoretically analyzing the photochemical and thermal changes of organic compound. This course will also provide basic knowledge on uses and preparation of dyes, organometallic and active methylene compounds

Unit – I UV-Vis, IR spectroscopy and Mass spectrometry 15 hrs

UV- Visible spectroscopy

Types of electronic transitions – Beer Lambert's law – terminologies used in UV Visible spectrum – seleection rules – effect of conjugation – effect of solvent – Woodward – Fieser rules – dienes and enones – applications of UV – Visible spectra.

IR Spectroscopy

Selection rules – Hooke's law – different molecular transitions – factors affecting vibrational frequencies – characteristic frequencies of important functional groups – Finger print region – Examination of IR spectra.

Mass Spectrometry

Basic principle – molecular ion peak – nitrogen rule – terms used in mass spectra (m/e, $M^{+\cdot}$ etc..) – isotopic pattern – even– electron rule – general rules of fragmentation – fragmentation pattern (alkane, alcohol, alkyl halide, aryl halide, aldehyde and ketone)

Unit – II NMR spectroscopy 15 hrs

^{1}H NMR Spectroscopy

Theory – relaxation processes – shielding, deshielding and chemical shift – factors affecting chemical shift – peak area and proton counting – splitting of signals and coupling constants – chemical and magnetic equivalence – simple problems in ^{1}H NMR.

^{13}C NMR Spectroscopy

Basic principles – Off resonance and Broad band decoupling techniques

Unit – III Pericyclic reactions 15 hrs

Photochemical vs thermal reactions – MO theory – LCAO method – bonding and antibonding MO's – electronic configuration of some molecules – 1,3 – butadiene – allyl systems – benzene – Woodward – Hofmann rules – electrocylic, cycloaddition and sigmatropic reactions using FMO

Unit – IV Dyes, Color and Constitution 15 hrs

Color and structure – Witt theory – Quinonoid theory – Modern theory – Classification of dyes (based on structure, based on its mode of application on fabrics) – Preparation and application of dyes – Methyl orange, Congo red, Bismuth brown, Malachite green, Phenolphthalein, Eosin, Fluorescein

Unit – V Organometallic and Active methylene compounds 15 hrs

Organometallic reagents – organomagnesium, oganozinc, organolithium, organocopper, and organosilicon – preparation and reactions.

Reactions and synthetic applications of active methylene compounds – diethylmalonate, ethyl acetoacetate, cyanoacetic ester

Text Book:

M.K. Jain and S.C. Sharma, Textbook of Organic Chemistry, Vishal publishing Co, IV (Revised edition), 2012.

Reference:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemistry, Pearson publication, 7th edition, 2012.
2. B. Mehta and M. Mehta, Organic Chemistry, Prentice – Hall of India Private limited,
   2007.
3. P.L. Soni and H.M. Chawla,Textbook of Organic Chemistry , Sultan Chand and Sons, 28th edition, 2007.
4. JagMohan, Organic spectroscopy: Principles and applications, Narosa publishing House, 2nd edition, 2005

CHE3616 PHYSICAL CHEMISTRY – V 6 credits/6 hours

The students get to know the principles of various spectroscopic analytical tools available for analysis of chemical compounds. Derivations of the spectroscopic methods are taught at basic level to enhance the student's knowledge on the roots of these available techniques. The chemistry point of group theory is presented at the introductory level with some applications. It also covers various photo chemical pathways and their applications.

Unit – I Spectroscopy – I 15 hrs

Molecular Spectroscopy: Introduction – regions of the spectrum – basic elements of practical spectroscopy – signal to noise ratio – resolving power – the width and intensities of spectral lines.

Microwave Spectroscopy: The rotation of the molecules – rotational spectra of diatomic molecules – linear polyatomic molecules.

IR Spectroscopy: Vibrating diatomic molecules – simple harmonic and unharmonic – diatomic vibrating rotator –Born Oppenheimer approximation – breakdown – vibrations of polyatomic molecules – overtones and combinations – analysis of IR spectra – skeletal vibrations and characteristic group vibrations – Instrumentation

Unit – II Spectroscopy – II 15 hrs

Raman Spectroscopy: Introduction – molecular polarizability – selection rules – pure rotational Raman spectra – linear molecules – vibrational Raman spectra – mutual exclusion principle – structural determination from Raman and IR spectra - nitrate, carbonate

Electronic spectra of diatomic molecules – Franck-Condon principle – dissociation constant of a diatomic molecule.

PES – principles of photoelectron spectroscopy and its applications

Unit – III Spectroscopy – III 15 hrs

NMR spectroscopy: basic principle – instrumentation – chemical shifts – spin – spin coupling

ESR spectroscopy: basic principle – hyperfine structure – presentation of ESR spectra – nitrogen rule – g-factor – splitting – applications of ESR spectroscopy – comparison between ESR and NMR

Mossbauer Spectroscopy: introduction, principle and applications

Unit – IV Group Theory 15 hrs

Properties of a group – group multiplication table – cyclic groups – subgroups – classes – symmetry elements and operations and its relation to optical activity – symmetry point groups – identification of point groups – matrices of geometric transformations – representations of groups – reducible and irreducible representations – rules governing irreducible representation and their characteristics – relationship between reducible and

irreducible representations – character tables C_{2v}, C_{3v}, C_{2h} – group theoretical selection rule in vibrational spectroscopy.

Unit – V Photochemistry 15 hrs

Photochemical and thermal reactions – comparison – Jablonski diagram – laws of photochemistry – Grotthus-Draper law – Stark- Einstein law – photochemical reactions in solution – Beer-Lambert's law – limitations – Quantum yields – Determination of Quantum yields – Photochemical rate law – kinetics of HBr and HCl formations – photochemical equilibrium – Photochemical process – secondary photochemical processes – photosensitization – Quenching – Stern-Volmer equation – photosynthesis – chemiluminescence – laser and maser – applications of laser

Text book:

Principles of Physical Chemistry, B. R. Puri, L. R. Sharma, and M. S. Pathania, 44th edition, Vishal Publishing company, 2010.

References:

1. Principles of Physical Chemistry, Puri, Sharma and Pathania, Vishal Publishing Co., 2014.
2. Textbook of Physical Chemistry, P.L. Soni, O.P. Dharmandam,
3. Essential of Physical Chemistry, Arun Bahl, B.S. Bahl and G.D. Tuli, S. Chand, 2014.
4. Physical Chemistry, G.W. Castellan, 3rd edition, Addison – Wesley, 1983.
5. Physical Chemistry, 8th edition, P.W. Atkins and J.De Paula, Oxford University press, 2008.
6. Fundamentals of Molecular Spectroscopy, 4th edition, C.N. Banwell, Tata McGraw Hill publications, 1995.
7. Chemical applications of Group theory, 3rd edition, F.A. Cotton, Wiley, 1990.

CHE 3614 APPLIED CHEMISTRY 6 credits/6 hrs

This course deals with the application of various chemical concepts in different fields. Ideas pertaining to the techniques of water treatment for domestic purpose, polymers and paints in our daily life are discussed. Also the chemistry behind fertilizers, ceramics and refractory materials will be covered. Through this course the students will be able to appreciate the significance of their knowledge of chemistry in their day to day life.

Unit – I : Water Treatment 15 hrs

Hardness of water – temporary hardness, permanent hardness – Units of hardness – Estimation of hardness – EDTA method – Estimation of total hardness – Water softening methods – Lime–Soda process, Zeolite process, Ion – exchange – Desalination – Reverse osmosis – Potability of water – Plumbosolvency – Nano filters

Unit – II : Polymers **15 hrs**

Synthetic polymers – Preparation, properties and uses of Polyethylene, PVC, Teflon, Nylon, Phenol formaldehyde, Urea Formaldehyde, Epoxy resin

Rubber – natural and synthetic – vulcanisation

Biodegradable polymers – classification – biomedical applications – medical sutures, pins, dental implants

Biostable polymers – Biomedical applications – cardiovascular applications – bones, joints, dental polymers – contact lenses and IOL – hemodializer materials – tissue engineering polymers – controlled release of drugs – polymeric blood substitutes – Nano biopolymers and application

Unit – III : Fertilizer **15 hrs**

Plant Nutrients – nutrients functions – need and requirements of fertilizers – classification – Nitrogenous fertilizers – types, preparation and uses – Phosphate fertilizers – types, preparation and uses – Potassium fertilizers – NPK fertilizers – ill effects of fertilizers – Biofertilizers – manures, compost, sawdust, biogas manures – Nano fertilizers – elementary ideas and uses

Unit – IV : Ceramics and Refractories

Ceramics – properties and types – basic raw materials – Clay – formation, types, properties – Glazing – Porcelain and China

Refractories – classification, properties – super refractories – preparation, properties and uses of Silicon carbide, graphite, oxides, Cermets, insulating refractories

Nano ceramics – elementary ideas and applications

Unit – V : Paints and Explosives **15 hrs**

Paints – classification – constituents – Pigment Volume Concentration – Distember – Varnishes – Lacquers - Pigments – name and formula of different coloured pigments and their uses – Toners – Nano paints

Explosives – classification – characteristics – chemistry of Nitrocellulose, nitroglycerine, gun powder, RDX – Toxic chemicals – important requirements – mustard gas, phosgene, nerve gas, adamsite, chloroacetophenone, chloropicrin – Screening smokes – Incendiaries - Pyrotechniques

Text book:

1. Industrial Chemistry, B.K.Sharma, 7th edition, 1995, ISBN – 8185842531, GOEL publishing house.

Reference books:

1. Environmental Chemistry, A.K. De, 4th edition, 2000, New Age International (P) Ltd.
2. Applied Chemistry, K. Bagavathi Sundari, 2006, ISBN 818094025X, MJP publishers. (Unit – 2)
3. Contemporary Polymer Chemistry, Harry R. Allcock, Frederick W. Lampe, James E. Mark, 3rd edition, 2005, Pearson Prentice hall. (Unit – 2)
4. Fundamental Concepts of Applied Chemistry, Jayashree Ghosh, 2nd edition, 2006, S. Chand publishing. (Unit – 3)

CHE 3532 SPECIAL LAB TECHNIQUES 5 credits/5hrs

This course deals with the various techniques like chromatography, viscosity, optical, emf and pH measurements etc. Students will be trained in analyzing commercial samples.

1. Column chromatography
2. Paper chromatography
3. Thin layer chromatography
4. Polarimetry – Inversion of sucrose
5. Ostwald viscometer – Measurement of Viscosity of liquids
6. Potentiometry – Dissociation constant of weak acid
7. Spectrophotometer – Validity of Beer – Lambert's law
8. Standardisation of pH meter and dissociation constant of weak acid
9. Conductometry – Titration of strong acid and weak acid in a mixture Vs strong base
10. Saponification value of an oil.

CHE 3200 ENVIRONMENTAL STUDIES 2Credits/4 hrs

In this course various types of pollutions, different types of pollutants the need and ways of controlling them will be discussed. Socio-environmental issues will also be dealt with.

Unit – I Introduction 10 hrs

Definition, scope, awareness – concept of environmental receptors, sink, pathways of pollutants speciation, environmental segments.

Composition of the atmosphere – atmospheric structure – formation of inorganic and organic particulate matters – photochemical reactions

Unit – II Ecology 10 hrs

Definition and kinds, biological cycles – Natural resources, renewable and non – renewable resources – food resources – mineral resources – forest resources – role of an individual in conservation of natural resources.

Unit – III Water and Soil Pollution 10 hrs

Source – BOD, COD, sewage treatment, primary and secondary treatment – industrial waste water treatment. Potable water and their standards. Soil pollution – treatment of soil pollution – disposal of radioactive waste

Unit – IV Air Pollution 10 hrs

Pollutants –particulate pollution – smog, acid rain – global warming – green house effect – metal pollution – monitoring of air pollution. Thermal and radioactive pollution – source – nuclear power plant. Noise pollution – source and effect. Noise level index

Unit – V Socio-environmental issues 10 hrs

Environmental act: air and water – wild life protection act – forest conservation act – issues involved in enforcement of environmental legislation. Human population and environment – population growth – variation among nations – population explosion – family welfare program – environment and human health – human rights – women and child welfare – value education – role of information technology in human health – case study.

References:

1. B.K. Sharma and H. Kaur, Environmental Chemistry, Goel Publishing House, Meerut, 1996.
2. H.Kothandaraman and G.Swaminathan. Principles of Environmental Chemistry. B.I. Publications, Chennai, India. 1997.
3. A.K.De, Environmental Chemistry. 4th Edition, New Age International (P) Ltd., New Delhi, India. 2000.
4. Abnubha Kaushik, C.P.Kaushik "Perspectives in Environmental Studies" New Age International Publishers, 3rd Edition, 2009.
5. S.S. Dara, A Textbook of Environmental Chemistry and Pollution Control, 8th Edition, S. Chand and Sons, New Delhi, 2008.

LIFE SKILL COURSES

CHE 3215 MEDICINAL CHEMISTRY 2Credits/3 hrs

This course intended to impart knowledge about the development of drugs and the need for conversion of drugs into medicines. This course also deals with pharmacokinetics, pharmacodynamics and pharmaceutical marketing.

Unit – 1 Basic Concepts 8 hrs

Drug – definition – requirements of an ideal drug – history of drug development – nomenclature of drugs – classification of drugs based on Sources, Chemical structure and Therapeutic actions. – Terminologies – pharmacology, pharmacy, pharmaceutics, toxicology, chemotherapy, pharmaco – dynamics, pharmaco – kinetics.

Unit – II Need for Drugs 8 hrs

Deficiency, disorder and diseases – Disease causing organisms – bacteria – types, fungi, virus and their activities – differences between them – specific diseases caused by various organisms – Immunity, Vaccination – Adverse drug reactions, types and minimisation.

Unit – III Pharmacokinetics and Pharmacodynamics 8 hrs

Pharmacokinetics: Introduction – Absorption, distribution, metabolism and excretion (ADME) – LD_{50}, ED_{50} Therapeutic index.

Pharmacodynamics: Elementary treatment of drug action, mechanism – enzyme stimulation, enzyme inhibition and drug design – Lead, analog, prodrug, Significance of drug metabolism in medicinal chemistry.

Unit – IV Formulation of Drug 8 hrs

Need for conversion of drugs into medicine – additives and their role – classification of formulations – route wise and form wise: tablets, capsules, syrups, suspensions, powders, ointment, creams, gels, lotions, sprays suppositories, injections.

Unit – V Pharmaceutical Marketing: **8 hrs**

Manufacture, packaging, distribution and stocking. Pharmaceutical Market, Pharmacy – Channels of distribution – Wholesaler and retailer – Departmental stores and chain stores – mail order business – Drug house management.

Traits and demands of medical representatives –Salesmanship – Uniqueness of pharma selling– Theories of selling – Planning – Detailing of products.

References:

1. G L David Krupadanam, D Vijaya Prasad, K Varaprasad Rao, K L N Reddy C Sudhakar, Drugs, Universities Press, Hyderabad (2001).
2. Graham Patrick, Instant notes – Medicinal chemistry, Pragati Prakashan Viva books (pvt) Ltd, 2002.
3. Alka and Gupta, Medicinal chemistry, Pragati Prakashan, II Edn , 2008.
4. Sekhar mukhopadhyay, Pharmaceutical selling – A text book, Sterling publishers private Ltd.1997.

CHE 3216 DAIRY AND DAIRY PRODUCTS 2 Credits/3 hrs

This course enriches the student's understanding about the milk and the various techniques involved during the processing and preservation of milk. This course also deals with various dairy products such as special milk, milk derivatives, and fermented milk products derived from milk.

Unit – I Composition of milk 8 hrs

Composition and structure of milk – constituents of milk – lipids, proteins, carbohydrates, vitamins and minerals – – Properties of milk – odour,density,viscosity,optical properties, acidity, freezing point – Recknagel's effect – estimation of fats and total solids in milk

Unit – II Milk processing and preservation 8 hrs

Microbiology of milk – Destruction of microorganism in milk – pasteurisation –types of Pasteurisation – bottle, Batch and HTST – ultra high temperature pasteurisation – preservatives and neutraliser

Unit – III Milk Derivatives 8 hrs

Cream – composition – chemistry of creaming process

Butter – composition – desibutter – salted butter

Ghee – major constituents – common adulterants added to ghee and their detection – rancidity – definition – prevention – antioxidants

Unit – IV Special Milk 8 hrs

Definition – merits – flow diagram for manufacturing – reconstituted milk – homogenised milk – flavoured milk – vitaminised milk – toned milk – imitation milk – condensed milk – definition, composition and nutritive value

Unit V – Milk products 8 hrs

Fermented milk products – definition of culture – cultured cream – cultured butter milk – cheese – unripened cheese – ripened cheese – paneer – yohurt and mazzorola cheese

Ice cream – types – ingredients – manufacture – stabilizer – emulsifiers and their role

Milk powder – skimmed milk powder – whole milk powder – buttermilk powder – types of drying process

References:

1. Sukumar De, Outlines of Dairy Technology, Oxford University Press, New Delhi, (2001)
2. Lillian Hoagland Meyer, Food Chemistry, CBS Publishers, New Delhi.(2004)

Department of Undergraduate Botany

B.Sc. – Botany Programme (CBCS)

(With effect from June 2015)

Sem.	Part	Course No.	Course Title	Hr.	Cr.	Marks
1	I	***12XX	TAM/HIN/FRE	3	2	30
	II	ENG1201	Conversational Skills	3	2	30
	IIIC	BOT1531	Ecology	5	5	75
	IIIC	BOT1433	Learning Basic Skills In Biology(LBSB)	4	4	60
	IIIC	BOT1435	LAB I (Ecology and LBSB)	4	4	60
	IIIS	CHE14XX	Chemistry for Botanists -1	3+2L	3+1	45+15
	IVE	***12XX	Basic Tamil/Adv.Tamil/Non-Major	3	2	30
	IVLS	***12XX	Life Skill -1	3	2	30
	V	***11XX	NCA/NCN/NSS/PED/SLP		-	
			Total	**30**	**25**	
2	I	***12XX	TAM/HIN/FRE	3	2	30
	II	ENG1202	Reading and Writing Skills	3	2	30
	IIIC	BOT1532	Economic Botany	5	5	75
	IIIC	BOT1434	Horticulture Practices and Post-Harvest Technology (HPPHT)	4	4	60
	IIIC	BOT1436	LAB II (Economic Botany and HPPHT)	4	4	60
	IIIS	CHE14XX	Chemistry for Botanists - 2	3+2L	3+1	45+15
	IVE	***12XX	Basic Tamil/Adv.Tamil/Non-Major	3	2	30
	IVLS	***12XX	Life Skill -2	3	2	30
	V	***11XX	NCA/NCN/NSS/PED/SLP		1	
			Total	**30**	**25+1**	
3	I	***22XX	TAM/HIN/FRE	3	2	30
	II	ENG2201	Study Skills	3	2	30
	IIIC	BOT2531	Microbiology and Phycology	5	5	75
	IIIC	BOT2533	Archegoniatae	5	5	75
	IIIC	BOT2335	Genetics and Plant Breeding	3	3	45
	IIIC	BOT2637	LAB III (Micro+Arche +Genetics)	2+2+2	6	90
	IIIS	ZOO24XX	General Zoology-I	3+2L	3+1	45+15
	V	***21XX	NCA/NCN/NSS/PED/SLP			
			Total	**30**	**27**	
4	I	***22XX	TAM/HIN/FRE	3	2	30
	II	ENG2202	Career Skills	3	2	30
	IIIC	BOT2552	Mycology and Pathology	5	5	75
	IIIC	BOT2444	Cell Biology	4	4	60
	IIIC	BOT2436	Anatomy and Reproductive Biology of Angiosperms (ARBA)	4	4	60
	IIIC	BOT2638	LAB IV (Myco+Cellbio+ARBA	6	6	90
	IIIS	ZOO24XX	General Zoology II	3+2L	3+1	45+15
	V	***21XX	NCA/NCN/NSS/PED/SLP		1	
			Total	**30**	**27+1**	

Sem.	Part	Course No.	Course Title	Hr.	Cr.	Marks
5	IIIC	BOT 3631	Plant Systematics	6	6	90
	IIIC	BOT3633	Biochemistry	6	6	90
	IIIC	BOT3535	Analytical Techniques and Research Methodology	5	5	75
	IIIC	BOT3637	LAB – V (Systematics + Biochem)	3+3	6	90
	IVLS	***32XX	Life Skill - 3	3	2	30
	IVEVS	BOT 3200	Environmental Studies	4	2	30
				30	**27**	
6	IIIC	BOT3832	Plant Biotechnology (Lab cum Theory)	5+3L	8	75+45
	IIIC	BOT3434	Entrepreneurial Botany	4	4	60
	IIIC	BOT3536	Bioresource Management	5	5	75
		BOT3538	Botany Project			
	IIIC	BOT3642	Plant Physiology (Lab cum Theory)	4+2L	6	60+30
	IVLS	*** 32XX	Life Skill IV	3	2	30
	IVVE	VAL32XX	Value Education	4	2	30
			Total	**30**	**27**	

Supportive Courses (Lab Cum Theory Courses)

Semester	Part	Course No.	Course Title	Hr.	Cr.	Marks
1	IIIS	BOT1437	Plant Biology I	3+2L	4	45+15
2	IIIS	BOT1438	Plant Biology II	3+2L	4	45+15
3	IIIS	BOT2439	Botany for Chemists-I	3+2L	4	45+15
4	IIIS	BOT2440	Botany for Chemists-II	3+2L	4	45+15

Life Skill Courses

Semester	Part	Course No.	Course Title	Hr.	Cr.	Marks
1	IVLS	BOT1231	Mushroom Culture Technology	3	2	30
2	IVLS	BOT1236	Nursery and Gardening	3	2	30
5	IVLS	BOT3239	Medicinal Botany	3	2	30
6	IVLS	BOT3240	Biofertilizers and Biopesticides	3	2	30

Non Major Courses

Semester	Part	Course No.	Course Title	Hr.	Cr.	Marks
1	IVE	BOT1233	Food and Nutrition	3	2	30
2	IVE	BOT1238	Plant Wonders	3	2	30

BOT 3631 PLANT SYSTEMATICS 6 Hr /6Cr

Preamble: This course is designed to give an introduction on plant systematics to the young minds who study the subject for the first time. The morphology and the history of classification will be an eye opener to the students. Further the on hand study of locally available flora can give them the basic knowledge of plants. This study will further helping the young students to appreciate and enjoy the nature and also lead them towards conservation of plants. After the successful completion of the course, the student will be able to understand and explain the principles of systematics, distinctive features of selected families, recall the economic value of the plants in the cited families.

Objectives

1. To appreciate the scientific approach diversity of plants with reference to the morphological characters
2. To enrich the students knowledge on plants by hands on study of various classes of plants.
3. To observe the plants in their habitat and to appreciate the evolution of plant diversity.

UNIT 1. Morphology of plants & History of classification:

Morphology of root, stem, leaf, inflorescence, flower and fruit – History of classification (Theophrastus, Linnaeus, Bentham and Hooker, and Engler and Prantle.)

UNIT 2. Principles of plant taxonomy:

Principles of Taxonomy – Minor and Major categories, rules and recommendations – ICBN and ICN – principles of ICN – active principles (priority of publication, typification and effective publication) author citation – naming of plants – rejection of names – dichotomous key – phytography – herbarium techniques – numerical taxonomy – Chemotaxonomy.

UNIT 3. Study of the locally available *Polypetalae* flora:

Annonaceae, Leguminosae (Fabaceae, Caesalpiniaceae, Mimosaceae), Rosaceae and Cucurbitaceae with their economic importance and phylogeny.

UNIT 4. Study of the locally available *Gamopetalae* flora:

Asteraceae, Sapotaceae, Apocynaceae, Rubiaceae and Lamiaceae with their economic importance and phylogeny.

UNIT 5. Study of the locally available *Monochlamydae* and Monocot flora:

Amaranthaceae, Euphorbiaceae, Orchidaceae , Arecaceae and Poaceae with their economic importance and phylogeny.

TEXT BOOKS

1. Singh, G., 2012. Plant systematics, Third edition. Oxibh publishers, New Delhi. ISBN: 978-8120417632.
2. Pandey, S. N. and Misra, S. P., 2008. Taxonomy of angiosperms. Ane books India, New Delhi. ISBN: 978-8180521768.

3. Verma, B.K., 2011. Introduction to taxonomy of angiosperms, PHI learning private limited, New Delhi. ISBN: 978-8120341142.
4. Lawrence, G.H.M., 1965. Taxonomy of vascular plants. The Macmilan co, New York. ISBN: 978-0023681905.
5. Pandey, B. P., 2001. Taxonomy of angiosperms, S. Chand and co limited. New Delhi. ISBN: 978-8121909327.

REFERENCE BOOKS

1. Gamble, J.S and Fischer, C.E.C., 1957. Flora of the presidency of madras, I – III, W. C. Adlard and son limited, London. ISBN: 978-1152544420.
2. Jeffrey, C., 1982. An introduction to plant taxonomy. Allied publishers private limited, New Delhi. ISBN: 978-0521287753.
3. Jones Jr, S. B. and Luchsinger, A. E., 1987. Plant systematics. Mcgraw hill book company, New Delhi. ISBN: 978-0070327962.
4. Sambamurty, A. V. S. S., 2005. Taxonomy of angiosperms. I. K. International private limited, New Delhi. ISBN: 978-8188237166.
5. Singh, H.B. and Subramanian, B., 2008. National institute of science communication and information resources, New Delhi. ISBN: 978-8172363307.

BOT 3633 BIOCHEMISTRY 6Hr/6Cr

Preamble: A cognitive and pedagogical exposure of biochemistry is useful for a concrete understanding of biology. The course work envisaged endeavors to provide students a broad based training to look at life as an outcome of interlocked events of simple biochemical reactions, biosynthetic pathways and metabolism which eventually gets expressed as physical and physiological changes. In addition to the theoretical knowledge imparted on the basic rules, emphasis will be placed on the applications and forefront areas of experimental biochemistry. A multidisciplinary approach will provide the learner a good leverage for better comprehension of integrated metabolism.

Objectives:

1. To relate the basic structure and properties of biomolecules to their function in living organisms.
2. To comprehend the carbohydrates, lipids, proteins and nucleic acids as important macromolecules.
3. To visualize the cell as self contained bio-entities in terms of energy generations and supporting biochemical processes.
4. To help students to appreciate the biochemical basis of life for pursuing further studies.

Unit 1. Introduction:

An overview of the cell structure and brief survey of major bioconstituents (Atoms – molecules – bonds and bonding – functional groups) – basic principles of thermodynamics – Gibbs free energy – entropy and enthalpy – redox reaction – electron transfer and its significance.

Unit 2. Carbohydrates:

Sources of various carbohydrates – classification – physio-chemical and optical properties of monosaccharides – structural and functional significance of sucrose, starch and cellulose.

Unit 3. Lipids:

Triglycerides – saturated and unsaturated fatty acids – brief outline on lipid metabolism – β-oxidation and lipid peroxidation – dietary value of lipids and vitamins

Unit 4. Nucleic acids, Amino acids and Proteins:

Types of nucleic acids – components – synthesis of purines and pyrimidines in outline – properties, classification and precursors for amino acid biosynthesis – structure and conformation of proteins – significance of Ramachandran plot – acid-base solubility – properties of proteins.

Unit 5. Enzymes:

Enzymes as quaternary proteins – properties –classification and nomenclature – mechanism of action – significance of Km – Michaelis and Menton concept– Enzyme catalysis – coenzymes and cofactors – competitive and non competitive inhibition – allosteric regulation – isoenzymes.

REFERENCE BOOKS

1. Berg, J.M. Tymoczko, J.L. and Stryer, L., 2002. Biochemistry, Fourth edition. W. H Freeman and company, New York. ISBN: 07 1674 9548.
2. Gasser, R.P.H. and Richards, W.G., 1986. Entrophy and energy levels. Oxford university publication, London. ISBN: 10- 0194424111.
3. Lehninger, A.L., Nelson, D.L. and Cox, M.M., 2000. Principles of biochemistry, Fifth edition. CBS publishers and distributors, New Delhi. ISBN: 10: 0716743396.
4. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Weil, P.A., 2009. Harper's illustrated biochemistry, Twenty-eighth edition. Mcgraw hill education, New York. ISBN: 978-0-07-162591-3.
5. Voet, D. and Voet, J.G., 2004. Biochemistry, Third edition. John wiley and sons, New Jersey, United States. ISBN: 10: 047119350X.
6. Zubay, G.L., 1998. Biochemistry, Fourth edition. Brown publishers, Chicago. ISBN: 0-697-21900-3.

BOT3535 ANALYTICAL TECHNIQUES AND RESEARCH METHODOLOGY 5Hr/5Cr

Preamble: This course imparts knowledge on principles of various instruments and gadgets employed in scientific enquiry. Students will learn various qualitative and quantitative techniques. Further students will gain skills to design scientific experiments, data mining, analysis and scientific paper writing.

Objectives:

1. To impart Good Laboratory Practices
2. To acquire knowledge about lab instrument and their working principles
3. To understand the fundamentals of biological research work
4. To learn standard procedures in planning, executing research work and interpretation of results

UNIT 1. Basic principles:

Units of measurement, expression of solutions concentration (molarity, molality, normality, percentage, parts per thousand, and ppm) – pH metry (working principle, components and buffers) – electromagnetic spectrum – gravitational force – Good Laboratory Practices (GLP)

UNIT 2. Analytical techniques:

Instrumentation for environmental analysis (sonometer, clinometer, altimeter, barometer, hygrometer, anemometer, lux meter, thermometer, rain gauge and smart phone Apps.)

colorimetry and spectrophotometry (working principle, components and applications) – Spectroscopy, UV visible and Mass spectrometry (working principle, components and applications.)

UNIT 3. Separation techniques and their application:

Centrifugation (principle, types of centrifuge and applications) – Chromatography (principle of paper and thin layer) – applications of HPLC, GC–MS, FTIR, NMR – electrophoresis – (principle, agarose and Poly Acrylamide Gel Electrophoresis) – applications of Southern and Northern blotting.

UNIT 4. Data collection and analysis:

Collection of primary and secondary data – population and sample – sampling methods (random and non–random sampling) – questionnaire – survey – field note – photo documentation.

Biostatistics (mean, mode, frequency distribution, standard deviations, standard error) – data processing softwares – Model biological organisms (*Escherichia coli* and *Arabidopsis thaliana*)

UNIT 5. Scientific report writing:

Scientific observations – critical thinking – research aptitude – research problem, hypothesis testing and experimental design – review of literature (journal references, on line resources.)

thesis writing – format of report, abstract, data presentation (tabulations, graphic representation) – interpretation of results – acknowledgements – MS-word, excel and power point – oral presentation – plagiarism.

REFERENCE BOOKS

1. Jeyaraman, J., 2011. Laboratory manual in biochemistry, Second edition. New age international private limited, New Delhi. ISBN: 9788122430493.
2. Kothari, C.K., 1985. Research methodology – methods and techniques. Wishwa prakashan publications, New Delhi. ISBN: 81 224 0002 7.

3. Palanivelu, P., 2009. Analytical biochemistry and separation techniques – A laboratory manual, Fourth edition. Twenty first century publications. India. ISBN: 978–8190848909.
4. Plummer, D.T., 1975. An introduction to practical biochemistry, Tata mcgraw hill publishing company limited. New Delhi. ISBN: 9780070994874.
5. Rastogi, V.B., 2011. Fundamentals of biostatistics. Ane books private limited, New Delhi. ISBN: 978 81 8052 2550.
6. Wallwork, A., 2011. English for writing research papers. Springer science publications, New York. ISBN: 9781441979216.
7. Wilson, K. and Walker, J., 2006. Principles and techniques of biochemistry and molecular biology, Sixth edition. Cambridge university press, New York. ISBN: 10 0 521 69180.

BOT 3637 LAB V (PLANT SYSTEMATICS AND BIOCHEMISTRY) 6hr/6cr

Plant systematic **3h/wk**

The lab course is aimed at giving on hand experience to the students. The students will be encouraged to observe and understand the various vegetative and reproductive structures of the plant.

1. Introduction: Various plant parts
2. Morphology of vegetative parts
3. Morphology of flowers and fruits
4. Phytography (description of plants)
5. Key construction (Indented and bracketed key)
6. Identification of plants up to family level using dichotomous keys used in the floras
7. Polypetalae I Annonaceae, Leguminosae (Fabaceae, Caesalpiniaceae, Mimosaceae),
8. Polypetalae II Rosaceae & Cucurbitaceae
9. Gamopetalae I Asteraceae, Asclepiadaceae,
10. Gamopetalae II (Convolvulaceae, Acanthaceae & Lamiaceae)
11. Monochlamydeae (Amaranthaceae, Euphorbiaceae.)
12. Monocots : Orchidaceae, Arecaceae, & Poaceae
13. Economic botany
14. Taxonomic problems

Further students are encouraged to participate in Field trips arranged by the Course Teacher to nearby botanically rich areas to study plants in their natural habitat.

Suggested places for field study:

Alagar Hills, Karungalakudi, Sathuragiri, Kodaikanal, Kuttupatti, Sirumalai .

REFERENCE BOOKS

1. Gamble, J.S. and Fischer, C.E.C., 1957. Flora of the presidency of madras, I – III, W. C. Adlard and son limited, London. ISBN : 978-1152544420.
2. Lawrence, G.H.M., 1965. Taxonomy of vascular plants. The macmilan co, New York. ISBN: 978-0023681905.
3. Matthew, K. M., 1995. An excursion flora of central tamilnadu, Oxford press, New Delhi. ISBN: 978-905410286.

Biochemistry **3h/wk**

This laboratory session is to train the student to quantitatively and qualitatively analyze biomolecules and metabolites besides providing knowledge about the principles and knowhow of using various instruments**.**

1. pH metry
2. Colorimetry - Verification of Beer – Lambert's law
3. Spectrophotometer- Determination of λ-max.
4. Qualitative test for carbohydrates
5. Quantitative estimation of carbohydrates by Anthrone's method
6. Qualitative test for proteins and amino acids
7. Quantitative estimation of protein by Lowry's method
8. Qualitative test for lipids and estimation of oil in seeds
9. Separation of amino acids using paper chromatography.
10. Separation of pigments using thin layer chromatography.
11. Enzyme activity (Catalase / Peroxidase)
12. Isolation of chloroplast for electron transport studies.
13. Estimation of PS II activity (DCPIP reduction method)

REFERENCE BOOKS

1. Cooper, T.G., 1991. The tools of biochemistry. John wiley and sons, New York. ISBN: 0-471 17116-6.
2. Jeyaraman, J., 1998. Laboratory manual in biochemistry. New age international publishers limited, New Delhi. ISBN: 0852264283.
3. Plummer, D.T., 2003. An introduction to practical biochemistry, Third edition. Tata Mcgraw hill publishing company limited, New Delhi. ISBN: 0-07-0994870

BOT 3239 MEDICINAL BOTANY 3Hr/2Cr

Preamble: This course will provide knowledge on botanical and therapeutic value of selected locally available and easily cultivable herbs. The students will be introduced to a few systems of medicines such as Siddha, Ayurveda, Unani and Homeopathy. Students will learn domestic usage of medicinal plants and be apprised about scope for documentation of folk medicinal knowledge, collection, marketing and sustainable utilization of medicinal plants.

Objectives:

1. To document folk knowledge and home remedies
2. To develop entrepreneurial skills in promoting herbal based products.

UNIT 1. Introduction to medical practices in India:
History – Literatures and physicians of ancient period. – Ayurvedha – Siddha – Unani-Homeopathy – Allopathy.

UNIT 2. Ethnobotany and Folk lore medical practices:
Ethnic communities in Tamil Nadu and their medicinal plant usage – patented products (Kani Tribe) – popular folklore medicines – methods of documenting the ethnobotanical knowledge – AICRPE.

UNIT 3. An overview of selected medicinal plants:
Morphology, family, vernacular and botanical name, useful part and active principles phytotherapeutics.
I. Root (*Asparagus racemosus & Gloriosa superba)*
II. Leaf (*Aloe vera, Azadirachta indica)*
III. Bulb(*Allium cepa, Allim sativum)*
IV. Rhizome(*Zingiber officianale, Curcuma longa)*
V.Fruit (*Solanum nigrum, Solanum xanthocarpum)*
VI. Seed(*Trigonella foenum graceum.Cuminum cyminum)*
VII. Oil seed (*Cocus nucifera, Ricinus communis)*

UNIT 4. Cultivation and processing of medicinal plants:
Propagules (Seed, leaf, stem, root, rhizome and bulbs) – cultivation methods – harvesting – processing – packaging – storage.

UNIT 5. Good Manufacturing Practices:
Choornam – legiyam – thailam – parpum– kasayam– herbal concoction – Processing of medicinal plants – medicinal plants in commercial products – list of commercial outlets.

REFERENCE BOOKS

1. Akerele, O., Heywood, V. and Synge, H., 1991. The conservation of medicinal plants. Cambridge university press. Cambridge. ISBN: 0521112028.
2. Chevallier, A., 1996. The encyclopedia of medicinal plants. D.K publishing, Michigan. ISBN: 0-789-41067-2.
3. Cunningham, A.B., 2001. Applied ethnobotany- people, wild plant use and conservation. Earth scan publications limited, London. ISBN: 1853836974.
4. Singh, M., 2009. Medicinal plants of india. New central book agency, New Delhi. ISBN: 8173815933.
5. Mathur, N., 2010. Medicinal plants of india. RBSA publishers, New Delhi. ISBN: 8-176114995.
6. Wallis, T.E., 1997. Textbook of pharmacognosy, Fifth edition. CBS publishers, New Delhi. ISBN: 0700012915

BOT 3200 ENVIRONMENTAL STUDIES 4Hr/2Cr

Preamble: The course presents an overview on the components of environment. Students will learn about the fragility and delicate balance between the interactive variables of habitat. Various causes of pollution with special reference to anthropogenic influences will be investigated. Learners will have an opportunity to get sensitized about local and global environmental issues and strategies to manage them.

Objectives:

1. To inform dynamic nature of planet earth.
2. To investigate the threats that are imminent.
3. To explore alternate resources for sustainability.
4. To bring awareness on policies that governs environmental management.

Unit 1. Living Earth:

Elements of Nature – Biotic, abiotic and climatic factors – lithosphere – atmosphere – hydrosphere – biosphere – renewable and nonrenewable energy resources (types – utilization – generation – solar – wind – hydro – wave – nuclear – biomass –fossil fuel.)

Unit 2. Ecosystem, Community and Population ecology:

Structure – **t**ypes – pyramids–food web – food chain – succession (hydrosere) – Clement's classification of community – attributes of population.

Unit 3. Pollution:

Pollution and its types – sources – effect – control (air –noise – space – water – land – thermal – biomedical and e-waste) – treatment of pollutants (reduce/ reuse/ recycle techniques) – episodes of concern (Ennore oil slick, Bhopal gas tragedy, Pacific gyre, Fukushima nuclear plant disaster)

Unit 4. Climate change and natural disasters:

Factors affecting global climate (green house effect, ozone depletion, acid rain) – disasters (occurrence – reasons – types – measurement – monitoring –management strategy) – participatory management – earthquake – volcanic eruption – floods – cyclones – tsunami – forest fire.

Unit 5. Environmental policies:

Future energy – environmental movements – national environmental issues – Indian environment policies – environment education – phytoremediation – aforestation and reforestation – social and agroforestry.

REFERENCE BOOKS

1. Chauhan, B.S., 2015. Environmental studies, Second edition. Laxmi publications, New Delhi. ISBN: 8-131-80328-7.
2. Cunningham, W. P., Cunningham, M.A. and Saigo, B. W., 2006. Environmental sciences, Nineth edition. Mcgraw-hill higher education, United States. ISBN: 978-0073218816.
3. Odum, E.P., 1971. Fundamentals of ecology, Third edition. W.B. Saunders company, Philadelphia. ISBN: 0-7216-6941-7.
4. Rai, G.D., 2011. Non conventional energy resources. Khanna publishers, New Delhi. ISBN: 1- 364-63010-1.
5. Rao, C.S., 2006. Environment pollution control engineering, Second edition. New age international publishers, New Delhi. ISBN: 812241835X.
6. Sharma, P.D., 1999. Ecology and environment. Rastogi publications. Meerut. ISBN: 81-713381-43.
7. Subramanyam, N.S. and Sambamurthy, A.V., 2000. Ecology. Narosa publishing house, New Delhi. ISBN: 81-7319-289-8.

BOT3832 PLANT BIOTECHNOLOGY (LAB CUM THEORY) 5T+3L

Preamble: This course opens up the vistas of molecular biology and its application in genetic engineering. Students will learn the purpose and the art of tissue culture for propagation and genetic transformation of plants. Students will analyze the wet lab data at dry lab. They will explore the practical issues involving fermentation industries and nitty-gritty of making marketable plant based products. On completion of the course students will appreciate the art of fermenting foods and beverages.

Objectives:

1. To introduce students the emerging technologies in plant sciences
2. To learn the application of rDNA technology
3. To familiarize *in-vitro techniques* in rearing plants and microbes
4. To introduce *in-silico* methods

Unit 1. Tissue culture as a tool for plant biotechnology:

Objectives and goals – historical perspective – laboratory design and equipments – MS Media composition and supplementation – explants selection, sterilization, inoculation –induction of callus – organogenesis – somatic embryogenesis and hardening – micro propagation – artificial seeds – protoplast isolation, culture and fusion – haploid plants.

UNIT 2. Basics of rDNA technology :

Central Dogma – DNA structure, variations and organization – replication – transcription, translation and protein synthesis – mutations – principles of recombinant DNA technology – pGEMT vector – restriction mediated and PCR based cloning – *Agrobacterium* mediated gene transfer.

Unit 3. Elements of bioinformatics:

In silico assistance in sequencing biomolecules – online nucleotide and protein databases (EBI and NCBI) and tools (BLAST,FASTA ,ClustalW and PHYLIP)

Unit 4 : Fundamentals of Fermentation Technology:

Potential microorganisms – culture and characterization – strain development – batch and continuous culture – media formulation – growth kinetics – fermented products – food (curd, yoghurt, dhokla, miso, sauerkrauts , sausages , vinegar and cheese) – beverages (wine, beer) – types of fermenters – design – control and scale-up – upstream and downstream processing – introduction to bioreactors.

UNIT 5. Marketable products and bio-applications:

Secondary metabolites production – immobilisation – Single Cell Protein(SCP) – enzymes – planticcines – biofuels – GM crops – terminator seed technology – bioremediation – bioethics and biosafety.

TEXT BOOKS

1. Demain, A.L. and Davis, J.E., 2004. Industrial microbiology and biotechnology, American society for microbiology press. ISBN: 9781555811280.
2. Brown, T.A., 2010. Gene cloning and DNA analysis: an introduction, Sixth edition. Wiley-blackwell, United States. ISBN: 9781405181730.
3. Dubey, R.C., 2006. Textbook of biotechnology, Fourth revised edition. S.Chand and company, New Delhi. ISBN: 8-219-2608-4.
4. Dubey, R.C., 2014. Advanced biotechnology. S. Chand and company, New Delhi. ISBN: 81-219-4290-X.
5. Stansbury, P.F., 2009. Principles of fermentation technology, Second edition, Butterworth-heinemann publisher- Elsevier, United Kingdom.ISBN: 9780080999531.
6. Razdan, M.K., 2003. Introduction to plant tissue culture. Oxford and IBH publishing, New Delhi. ISBN: 81-210-41571-X.
7. Stansbury, P.F., Whitaker, A. and Hall, S.J., 1997. Principles of fermentation technology, Butterworth-heinemann publisher-Elsevier, United Kingdom. ISBN: 978-0750645010.

REFERENCE BOOKS:

1. Peterson, C.S., 1971. Microbiology of food fermentations, Second revised edition. AVI publishing company, Connecticut. ISBN: 978-0870552779.
2. Joshi, V.K., 2009. Biotechnology: Food fermentation-Volume I. Educational publishers and distributors, Kerala. ISBN: 978-8187198048

Lab in Plant Biotechnology 3L

1. Sterilization
2. Media preparation
3. Callus culture
4. DNA Extraction and agarose gel electrophoresis
5. DNA Quantification
6. Restriction Digestion of DNA
7. Introduction to databases
8. Usage of tools-BLAST, ClustalW analysis
9. Growth curve of *Escherichia coli*
10. Production of primary metabolites-catalase, amylase
11. Wine/Beer production
12. Production of acetic acid and lactic acid
13. Biodiesel production-*Jatropha*

BOT 3434 ENTREPRENEURIAL BOTANY 4Hr/4Cr

Preamble: This course is designed to help students gain the know-how on contemporary opportunities in business situations and develop skills needed to successfully convert them into entrepreneurial ventures. The basics of entrepreneurship as a concept and the fundamentals training they may require to meet their livelihoods will be explored. On completion learners will be able to develop ideas that will lead them to start their own business and enable them to be professionally competent.

Objectives:

1. To provide an understanding the essentials of entrepreneurship.
2. To introduce organizations and agencies that can backup entrepreneurial initiatives.
3. To expose students to various business opportunities emerging around the study of plants.
4. To encourage students to built proposals and projects to become an entrepreneur.

Unit 1. Introduction:

Need – definition and concept – Types and characterization – entrepreneurial values – motivation and barriers – entrepreneurship as innovation, risk assessment and solutions.

Unit 2. Bioventure:

Industry – overview of *Spirulina*, *Pleurotus sajor-caju*, *Ganoderma*, *Lentinus edodes*, drumstick and coconut – Straight Vegetable Oil (SVO) and Pure Plant Oil (PPO) - methods and marketing – fresh and dry flowers for aesthetics.

Unit 3. Value added products:

Canning of fruits – process and equipment – fruit and vegetable based products (squash) – ready to serve (RTS) (syrup, pulp, paste, ketchup, soup, vegetable sauces, jam and jellies) –bio-fuel production – Bamboo and cane based products – virgin coconut oil, jasmine oil production – nutraceuticals – standards and quality management.

Unit 4. Organizations and agencies:

TIIC, DIC, NABARD, MICROSTAT, DBT – case study – sarvodaya – SIDCO – Micro Small and Medium Enterprises – support structure for promoting entrepreneurship – various government schemes.

Unit 5. Entrepreneurial opportunities:

Understanding a market and assessment – selection of an enterprise – business planning –mobilization of resources – Break Even Analysis – project proposal (guidelines, collection of information and preparation of project report) – steps in filing patents – trademarks and copyright – Intellectual Property Rights – export and import license.

REFERENCE BOOKS

1. Taneja, S. and Gupta, S.L., 2015. Entrepreneurship development, New venture creation, Galgeha publication company, New Delhi. ISSN: 2321-8916.
2. Desai, V., 2015. Entrepreneurship development, First edition. Himalaya publication house, Mumbai. ISBN: 9789350973837.
3. Khanna, S.S., 2016. Entrepreneurial development. S.Chand company limited, New Delhi. ISBN: 9788121918015.
4. Manohar, D., 1989. Entrepreneurship of small scale industries, vol.III. Deep and deep publication, New Delhi. ISSN: 09735925.
5. Lal, G., Siddhapa, G.S. and Tandon, G.L., 1988. Preservation of fruits and vegetables. Indian Council of Agricultural Research (ICAR). ISSN: 0101-2061.
6. Ranganna, S., 2001. Hand book of analysis and quality control of fruits and vegetable products, Second edition, Tata mcgraw hill, New Delhi. ISBN: 9780074518519.
7. Cruses, W.V. and Fellows, P.J., 2000. Commercial fruits and vegetable processing. CRC press, United States. ISBN: 9780849308871.

BOT3536 BIO-RESOURCE MANAGEMENT 5Hr/5Cr

Preamble: This course is framed to cater the need of non major students about the Bioresources and its conservation of Indian subcontinent. Current status of our country's wealth is given a greater emphasis. *In situ* and *ex situ* methods of conservation are being taught to create a holistic approach in natural resources management. The course is designed to create leadership abilities among students and transform them as stewards of our natural resource.

Objectives:

1. To achieve an in-depth knowledge of classifying landscapes and waterscapes of India using geological and geographical inputs.
2. To appreciate forest as one of the life support systems of human and other living organisms.
3. To related the quality of soil with the productivity of agricultural crops.

UNIT 1. Geology of India:

Introduction of Geology – types of rocks – geographical position and boundaries – soil types in India – pedology – soil as natural capital – ecosystem services of soil – mineral sources – mining and its impact – depletion of minerals – conservation strategies.

UNIT 2. Water, Wetlands and Marine resources:

Watershed management – raining pattern – harvesting and storage – indigenous and remote sensing techniques – fresh water and wetland ecosystems located in India – global and national statistics of water resources – an overview of ecosystem services of wetlands – types of marine ecosystems – marine resources (production, status, dependence, issues and challenges for resource supply, threats and prospects.)

UNIT 3. Phytogeography:

Mega diversity countries – biodiversity hotspots- endemism biogeographical realms – flora and fauna – forest types (Champion and Seth 1968) – Eastern and Western Ghats (physiography, distribution maps, diversity of plants and animals.) – desert ecosystem.

UNIT 4. Food, Agriculture and Forestry:

Native seeds and agricultural implements – land use patterns – ancient and modern agriculture –Food (sources,sustainable usage, shortage and management,food storage methods merits and demerits.) Public distribution system (FAO, IBPGR, NBPGR.) – timber and Non timber forest produce (NTFP).

UNIT 5. Conservation and Management:

Heritage sites of UNESCO – Man and Biosphere Reserve (MAB) program – national parks – wildlife sanctuaries – botanical gardens – field gene bank – cryopreservation – reintroduction – silviculture.

REFERENCES

1. Sharma, P. D., 2015. Ecology and environment. Rastogi publications, New Delhi. ISBN: 978-93-5078-068-8.
2. Rana, S.V.S., 2012. Environmental studies. Rastogi publications, New Delhi. ISBN: 81-7133-728-7.
3. Sharma, P. D., 2013. Environmental biology and toxicology. Rastogi publications, New Delhi. ISBN: 978-81-7133-964-8.
4. Sharma, P. D., 2013. Ecology and utilization of plants. Rastogi publications, New Delhi. ISBN: 81-7133-861-5.
5. Bawa, K.S., Primack, R.B. and Oommen, M.A., 2012. Conservation biology. Universities press, New Delhi. ISBN: 9788173717246

BOT 3538 Botany Project 5Cr./5hr.

PREAMBLE : Botany Project work is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation or difficult problem. A project work may be given in lieu of an elective paper (Bio-resource Management). Interested students will get an opportunity to carryout research project at the department laboratories. Every year, based on the faculty availability a few areas will be identified and informed well in advance. Eligible students will be asked to make a list of three areas according to his/ her ranked choice. According to his/ her ranked choice of the area, project will be allotted. In the case of competition for a specific project the cumulative credential of first four semesters would be considered for project allotment. At the end of the research work students will be encouraged to create fact sheets and posters to report their findings.

Objective:

1. To promote research interest among students utilizing locally available resources.
2. To help students to develop research proposals of their own and develop unique problem solving methodologies.
3. To systematically document research experiences of every student and inculcate research aptitude among them.
4. To create self-explanatory fact sheets and posters (prescribed format) to report his/her findings.

BOT 3642 Plant Physiology (Theory Cum Lab) 4+2L Hr/6C

Preamble: This course explores the knowledge on life processes exclusive to plants. Students learn intricate details on water transport, transpiration and the uptake of nutrients of plants. It also facilitates them to have a deeper insight on energy generation and utilization mechanisms. Eventually learners understand the music of 'plant growth' from the notations of 'chemical regulators'.

Objectives:

1. To learn the overall dynamics of plants as autotrophs.
2. To understand the plant- environment relationship.
3. To explore the uptake and transport mechanisms that support plant metabolism.
4. To gain an understanding on the synthesis and utilization of metabolites.
5. To conceive the idea on the complexity and significance of various growth processes.

Unit 1. Plant-Water relations:

Characteristics of water molecule – Diffusion, osmosis, Imbibition– diffusion pressure deficit–guttation– ascent of sap– transpiration–factors affecting transpiration –translocation and descent of sap – components of phloem– girdle experiment– pressure flow hypothesis–flag leaf physiology.

Unit 2. Mineral nutrition:

Essential elements – macro and micronutrients – transport of ions across membrane – active and passive transport – deficiency symptoms and toxicity– nitrogen metabolism and phosphate solubilization.

Unit 3. Photosynthesis:

Photosynthetic pigments – PS I and PS II– reaction centres –antenna pigments – light dependent and independent reactions (C3, C4 and CAM) – C2 cycle – factors affecting photosynthesis.

Unit 4. Respiration:

Glycolysis – Krebs cycle-electron transport system – oxidative phosphorylation– pentose phosphate pathway–respiratory quotient.

Unit 5. Growth Physiology:

Introduction to plant growth – germination – physiological role and assays of auxins, gibberellins, cytokinin, abscissic acid, ethylene – photoperiodism and vernalization – photo morphogenesis – phytochromes – LDP, SDP and day neutral plants – Biorhythms and plant movements –senescence –plant re
sponse to abiotic stresses.

TEXT BOOKS

1. Sinha, R. K., 2004. Modern plant physiology. Narosa publishing house, New Delhi. ISBN: 81-7319-333-9.

REFERENCE BOOKS

1. Bidwell, R. G. S., 1975. Plant physiology. Macmillan publishing co. inc., New York. ISBN: 0-02-309430-3.
2. Salisbury, F. B. and Ross, C.W., 1992. Plant physiology, Fourth edition. Eastern press, Bangalore. ISBN: 981-243-853.
3. Srivastava, H. S., 2005. Plant physiology. Rastogi publications, Meerut. ISBN: 81-7133-785-6.
4. Williams, M. B., 1984. Advanced plant physiology. Pitman publishing, New Zealand. ISBN: 0-273-02306-3.
5. Ghosh, M. S., 1996. Plant physiology, First central edition. New central book agency private limited, New Delhi. ISBN: 81-7381-478-3

PLANT PHYSIOLOGY (LAB)

1. Determination of water potential.
2. Influence of temperature over permeability of membrane.
3. Transpiration measurement by potometer.
4. Cobalt chloride Experiment for transpiration.
5. Calculation of stomatal index and frequency of mesophytes and xerophytes.
6. Oxygen evolution in photosynthesis (Thistle funnel experiment).
7. Demonstration of light by DCPIP.
8. Characterization of C3 and C4 plants.
9. Demonstration of respiration using Ganong's respiroscope.
10. Comparison of rate of respiration of two plants using respirometer.
11. Auxin bioassay
12. Demonstration of Ethylene triple response.
13. Phototropic movements in plants.

REFERENCES

1. William, G H., 2009. Introduction to plant physiology. John wiley, New Jersey, United States. ISBN: 9780123741431.
2. Nobel, P.S., 1990. Physiochemical environmental plant physiology. Academic press, United States. ASIN: B0043KK4KY.
3. Taiz, L., 2015. Plant physiology, Sixth edition. Sinauer associates, United States. ISBN: 978- 1-60535-255-8.
4. Bajracharya, D., 1999. Experiments in plant physiology. Narosa publishing house, New Delhi. ISBN-13: 978-8173193101, ISBN-10: 817319310X

BOT3240 BIOFERTILIZERS AND BIOPESTICIDES 3H/2CR

Preamble: Through this course the non biology students will come to know the importance of eco-friendly approaches in agriculture. By enrolling in this course students will primarily know about the common agriculture practices and will able to appreciate the use of natural methods of providing nutrition and controlling pests and herbs. They will further learn about the regulations governing the organic farming.

Objectives:

1. To encourage students to learn the relevance of using plants and organic inputs in agriculture.
2. To enable students to gain a general understanding on eco–friendly, pollution free approaches that can replace the use of anthropogenic supplements.
3. To provide students hands on experience in preparing bioproducts this can be used for growing crops.
4. To introduce the concept of kitchen and terrace garden that can be practiced in urban situation.

Unit 1. Introduction to Agriculture:

Domestication of plants – early agricultural practices – shifting cultivation – settled cultivation– major cultivated crops in India (rice, wheat, soya, maize and brinjal) – industrialization and consequences– green revolution – indiscriminate use of agrochemicals.

Unit 2. Organic farming:

Principles and practices of organic farming – organic matter management in agricultural fields – crop rotation – plant health – sustainable agriculture– supplementation of NPK as bioresource – vermicomposting – green manure – terrace and kitchen garden– value addition in organic products – government policies.

Unit 3. Biofertilizers:

Scope, application, types – mass cultivation of Biological nitrogen fixers – Blue green algae – *Rhizobium, Azolla* – Phosphate solubilizing bacteria (*Pseudomonas fluorescens)* – Mycorrhiza – cost-benefit analysis.

Unit 4. Biopesticides:

History – comparative study of bio and synthetic pesticides – mass production and economics of microbial biopesticides (case study on *Trichoderma*, *Pseudomonas fluorescens*, *Bacillus thuringiensis (Bt)* – plant pesticides (a case study on Neem.)

Unit 5. Commercial formulation:

Types of formulation – dry and liquid product – shelf-life, Stabilization, Methods of field application, certification – Bureau of Indian Standards (BIS) –biopesticide regulations (national and international with special emphasis on European Union.)

REFERENCE BOOKS

1. Dubey, R.C., 2014. A textbook of biotechnology. S. Chand and co private limited, New Delhi. ISBN: 81–219–2608–4.
2. Lakshmana, H.C. and Channabasava, A., 2014. Biofertilizers and biopesticides. Pointer publishers, Jaipur. ISBN: 8171327753.
3. Himadri, P. and Dharamvir, H., 2007. Biofertilizers and organic farming. Gene–tech books, New Delhi. ISBN: 978–8189729202.
4. Hegazi, N. I., Fayez, M. and Hamza, M., 2013. Biofertilizers for organic farming. Academic publishing, Egypt. ISBN: 978–3659336157.
5. Dilip, N., 2016. Organic farming for sustainable agriculture. Springer publishing, New Delhi. ISBN: 978–3319268019.

DEPARTMENT OF UNDER GRADUATE ECONOMICS

B.A. – Economics Programme (English & Tamil Medium)

(w. e. f. 2015-16 batch onwards)

Sem	Part	Course code	Title	Hr	Cr	Mark
5	IIIC	ECO3631	Indian Economics I	6	6	90
5	IIIC	ECO3633	Development Economics and Planning	6	6	90
5	IIIC	ECO3635	Environmental Economics	6	6	90
5	IIIC	ECO3537	Econometrics I	5	5	75
5	LS	ECO3239	Economic Journalism	3	2	30
5	VAL	VAL	Value Education	4	2	30
			TOTAL	**30**	**27**	**405**
6	IIIC	ECO3632	Indian Economics II	6	6	90
6	IIIC	ECO3634	Financial Market and Services	6	6	90
6	IIIC	ECO3636	Labour Economics	6	6	90
6	IIIC	ECO3538	Econometrics II	5	5	75
6	LS	ECO3240	Personal Empowerment	3	2	30
6	EVS	ECO3200	Environmental Studies	4	2	30
			TOTAL	**30**	**27**	**405**

ECO 3631 INDIAN ECONOMICS - I 6 Hrs 6 Cr

Objective:

To enrich the understanding of structural changes in Indian Economy. The course deals with the characteristics of Indian Economy relative importance of primary, secondary and tertiary sectors.

Unit I: Structure of Indian Economy

Indian Economy in transition – Basic characteristics of Indian Economy – Main causes of slow growth of Indian Economy – Indian Economy fast growing economy.

Unit II: Natural Resources

Land - Soil – Water – Mineral –Forest Resources – types - Conservative measures-Resource Management

Unit III: Agriculture Sector

Role of Agriculture in India's Economic Development – Trends in agricultural production and productivity– Causes and Measures to Increase Agricultural Productivity – Green Revolution – Features- Effects – New Agriculture policy –Food Problem and Food security in India.

Unit IV: Industrial Sector

Types of Industries-Large- Small- Medium scale Industries-Village & Cottage industries-Problems- Prospects-Measures-Recent Industrial policy

Unit V: Service Sector

Transport-Communication-Tourisom-Education-Housing-Health-E.Banking-ICT-Banking-Contribution to GDP

References:

Datt and Sundaram (2016) , "Indian Economy", Himalaya Publishing House, New Delhi.
P.K Dhar (2003), "Indian Economy" its growing Dimensions, Kalyani Publishers, Ludhiana.
K.P.M. Sundaram (2013), 'Indian Economy', Himalaya Publishing House, New Delhi.
V.K.Misra.S.K. Puri (2016), 'Indian Economy', Himalaya Publishing House, New Delhi.

ECO 3633 DEVELOPMENT ECONOMICS AND PLANNING 6Hrs 6Cr

Objective:

To familiarize the students with the issues and approaches of economic development.

Unit I: Introduction

Development Vs growth-Indicators-Measurement-Characteristics of Economy: Developed- Developing- Underdevelopment

Unit II: Factors of Development

Economic and Non – Economic Factors – Basic Requirements for Economic Growth – Obstacles to Economic Development.

Unit III: Theories of Development

Adam Smith – Marx – Keynesian - Schumpeter – Lewis Theory of unlimited supply of labour – Rostow's Stages of Economic Growth – Balanced Growth – Unbalanced Growth – Big Push Theory – Critical Minimum Effort.

Unit IV: Growth Models

Harrod – Domar Model – Joan Robinson's Model – Kaldor Model – Mahalanobis Model Two Sector Model – Wage - Goods Model

Unit V: Development Planning

Meaning – Needs – Types – Role of Planning – 12^{th} Five year plan: objectives – Performance of Indian Plannig- Introduction of Niti Yaog.

References:

Taneja and Sharma (2009), "Economics of Development and Planning", Vishal Publication, Allahabad.

Misra and Puri,(2016), "Economics of Development and Planning",Himalaya Publications, Mumbai.

Jhingan M.L.(2007), "The Economics of Development and Planning", Vrinda Publications Limited.

Agarwal R.C and Kundan Lal (1998,) "Economics of Development and Planning", Vikas Publications, Ludhiana.

ECO 3635 ENVIRONMENTAL ECONOMICS 6Hrs 6Cr

Objectives:

The objective is to acquaint the learner with the eco-consciousness and environmental awareness.

The course deals with basic ecology and economics-oriented environmental concepts.

Unit I: Introduction to Environmental Economics

Environment as a Permanent Economy-Ecosystem Diversity: Forest – Grassland – Desert - Aquatic Ecosystems - Bio-Diversity - Genetic Variety: Productive - Social Ethical – Aesthetic - Option Values of Bio-Diversity. Hot Spots.

Food Chain - Food Web and Ecological Pyramid - Producers Consumers and Decomposers - Features of Common Property Resources. Functions of Environment Sink – Source - Carrying Capacity - Renewable and Exhaustible Resources

Unit II: Economy and Environmental Interaction

Tragedy of Commons, Limits to Growth Deforestation, Water Security. Food Security Energy Crisis Land degradation and Desertification Eutrophication – Trans - Frontier or Cross Country Environmental Problem - "Population Poverty Environment Triangle".

Unit III: Global Environmental Problems

Land-Water-Air-Acid Rain-Global Warming-Climate Change-Green House Effect-Deforestation- Causes-Effect-Measures.

Unit IV: Cost Benefit Analysis and Project Evaluation

Trade-off – Environment Concern - Watershed Management, Rain Water Harvesting. Maximum Sustainable Yield Principle - Product Life Extension, Resource - Life Extension or Recycling Substitutes. Marketing of the Waste Sustainable Energy Use.

Unit V: Environmental Management

Environmental Ethics, Inter Generation Equity.- Environment and Human Health, Human Rights, Environmental Education - Participatory Learning and Experience - Participatory Rural Appraisal (PRA) – Practice Of PRA - Resource Mapping – Transact Walk.

References:

1. Sankaran, S. (2004), "Environmental Economics", Margham Publications, Chennai.
2. Karpagam,M.(2001), "Environmental Economics", Sterling Publications Pvt Ltd, New Delhi.
3. Ganesamurthy, V.S.(2009), "Environmental Economics in India", New Century Publications, New Delhi.
4. Eugine, T.(2004), "Environmental Economics", Virnda Publications (P) Ltd, Delhi.
5. Ulagnathan Sankar.(2003),"Environmental Economics", Oxford University Press, New Delhi.
6. Ahulwalia. V.K. (2013), "Environmental studies: Basic Concepts", The Energy and Resource Institute Publication, New Delhi.

ECO 3537 ECONOMETRICS - I 5 Hrs 5 Cr

Objective:

The objective of this course is to enable the students to acquire the skill of estimating, building and interpreting econometric models.

Unit I: History of Econometrics

Introduction – Evolution of Econometrics- Development of Probability Test Statistics – Applicability of Econometrics to Economic Issues – Economics as a Science.

Unit II: Econometric theory

Concept and Goals of Econometrics – Difference between Mathematical Economics and Econometrics, Role of Econometrics in Economic Analysis – Limitations of Econometrics.

Unit III: Methodology of Econometric Research

Specification of the Model – Estimation of the Model – Evaluation of the Parameter Estimates – Evaluation of the Forecasting Power of the Model – Desirable Properties of an Econometric Model.

Unit IV: Simple Linear Regression Model

SLR Model– OLS Method - Derivations of the OLS Estimators – BLUE Properties – Significance of OLS Estimators – Interval Estimation – Derivation Of R^2 – Goodness of Fit.

Unit V: Multiple Regression Model

Multiple Regression Model with Two Explanatory Variables – Assumptions – Derivations of Formula for Estimators – Standard Error – R^2 and Adjusted R^2

References:

S.Shyamala, Arulparakasam (2010) "Text Book Econometrics – Theory and application", Vishal publishing company Delhi. (2e).

Mehata G.M.K., Madnani (1994), "Introduction to Econometrics: Principles and applications", Sixth Edition, Oxford & IBH Publishing (P) Ltd, New Delhi.

Chow, G.G (1983), "Econometrics", McGraw- Hill Book Co. New York.

Gujarathi, Madala (2004),"Basic Econometrics", Mc Graw-Hilt Book Co. New York

ECO 3239 ECONOMIC JOURNALISM 3 Hrs.2 Cr

Objectives:

To impart the skills media and Journalism
To create awareness among the economic Journalism

Unit I: Introduction

Journalism as an art- a social science- Aims and functions of Journal-canons of Journalism-standard, quality and content provider-professional and freelance Journalists – Basics in Indian Business Environment

Unit II: Types of Media

Print, Electronic Media and Visual Media – Global, National, Regional Media Information Communication Technology - Cyber Journalism

Unit III: Understanding Economics

Understanding Economic Issues through newspapers , Journals and Media with reference to agriculture , industries and service sectors –Economics effects on Indian Economy.

Unit IV: Knowledge Management

Reporting and Editing - Simplifying data, information- Report writing on economic matters-dissemination of explicit knowledge- transfer of tacit, conceptual knowledge into explicit knowledge

Unit V: Media and Review

Role of Mass Media and Social Media - Reviewing Journals and Magazines pertaining economics-Book review – Article Review

References

Keith Hayes, (2014), 'Business Journalism: How to Report on Business and Economics', APress Publications, London
Gurusamy.M.P, (2000), 'Journalism', Guru Thenmoli Publications, Dindigul
Parkinson, Kamath, (2000), 'What Journalism is all about?', Indian Book house, Bombay
Puri,G.K (2000), 'Journalism', Sudha Publications, New Delhi
Rangasami (1984), 'Basic Journalism', Macmillan, New Delhi

ECO3632 INDIAN ECONOMICS - II 6 Hrs 6 Cr

Objectives:

To impart awareness about the current state of the Indian Economy.
The course is about the present and future scenario of Indian economy.

Unit I: Poverty and Unemployment

Poverty: Definition –Absolute-Relative-Object-Causes – Effects – Measures.
Unemployment and Underemployment: Types – Causes- Measures.

Unit II: Economic Reforms

Economic issues-Role of State – Black Money – Public Private Partnership-Disinvestments-Counterfeit Currency- Parallel economy – Measures- Demonetization and digital economy.

Unit III: Regional Imbalances

Regional inequalities – Balanced Regional development – Public Distribution System – Special Economic Zone – Land and Water use Conflicts –Measures.

Unit IV: Income, Saving & Investment

National Income estimation in India – Growth – Sectoral Contribution – Saving and Investment – types-Measures.

Unit V: Globalization

International Institutions-International Monetary Fund- International Bank for Reconstruction and Development-World Trade Organization-International Labour Organization-Objectives- Role and Functions.

References:

Datt and Sundaram (2016) , "Indian Economy", Himalaya Publishing House, New Delhi.
Dhar. P.K (2003)," "Indian Economy" its growing Dimensions , Kalyani Publishers, Ludihiana.
Sundaram K.P.M. (2013), "Indian Economy", Himalaya Publishing House, New Delhi.
Puri.V.K.Misra.S.K.(2016), "Indian Economy", Himalaya Publishing House, New Delhi.

ECO 3634 FINANCIAL MARKET AND SERVICES 6Hrs 6Cr

Objective

The objective of this course is to update the students knowledge in the developments is the functioning of financial market.

Unit I: Financial System in India

Functions of Financial System – Financial Concepts – Classification of Financial Markets: Capital Market, Government Securities Market, Long Term Loans Market, Mortgages Market – Money Market: Call Money Market, Treasury Bills Market, Commercial Bills Market, Commercial Paper, Certificate of Deposits – Features of Indian Money Market – Weakness of Indian Financial System.

Unit II: Risk and Return

Concept of Returns and Risks – Sources of Risks – Types – Measurement – Inflation and Investment Strategy.

Unit III: Industrial Securities Market

New Issue Market: Meaning – Relationship between New Issue Market (NIM) and Stock Exchange – Functions – Instruments of New Issue – Players in New Issue Market – Investing in IPO's (Initial Public Offer) – Pros and Cons of Investing in IPO's.

Secondary Market: Meaning – Services of Stock Exchanges – Listing of Securities – Advantages and Disadvantages of Listing – Listing Criteria – Listing Obligation – Investors vs. Speculators - Kinds of Speculators – Defects of Indian Capital Market.

Unit IV: Understanding Investment in Equity Market

Investment – Investment vs Speculation – Factors of Sound Investment – Direct and Indirect Investment – Mutual Funds as an Indirect Investment in Equity Market - Features – Benefits – Mutual Fund Schemes – Drawbacks.

Stock Market Intermediaries: Brokers, Sub-Brokers, Depository and Depository Participants – Stock Market Procedures: D-mat Account, Placing Order, Different Types of Order, Book Closure, Record Date and Ex-Date, Rolling Settlement – Internet Trading.

Depository System: Meaning – Objectives – Interacting institutions – Depository process – Benefits.

Unit V: Investor's Protection and Prevention of Unfair Trade Practices

SEBI Guidelines on Protection of Investor's Interest in Primary and Secondary Market – Investor's Education – Unfair trade practices: Price Rigging, Insider Trading - Model Code of Conduct for Listed Companies – Arbitration Facilities.

References:

Rustagi, R.P., (2012), Investment Management: Theory and Practice, Sultan Chand and Sons, New Delhi.
Yasaswy, N.J., (2011), Stock Market Investing Handbook, Vision Books Private Limited, New Delhi.
Gorden, E and Natarajan, K., (2010), Indian Financial Market and Services, Himalaya Publishing House, New Delhi.

ECO 3636 LABOUR ECONOMICS 6Hrs 6Cr

Objectives:

To create awareness for the rights of Laboures
To study the present state of social welfare in India

Unit I: Introduction to Labour

Meaning, Importance, Nature and Scope of Labour Economics, Characteristics of Labour, Forms of Labour

Unit II: Wages and Employment

Wages: Types of Wage Payment, Wage types and Wage Differentials, Wage Structure in India.

Employment**:** Recruitment, Training and Development, Problems of Unemployment, Causes of Unemployment, Types of Unemployment.

Unit III: Workers Participation in Management and Collective Bargaining

Labour Managed Firms - Workers Participation In Management – Works Committee – Joint Management Councils – Workers Directors – Works Ethics – Indian Experience – Labour Co-Operatives.

Unit IV: Industrial Disputes and Trade Union

Industrial Disputes- Meaning-Forms of Industrial Disputes – Absenteeism- Causes for Industrial Disputes- Effects- Preventions of Industrial Disputes – Methods for Settlement of Industrial Disputes – Labour Laws - Trade Union: Meaning- Objectives Functions of Trade Unions.

Unit V: Social Security Measures

Social Security – Meaning – Relevance – Social Security Measures In India – Workmen Compensation Act- Employees State Insurance Scheme – Minimum Wage Act – Welfare Schemes: Gratuity Benefit Fund-Employees Provident Fund-Contributory Pension Scheme -ILO - Aims and Objectives.

References

Kulshrestha. U.C (2005), "Labour Problems and Social Welfare", Lakshmi Narain Agarwal Education Publishers, Agra.
Saxena R.C.,Sexena S.R. (2007), "Labour Relation in India", Asia printers Mata Ghat Road, Khurja.
B.P. Thgai (2008) "Labour Economics and Social Welfare", Jai Prakash Nath &Co, Meerut.

ECO 3538 ECONOMETRICS - II 5 Hrs 5 Cr

Objectives:

To verify the robustness of the model.
To aid student to draw inferences**.**

Unit I: Autocorrelation Problem

Violation of normality of U – Meaning and Consequences – Autocorrelation – Meaning – Causes and Consequences – Detection – Graphic Method and Durbin – Watson test – Methods of Removal.

Unit II: Hetroscedasticity Problem

Hetroscedasticity – Meaning – Causes and Consequences- Detection – Graphic Method and Rank Correlation – Methods for detecting Hetroscedasticity and Methods of Removal.

Unit III: Multicollinearity Problm

Meaning – Consequences of Perfect and Imperfect Multicollinearity on OLS estimates tests for detecting Multicollinearity – Methods for Removal.

Unit IV: Simultaneous Equations

Simultaneous Systems – Endogenous Variables and Exogenous Variables – Reduced forms – Identification.

Unit V: Dummy Variable Models

Meaning- Reasons - Uses –Dummy Variable Model – Types – Applications.

References:

1. Damodhar Gujarati (2012), "Basic Econometrics"TaTa McGraw Hill, New York, 5th Ed.
2. Johnston, J (1997). "Econometric Methods", McGraw-Hill, 4th Ed, New Delhi.
3. Koutsoyiannis, A. (1977). "Theory of Econometrics" (2nd Edn.). The Macmillan Press Ltd., London.
4. Maddala, G.S. (1997). "Econometrics", McGraw Hill; New York.
5. Jack Johnston and John Dinardo,(1997) "Econometric Method(PB)", McGraw Hill Higher Education,4th Ed.
6. Arthur Goldberger,S. (1998), "Introductory Econometrics",Harward University press.

ECO 3240 PERSONAL EMPOWERMENT 3Hrs 2 Cr

Objectives:

To promote goals and developing new skills through personal empowerment

To develop the Confidence and to attain the full potential through personality development.

Unit I: Personality

Personality – Rotter's Locus of Control, Type A and Type B Personality - Hassled Type –Uplifted type 1 – Nash Co–operative Equilibrium – Intellectual Madness – Beautiful Mind – Global Citizen.

Unit II: Self – awareness

Self-Directed Individual – Self Actualized Person – Survival of the Adaptive – Self Concept Inventory – Self Esteem – Rules for Creating Effective Self – Esteem Visualization

Unit III: Hedonic Egoism and Creativity

Hedonic Egoism - Self Interest – Self Worth – Asthetic Values – Rational Vs Irrational – Arational– Identity – Self Satisfaction – Tangible and Intangible – Visible and In-visible – Creativity – 3A's – Invention – Innovation.

Unit IV: Emotional Intelligence

Emotional Intelligence vs Intelligent Quotient – Personal Competence – Empathetic Ability

Unit V: Empowerment

Progressive Maturity – Competence Based Empowerment – Relying on Core Strength – Self Leadership – One on One Influence – Self Directed Team Sprit for Win-Win Strategy –Blue Ocean and Red ocean Strategy.

References:

Ken Blanchard (2001),"Empowerment takes more than a minute", Magna Publishing company, Mumbai.
Aparna Chattopadhyay (2007) ,"what's your Emotional IQ", Pustak Mahal, Bangalore.
Jyotsna Codaty (2007), "Understanding Emotional IQ" , Pustak Mahal, Bangalore.
Matthew Mckay, Patrick Fanning (2000), "Self-esteem", Master Mind Book, Bangalore.

ECO 3200 Environmental Studies 4hrs 2 cr

Objective:

To create awareness in solving the environmental problems

Unit I: Basics in Environmental Studies

Multi-Displinary nature of environmental studies – Definition – Scope and Significance – Need for public awareness.

Environment as public goods – Resource Economics – Conservation of Resources.

Unit II: Environmental Problems

Environmental Pollution: Air, Water, Land, Noise – Causes – Consequences – Remedial Measures.

Unit III: Environmental Protection

Environmental cost of Economic Growth – Cost-Benefit Analysis – Social Cost Benefit analysis – Sustainable Development – Role of NGO- CHIPKO movement- Corporate Social Responsibility – Institutional Social Responsibility.

Unit IV: Policy Measures

Basic approaches to Environmental Policies –Control and effluent fees- India's Environmental Policy- International Environmental Policy.

Unit V: Environment and Media

Role of Media in Environmental Protection- Social Media and Environment - Knowledge Sharing in Environment and Media

References:

1. Ganesamurthy, V.S.(2009), "Environmental Economics in India", New Century Publications, New Delhi.
2. Sankaran, S. (2004), "Environmental Economics", Margham Publications, Chennai.
3. Karpagam,M.(2001), "Environmental Economics", Sterling Publications Pvt Ltd, New Delhi.
4. Eugine, T.(2004), "Environmental Economics", Virnda Publications (P) Ltd, Delhi.
5. U. Sankar.(2003), "Environmental Economics", Oxford University Press, New Delhi.
6. Ahulwalia. V.K. (2013), "Environmental Studies: Basic Concepts", The Energy and Resource Institute Publication, New Delhi.

ECO 3631 **இந்தியப் பொருளாதாரம் - I** **6 Hrs 6 Cr**

நோக்கங்கள் : ஒட்டு மொத்த இந்தியப் பொருளாதார அமைப்பை அறிந்து கொள்ளுதல் பல்வேறு துறைசார் வளர்ச்சி, பாதிப்புகள் மற்றும் துறைசார் வளர்ச்சிக் கொள்கைகளைப் புரிந்து கொள்ளல்.

அலகு 1: இந்தியப் பொருளாதாரத்தின் அமைப்பு

இந்தியப் பொருளாதாரத்தில் மாற்றம் - இந்தியப் பொருளாதாரத்தின் அடிப்படை குணாதிசயங்கள் - இந்தியப் பொருளாதாரத்தின் குறைவான வளர்ச்சிக்கான காரணங்கள் - வேகமாக வளரும் இந்தியப் பொருளாதாரம்.

அலகு 2: இயற்கை வளங்கள்

நிலம் - மண் - நீர் - தாது வளம் - காட்டு வளங்கள் - வகைகள் - பாதுகாக்கும் முறைகள் - வள மேலாண்மை.

அலகு 3: வேளாண் துறை

இந்தியப் பொருளாதார முன்னேற்றத்தில் விவசாயத்தின் பங்கு – வேளாண்மைப் போக்கின் உற்பத்தி மற்றும் உற்பத்தி திறன் – உற்பத்தித் திறனை பாதிக்கும் மற்றும் அதிகரிப்பதற்கான வழிமுறைகள் - பசுமைப் புரட்சி - இயல்புகள் - விளைவுகள் - புதிய வேளாண் கொள்கை – இந்தியாவின் உணவுப் பிரச்சினைகள் மற்றும் உணவுப் பாதுகாப்புக் கொள்கை.

அலகு 4: தொழில் துறை

தொழில் துறையின் வகைகள் - பெரிய - சிறிய – நடுத்தரத் தொழில் துறைகள் - கிராமம் மற்றும் குடிசைத் தொழில்கள் - பிரச்சினைகள் - வாய்ப்புகள் - அளவிடும் முறைகள் - புதிய தொழிவ் கொள்கை.

அலகு 5: சேவைத் துறை

போக்குவரத்து – தொலைத் தொடர்பு – சுற்றுலா – கல்வி – வீட்டு வசதி – சுகாதாரம் - மின்னணு வங்கியியல் – தகவல் , தொலைத் தொடர்பு மற்றும் தொழில் நுட்பம் (ICT) – வங்கியியல் – மொத்த உள் நாட்டு உற்பத்தியின் பங்களிப்பு.

மேற்பார்வை நூல்கள்:

மா. பா. குருசாமி , (2012), இந்தியப் பொருளாதாரம், குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

மா.பா.குருசாமி , (2010), இந்தியப் பொருளாதார வளர்ச்சி , குரு தேமொழி பதிப்பகம், திண்டுக்கல்

ECO 3633 பொருளாதார முன்னேற்றம் மற்றும் திட்டமிடல் 6Hrs 6Cr

நோக்கம்: பொருளாதார முன்னேற்றம் மற்றும் திட்டமிடல் தொடர்பான பிரச்சினைகள், தடைகள் மற்றும் முன்னேற்றக் கொள்கைளைப் பற்றி அறிந்து கொள்ளல்.

அலகு 1: அறிமுகம்

முன்னேற்றம் மற்றும் வளர்ச்சி – குறிகாட்டிகள் - அளவிடும் முறைகள் - பொருளாதாரத்தின் குணாதிசயங்கள் : வளர்ந்த நாடுகள் – வளர்ந்து கொண்டிருக்கிற நாடுகள் – பின்தங்கிய நாடுகள்.

அலகு 2: முன்னேற்றக் காரணிகள்

பொருளாதாரம் மற்றும் பொருளாதாரமற்ற வளர்ச்சிக் காரணிகள் - பொருளாதார வளர்ச்சிக்கான அடிப்படைத் தேவைகள் - பொருளாதார முன்னேற்றத்திற்கான தடைகள்.

அலகு 3: வளர்ச்சிக் கோட்பாடுகள்

ஆடம் ஸ்மித் - மார்க்ஸ் - ரிக்கார்டோ – மால்தஸ் - சும்பீட்டர் - லூயிஸ் - ரோஸ்டோவின் பொருளாதார வளர்ச்சிப் படிநிலைகள் - சமச்சீர் வளர்ச்சி – சமச்சீரற்ற வளர்ச்சி - மிகை உந்துதல் கோட்பாடு – குறைந்த பட்சத் தீவிர முயற்சிக் கோட்பாடு.

அலகு 4: வளர்ச்சி மாதிரிகள்

ஹராட் - டோமர் மாதிரி – ஜோன் ராபின்சன்ஸ் - கால்டார் மாதிரி – மஹலனோபிஸ் மாதிரி.

அலகு 5: முன்னேற்ற திட்டமிடல்

பொருள் - தேவைகள் - வகைகள் - திட்டமிடலின் பங்கு – 12$^{ஆவது}$ ஐந்தாண்டுத் திட்டம்: நோக்கங்கள் - இந்தியத் திட்டமிடலின் செயல்திறன் - AYOG யின் அறிமுகம்.

மேற்பார்வை நூல்கள்

மா. பா. குருசாமி, பொருளாதார வளர்ச்சி மற்றும் திட்டமிடல் (2012), குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

மா.பா.குருசாமி, இந்தியப் பொருளாதார வளர்ச்சி மற்றும் திட்டமிடல் (2014), குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

ந.சீனிவாசன், இந்தியப் பொருளாதார வளர்ச்சி மற்றும் திட்டமிடல் (2014), மீனாட்சி பதிப்பகம், திண்டுக்கல்.

ECO 3635 **சுற்றுச்சூழல் பொருளாதாரம்** **6 Hrs 6Cr**

நோக்கம் : பொருளாதார வளர்ச்சியினால் ஏற்படும் சுற்றுப்புறச் சூழலில் சாதக , பாதக விளைவுகளைப் பயிலுதல்.

அலகு 1: சுற்றுச்சுழல் பொருளாதாரத்தின் அறிமுகம்

சுற்றுச்சூழல் ஒரு நிரந்தர பொருளாதார அமைப்பு – சூழல் வகைமை : காடு - புல்வெளி - பாலைவனம் - நீர்வாழ் சூழல் அமைப்பு – உயிரினப் பல்வகைமை மரபணு : ஆக்கவளம் - சமுதாய நீதிநெறி - இரசனை மதிப்பு, விருப்பப் பயன் மதிப்பு - உயிர்பன்வகைமை செறிவு மிக்க இடங்கள்.

உணவுச்சங்கிலி - உணவு வலை மற்றும் சுற்றுச்சூழல் கூர்நுனிக்கோபுரம் - உற்பத்தியாளர் - நுகர்வோர் - சிதைப்போர்கள் - சுற்றுச்சூழல் பணிகள் சூழல் தாங்குதல் - புதுப்பிக்கக்கூடிய மற்றும் அழிந்து போகும் வளங்கள்

அலகு 2: பொருளாதாரம் மற்றும் சுற்றுச்சூழல் தொடர்பு

பொதுவான இடர் - வளர்ச்சி வரம்புகள் - காடுகளை அழித்தல் - பாதுகாக்கப்பட்ட நீர் - உணவுப் பாதுகாப்பு - ஆற்றல் நெருக்கடி - நிலவளம் குறைதல் மற்றும் பாலைவனமாக்குதல் - தூர்ந்து போதல் - எல்லை தாண்டிய சுற்றுச்சூழல் பிரச்சினைகள் - மக்கள் வறுமை சுற்றுச்சூழல் முக்கோணம்.

அலகு 3: உலகச் சுற்றுச்சூழல் பிரச்சினைகள்

நிலம் - நீர் - காற்று – அமில மழை – உலக வெப்பமயமாதல் - பருவகால மாற்றம் - பசுமை வீட்டின் விளைவு – காடழிப்பு – காரணங்கள் - விளைவுகள் - நடவடிக்கைகள்.

அலகு 4: நன்மை - செலவு ஆய்வு மற்றும் ஆய்வு மதிப்பீடு

கிராமிய மற்றும் நகரியச் சுற்றுச்சுழல் திட்டமிடல் - நீர்மேலாண்மை, மழைநீர் சேகரிப்பு திட்டம் - தன்னிறைவு அடைந்த உச்ச உற்பத்திக் கொள்கை – பொருள் வாழ்வாதார விரிவாக்கம் - வளங்கள் - மறுசுழற்சிப் பதிலீடுகள் , கழிவில் தன்னிறைவு ஆற்றல் பயன்பாட்டினைச் சந்தையிடுதல்.

அலகு 5: சுற்றுச்சூழல் மேலாண்மை

சுற்றுச்சூழல் நெறிகள் - தலைமுறை இடைநிலைப் பங்கு - சுற்றுச்சூழல் மற்றும் மனித ஆரோக்கியம் - மனிதவுரிமை சுற்றுச்சூழல் கல்வி - பங்கேற்புபடித்தல் மற்றும் அனுபவம் - கிராமியப் பங்கேற்பு மதிப்பீடு [PRA] - வளங்களைக் குறியிடுதல் - செயல் திட்டம் - பரிமாற்ற நடை.

மேற்பார்வை நூல்கள் :

Dr. N. ஆறுமுகம், (2015) , சுற்றுச்சூழல் கல்வி, - சரஸ் பதிப்பகம் - நாகர்கோவில்

J.தர்மராஜ், (2011) , சுற்றுச்சூழல் கல்வியியல், டென்சி பதிப்பகம், சிவகாசி

Dr. ராதா (2010) ,சுற்றுச் சூழல் கல்வி, பிரசன்னா பதிப்பகம், சென்னை.

ECO 3537 **பொருளாதார அளவையியல் - I** **5Hrs 5 Cr**

நோக்கம்: பொருளாதார மாதிரிகளைக் கட்டமைத்து கணித்தல் மற்றும் அதன் உள்ளார்ந்த கருத்துக்களை வெளிக் கொணர்தல்

அலகு 1: பொருளாதார அளவையியலின் வரலாறு

அறிமுகம் - பொருளாதார அளவையியலின் பரிணாமம் - புள்ளியலின் நிகழ்தகவு சோதனையின் வளர்ச்சி – பொருளாதாரப் பிரச்சினைகளில் பொருளாதார அளவையியலின் பங்கு – அறிவியலாகப் பொருளாதாரம்.

அலகு 2: பொருளாதார அளவையியல்

இலக்கணம் - பரப்பெல்லை மற்றும் நோக்கம் - கணிதப் பொருளாதாராத்திற்கும் பொருளாதார அளவையியலுக்கும் உள்ள வேறுபாடு - பொருளியல் ஆய்வில் பொருளாதார அளவையிலின் பங்கு – பொருளாதார அளவையியலின் வரையறைகள்.

அலகு 3: பொருளாதார அளவையியலின் ஆய்வுமுறை

உருவகத்தின் விபரங்களைக் குறிப்பிடுதல் - உருவகத்தை மதிப்பீடு செய்தல் - பண்பளவைகளை மதிப்பீடு செய்தல் – எதிர்காலப் போக்கு கணிப்பு – பொருளாதார அளவையியல் மாதிரிகளின் இயல்புகள்.

அலகு 4: சாதாரண நேரியல் தொடர்புப் போக்கு உருவகம் (SLR)

OLSமுறை – OLS உருவகத்தின் வர்க்க மதிப்பீடு - BLUE எடுகோள்கள், இயல்புகள் - சிறப்புக் காண சோதனை - நம்பிக்கை இடைவெளி - R^2 – சிறந்த பொருத்துதல்

அலகு 5: பன்முக நேரியல் தொடர்புப் போக்கு உருவகம் (MLR)

இரண்டு சாராத மாறிகளுடன் MLR – எடுகோள் - உருவகத்தைச் சூத்திரத்தின் மூலம்

மதிப்பீடு செய்தல் - திட்டப்பிழை – R^2 மற்றும் $\bar{R}^2$.

மேற்பார்வை நூல்

S. சியாமளா, (2010) 'பொருளாதார அளவையியல்', ACME Computers , மதுரை.

ECO 3239 **பொருளாதார இதழியல்** **4Hrs 2 Cr**

நோக்கங்கள்: பொருளாதார உள்ளார்ந்த கருத்துக்களை, வெளித் திறமைகளைப் பயிலல். பொருளாதாரச் சிக்கல்கள், வளர்ச்சி மற்றும் கொள்கைகளை ஊடகவியல் பார்வையோடு அணுகுதல்

அலகு 1: அறிமுகம்

இதழியல் என்பது கலை - இதழியல் என்பது சமூக அறிவியல் - இதழியலின் பணிகள் மற்றும் நோக்கங்கள் - இதழியலின் விதிமுறைகள் - தரம் மற்றும் கருத்து அளிப்பு - இந்திய வணிகச் சூழ்நிலையின் அடிப்படைகள்.

அலகு 2: ஊடகங்களின் வகைகள்

அச்சு மற்றும் மின்னணு ஊடகங்கள் - உலகளாவிய, தேசிய , வட்டார ஊடகங்கள் - தகவல் தொழில்நுட்பம் மற்றும் கணினி இதழியல்கள்.

அலகு 3: இதழியல் மற்றும் பொருளாதாரம்

செய்தித் தாள்கள், இதழியல் மற்றும் ஊடகவியல் மூலமாக விவசாயம் - தொழில் துறை - சேவைத் துறை போன்றவற்றை அறிந்து கொள்ளுதல் - இந்தியப் பொருளாதாரத்தில் தாக்கங்கள்.

அலகு 4: அறிவு மேலாண்மை

அறிக்கை மற்றும் தொகுத்து அமைத்தல், புள்ளி விவரங்களை எளிமையாக்குதல் - தகவல் - பொருளாதாரக் கருத்துக்களை அறிக்கையாக்குதல் - வெளிப்படையான அறிவினைப் பரவலாக்குதல் - பேச விரும்பாதவற்றை மாற்றுதல் - கருத்துருவாக்க அறிவிலிருந்து பரவலாக மாற்றுதல் - அறிவுரை.

அலகு 5: ஊடகம் மற்றும் திறனாய்வு

பேரளவு ஊடகம் மற்றும் சமுதாய ஊடகத்தின் பங்கு – பொருளாதார நாளிதழ்களையும் , பத்திரிகைகளையும் திறனாய்வு செய்தல் - புத்தகத் திறனாய்வு – கட்டுரைத் திறனாய்வு.

மேற்பார்வை நூல்

மா.பா.குருசாமி, (2012), இதழியல், குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

ECO 3636 **உழைப்புப் பொருளாதாரம்** **6Hrs 6Cr**

நோக்கங்கள்: உழைப்பாளர்களின் உரிமைகளைப் பற்றிய அறிவினை உருவாக்குதல்

இந்தியாவில் தற்போதிய சமுதாய நலன் பற்றிப் படித்தல்.

அலகு 1: உழைப்பு – அறிமுகம்

பொருள் - முக்கியத்துவம் - இயல்பு மற்றும் பரப்பெல்லை - உழைப்பின் குணாதிசயம் - உழைப்பின் வகைகள்.

அலகு 2: கூலி மற்றும் வேலைவாய்ப்பு

கூலி: கூலி செலுத்தும் வகைகள் - கூலி வகைகள் மற்றும் கூலி வேறுபாடுகள் - இந்தியாவின் அணுகுமுறை.

வேலைவாய்ப்பு: பணியாளர் நியமனம் - பயிற்சி மற்றும் முன்னேற்றம் - வேலையின்மையின் பிரச்சினைகள் - வேலையின்மையின் காரணங்கள் - வகைகள்.

அலகு 3:தொழிலாளர் பங்கின் மேலாண்மை மற்றும் கூட்டுப் பேரம்

தொழிலாளர் நிர்வகிக்கும் நிறுவனம் - நிறுவன மேலாண்மையில் தொழிலாளர்களின் பங்கு – தொழிலாளர் குழு – கூட்டு நிர்வாக குழு – தொழிலாளர் நிர்வாகிகள் - உழைப்பின் நெறிமுறைகள் - தொழிலாளர் கூட்டுறவு - இந்தியாவின் அணுகுமுறை.

அலகு 4: தொழில் தகராறுகள் மற்றும் தொழில் சங்கம்

தொழில் தகராறுகள்: பொருள் - தொழில் தகராறுகளின் வகைகள் - காரணங்கள் - விளைவுகள் - தொழில் தகராறுகளைத் தடுக்கும் நடவடிக்கைகள் - தொழில் தகராறுகளை தீர்க்கும் பல்வேறு வழிமுறைகள் - தொழிலாளர் சட்டங்கள் - வெளியேறும் கொள்கை - தொழிலாளர் சங்கம் : நோக்கம் மற்றும் செயல்பாடுகள்.

அலகு 5: சமூக – பாதுகாப்பு மற்றும் நலன் நடவடிக்கைகள்

சமூக - பாதுகாப்பு: பொருள் - அவசியம் - சமூகப் பாதுகாப்பின் நன்மைகள் - இந்தியாவில் சமூகப் பாதுகாப்பு முறைகள் - தொழிலாளர் இழப்பீட்டுச் சட்டம் - அரசு தொழிலாளர் காப்பீட்டுத் திட்டம் - குறைந்த பட்சக் கூலிச் சட்டம். நலத்திட்டம் : பணிக்கொடை சேம நிதி – தொழிலாளர் வருங்கால வைப்பு – பங்களிப்பு ஓய்வூதியத் திட்டம் - சர்வதேசத் தொழிலாளர் அமைப்பு - பணிகள் மற்றும் நோக்கம் .

மேற்பார்வை நூல்கள்

மா. பா. குருசாமி,(2012), உழைப்புப் பொருளாதாரம், குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

மா. பா. குருசாமி,(2012), தொழில் பொருளாதாரம், குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

மா. பா. குருசாமி, (2012), இந்தியப் பொருளாதார வளர்ச்சி, குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

ECO 3538 பொருளாதார அளவையியல் - II 5Hrs 5 Cr

நோக்கங்கள்: பொருளாதார மாதிரிகளின் நம்பகத் தன்மையை ஆய்வுக்கு உட்படுத்துதல்

பொருளாதாரத் தீர்மானங்களை உருவாக்கப் பயன்படுத்துதல்.

அலகு 1: தன்னுடன் தொடர்புச் சிக்கல்

இயைபு(U)வின் பிறழ்ச்சித் தன்மை – பொருள் மற்றும் விளைவுகள் - தன்னுடன் தொடர்பு – பொருள் - முக்கியத்துவம் மற்றும் விளைவுகள் - வெளிக்கொணர்தல் – சிதறல் வரைபடம் மற்றும் டர்பின் வாட்சனின் புள்ளிச் சோதனை – பிழை நீக்குதல்

அலகு 2: சமமற்றப் பரவுகை சிக்கல்

சமமற்றப் பரவுகை – பொருள் - விளைவுகள் மற்றும் முக்கியத்துவம் - சிதறல் வரைபடம் - வரைபட முறை மற்றும் தரக்கெழுத் தொடர்பு – தரக்கெழுச் சோதனை மற்றும் நீக்குதல்.

அலகு 3: பன்முக ஒத்த தன்மை

பொருள் - நிறை மற்றும் நிறை குறை பன்முக ஒத்த தன்மையின் OLSஇன் விளைவுகள் , பன்முக ஒத்த தன்மை சிக்கலை நீக்கும் முறைகள் - குறை நீக்கும் முறைகள்.

அலகு 4: ஒருங்கமைச் சமன்பாட்டு உருவகம்

பொருள் - காரணங்கள் - உள் மற்றும் வெளி நின்ற மாறிகள் - குறைக்கப்பட்ட உருவகம் - அடையாளப்படுத்துதல்.

அலகு 5: இருபடித்தான மாறிகள்

பொருள் - காரணங்கள் - இருபடித்தான மாறிகள் - வகைகள் - செயல் முறை சார்ந்த.

மேற்பார்வை நூல்

சியாமளா,S, (2012), 'பொருளாதார அளவையியல்', ACME Computers , மதுரை.

ECO 3240 தனிநபர் மேம்பாடு 3 Hrs 2 Cr

நோக்கம்: 1. தனிநபர் மேம்பாட்டின் மூலம் குறிக்கோள்களையும் மற்றும் புதிய திறன்களையும் உருவாக்கிக் கொள்ளல்.

2. தனிநபர் மேம்பாட்டின் மூலம் முழு ஆற்றல் மற்றும் தன்னம்பிக்கையைப் பெறுதல்.

அலகு 1: ஆளுமை

ஆளுமை : ரோட்டரின் மன சுழற்சிக் கட்டுப்பாடு, A வகை, B வகை, ஆளுமை, ஹஸ்ல்ட் வகை – மேம்படுத்தப்பட்ட வகை – நாஸ்இன் கூட்டுறவுச் சமநிலை – அறிவு மூடத்தனம் – அழகான சிந்தனைகள் - உலகளாவிய பண்பாளார்.

அலகு 2: சுய முன்னெச்சரிக்கை

சுய நோக்குத் தனித்திறன் - தன்நிறைவுத் தேவைகள் ஏற்றுக் கொள்ளக்கூடிய நிலைத்தன்மை – தனிநபரின் கருத்துகள் தன் மதிப்பு – தன் மதிப்பை உருவாக்கும் பயனுள்ள விதிகளைப் பார்த்தல் - உயர்வான கருத்துக்களைப் பார்த்தல்.

அலகு 3: தன்மன நிறைவு தன்னலம் மற்றும் ஆக்கத்திறன்

தன்மன நிறைவு தன்னலம் - தன் விருப்பம் - தன்மதிப்பீடு - ஈர்ப்பு மதிப்பு – பகுத்தறிவு vs பகுத்தறிவற்ற – பொது நலனில் தன்னலம் - தனித்துவம் - தன்நிறைவு – உணரக் கூடியது மற்றும் உணரக் கூடாதது – கண்ணுக்குப் புலனாகக் கூடியது மற்றும் புலனாகக் கூடாதது – 3A's – கண்டுபிடிப்பு – புத்தாக்கம்.

அலகு 4: உணர்ச்சிப் புலனாய்வு

உணர்ச்சிப் புலனாய்வு – நுண்ணறிவெண் - மன எழுச்சி நுண்ணறிவு – மற்றவரின் உணர்வை அறியும் திறன்.

அலகு 5: ஆற்றல்படுத்துதல்

வளர்ச்சி நிலை – தகுதி அடிப்படையில் அதிகாரமளித்தல் - ஒட்டுறவுப் பலத்தை ஏற்படுத்துதல் - தனி தலைமை – ஒரு நபர் அதிகாரம் - வெற்றி வெற்றி வியூகத்தைத் தானே இயக்கும் கூட்டணி மனப்பான்மை – நீலக் கடல் உத்தி மற்றும் சிவப்புக் கடல் உத்தி.

மேற்பார்வை நூல்:

மா.பா.குருசாமி , (2010), ஆளுமை மேம்பாடு , குரு தேமொழி பதிப்பகம், திண்டுக்கல்

ECO 3632 **இந்தியப் பொருளாதாரம் - II** **6 Hrs 6 Cr**

நோக்கம் : இந்தியா எதிர்கொள்ளும் பல்வேறு (மக்கள் தொகை, வளர்ச்சியில் அரசுத் தலையீடு, தேசிய மற்றும் பன்னாட்டு) பிரச்சினைகளை உணர்ந்து கொள்ளல்.

அலகு 1: வறுமை மற்றும் வேலையின்மை

வறுமை: இலக்கணம் – அளவிடுதல் - காரணங்கள் - விளைவுகள் - நீக்க நடவடிக்கைகள். வேலையின்மை: வகைகள் - அளவீடு – சிறப்பு நடவடிக்கைகள்.

அலகு 2: பொருளாதாரச் சீர்திருத்தங்கள்

பொருளாதாரப் பிரச்சினைகள் - அரசின் பங்கு – கருப்புப் பணம் - அரசு மற்றும் தனியார்க் கூட்டளிப்பு – பங்குகளை விற்றல் - போலியான பணம் - இணைப் பொருளாதாரம் - அளவிடுதல் - பணமதிப்பிறக்கம் மற்றும் மின்னியல் பொருளாதாரம்.

அலகு 3: வட்டாரப் பிரச்சினைகள்

வட்டார ஏற்றத் தாழ்வுகள் – சமச்சீரான வட்டார முன்னேற்றம் - பொது விநியோக முறை – சிறப்பு பொருளாதார மண்டலம் - நிலம் மற்றும் நீர்ப் பயன்பாடு , முரண்பாடுகள் - அளவிடுதல்.

அலகு 4: வருமானம், சேமிப்பு மற்றும் முதலீடு

தேசிய வருமானம் : கணக்கீடு – வளர்ச்சி – துறைகளின் பங்களிப்பு – சேமிப்பு மற்றும் முதலீடு – வகைகள் - அளவிடுதல்.

அலகு 5: உலகமயமாக்கல்

பன்னாட்டு நிறுவனங்கள் - பன்னாட்டுப் பணநிதியகம் - பன்னாட்டு மற்றும் மறுசீரமைப்பு வங்கி – உலக வர்த்தக அமைப்பு – பன்னாட்டுத் தொழிலாளர் அமைப்பு – நோக்கங்கள் - பங்கு மற்றும் பணிகள்.

மேற்பார்வை நூல்கள்:

மா. பா. குருசாமி , (2012), இந்தியப் பொருளாதாரம் குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

மா.பா.குருசாமி , (2010), இந்தியப் பொருளாதார வளர்ச்சி , குரு தேமொழி பதிப்பகம், திண்டுக்கல

ECO 3634 நிதி அங்காடி மற்றும் சேவைகள் 6Hrs 6Cr

நோக்கம்: இந்தியப் பணமற்றும் முதலீட்டு அங்காடிகளைத் தெரிந்து கொண்டு, முதலீட்டு முயற்சிகளை மேற்கொள்ளல்.

அலகு 1: இந்திய நிதி அமைப்பு:

இந்தியாவில் நிதியின் அமைப்பு - கருத்துக்கள் - பகுப்புகள் - மூலதன அங்காடிப் பகுப்புகள் : மூலதன அங்காடி – அரசு நிதிப் பத்திர அங்காடி – நீண்ட கால கடன் அங்காடி – அடமான அங்காடி . பண அங்காடி : அழைப்புப் பண அங்காடி, - கருவூல உண்டியல் அங்காடி - வணிக உண்டியல் அங்காடி – வணிகக் காகிதம் - வைப்புச் சான்றிதழ். - இந்தியப் பண அங்காடியின் இயல்புகள் - இந்தியப் பண அங்காடியின் குறைபாடுகள்.

இடர் மற்றும் மீட்பு: இடர் மற்றும் மீட்புக் கருத்துக்கள் - இடரின் மூலங்கள் - வகைகள் - அளவிடும் முறைகள் - பணவீக்கம் மற்றும் முதலீட்டு அணுகுமுறை.

அலகு 2: தொழில் பங்குச் சந்தை

புதிய பங்கு வெளியீட்டுச் சந்தை: பொருள் - புதிய பங்கு வெளியீட்டு சந்தை மற்றும் பங்கு மாற்றகம் தொடர்பு – பணிகள் - புதிய வெளியீட்டுக் கருவிகள் - பங்கேற்பாளர் - பொது வெளியீட்டு (IPOs) நன்மைகள் மற்றும் தீமைகள்.

பங்கு மாற்றகம்: பொருள் - பணிகள் - பத்திரங்கள் பட்டியலிடுதல் - நன்மைகள், தீமைகள் - பட்டியலிடுதலில் உத்திகள் – பட்டியல் உதவிகள் - பட்டியலிடுதலின் சலுகை - முதலீட்டாளர்கள் மற்றும் ஊக வணிகர்கள் - வகைகள் - இந்திய மூலதன அங்காடியின் குறைகள்.

அலகு 3: பங்குச் சந்தையில் முதலீடு

பங்குச் சந்தையில் முதலீடு: முதலீடு மற்றும் ஊக வணிகம் - நம்பகத்தன்மையான முதலீட்டுக் காரணிகள் - நேர்முக மற்றும் மறைமுக முதலீடு.பங்குச் சந்தை இடைத்தரகர்கள் : தரகர்கள் - துணைத்தரகர்கள் - சேமிப்பிற்காகப் பங்கேற்பவர்கள் - பங்கு மாற்று அங்காடி அமைப்புகள் - இருப்பு ஆணை - இட ஆணையின் வகைகள் - இணைய வாணிபம்.

முதலீட்டகத்திற்கு அமைப்பு: பொருள் - நோக்கங்கள் - இணைவிக்கும் நிறுவனங்கள் - களஞ்சிய முறைகள் - நன்மைகள்.

அலகு 4: முதலீட்டாளர் பாதுகாப்பு

முதலீட்டாளர் பாதுகாப்பு - செபி – முதலீட்டாளர் - ஆர்வம் - வளர்ச்சிக்குச் செபியின் வழிகாட்டுதல்கள் - முதலீட்டாளர்க்கு கல்வி – நியாயமற்ற வர்த்தக வழிமுறைகள் - விலை நிர்ணயத்தில் உள்ளிருப்போர் வாணிபம் - பட்டியலிடப்பட்ட நிறுவனங்களுக்கான நடைமுறை – சமரச நடவடிக்கைகள்.

அலகு 5: நிதிச் சேவைகள்

நிதிச் சேவை – பரஸ்பர நிதி – வணிகர் வங்கி – துணிகர முதலீடு – கடன் முகவர் மதிப்பீடு.

மேற்பார்வை நூல்கள்

ராதா, (2012), இந்திய நிதி நிறுவனங்கள், குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

ரஸ்டாகி, R.P., (2012), முதலீட்டு மேலாண்மை, சுல்தான் சந்த் & சன்ஸ் புது டில்லி.

ECO 3200 **சுற்றச்சூழல் கல்வி** **4hrs 2 Cr**

நோக்கம் : சுற்றுச்சூழல் பிரச்சனைகளைத் தீர்ப்பதற்கான விழிப்புணர்வை உருவாக்குதல்

அலகு 1: சுற்றுச்சூழல் கல்வி அடிப்படை

சுற்றுச்சூழல் கல்வியின் பலதுறை சார்ந்த தன்மை - இலக்கணம் - பரப்பெல்லை மற்றும் முக்கியத்துவம் - பொது விழிப்புணர்வுக்கான தேவைகள்.

சுற்றுச்சூழலின் பொதுப்பொருள்கள் – பொருளாதார வளங்கள் - வளங்களைப் பாதுகாத்தல்.

அலகு 2: சுற்றுச்சூழல் பிரச்சனைகள்

சுற்றுச்சூழல் மாசுபடுதல்: காற்று – நீர் - நிலம் - ஒலி – காரணங்கள் - விளைவுகள் - நீக்குவதற்கான நடவடிக்கைள்.

அலகு 3: சுற்றுச்சூழல் பாதுகாப்பு

பொருளாதார வளர்ச்சிக்கான சுற்றுச்சூழல் செலவு – செலவு–நன்மை பகுத்தாய்வு – சமுதாயச் செலவு பயன்பாட்டுப் பகுத்தாய்வு – நீடித்த வளர்ச்சி – தன்னார்வ அமைப்புகளின் பங்கு – "சிப்கோ" இயக்கம் - பெருநிறுவனங்களின் சமூக பொறுப்புகள் - நிறுவனங்களின் சமூக பொறுப்புகள்.

அலகு 4: கொள்கை நடவடிக்கைகள்

சுற்றுச்சூழல் கொள்கையின் அடிப்படை அணுகுமுறைகள் - கட்டுப்பாடு மற்றும் கழிவுக் கட்டணங்கள் - இந்தியாவின் சுற்றுச்சூழல் கொள்கைகள் - பன்னாட்டுச் சுற்றுச்சுழல் கொள்கைகள்.

அலகு 5: சுற்றுச்சூழல் மற்றும் ஊடகம்

சுற்றுச்சூழல் பாதுகாப்பில் ஊடகத்தின் பங்கு – சமூக ஊடகம் மற்றும் சுற்றுச்சூழல் - சுற்றுச்சூழல் மற்றும் ஊடகத்தின் அறிவார்ந்த பகிர்வு.

மேற்பார்வை நூல்கள்

மா. பா. குருசாமி ,(2012), சுற்றுச்சூழல் கல்வி, குரு தேமொழி பதிப்பகம், திண்டுக்கல்.

தர்மராஜ் (2010) , சுற்றுச்சூழல் கல்வி, மீனாட்சி பதிப்பகம், மதுரை.

VAL 3232 SOCIAL ISSUES AND VALUE STAND 2 Cr / 4 hrs

Objectives: This course aims at introducing and clarifying values amidst various issues in society. By internalizing the values on the basis of universal frame of reference such as the Indian constitution, the course helps the students to take appropriate value stands on wide ranging societal issues.

I – Introducing the concept of Values

Concept of "Value" – Dimensions of Values, Identification of Values, Values as socially desirable quality, Spatio-temporal and cultural relativeness of values – Philosophical / ethical, sociological and psychological aspects of values – Sources of Values, Values and rights – Indian constitutional basis for values - Importance of value Education

II – Caste in Indian Society

Origin & features of Caste system – Varna & Jati – Understanding untouchability – Reservation and the concept of positive discrimination – Issues related to caste in contemporary India.

III – Gender in Indian Society

Sex & Gender - Definition and concept of gender inequality – Patriarchy System - Crimes against Women - Data pertaining to inequality index in India – Economic participation, educational achievements, health & life expectancy & political empowerment – Female foeticide & infanticide, sex ratio, maternal mortality rate – Legal and constitutional safeguards against gender inequality

IV – Religion in Indian Society

Religious diversity in India – Concept of secularism - Religious fundamentalism – Issues related to religious violence – Need for dialogue, Pluralism & inclusiveness.

V – Youth and Value orientation

Youth and personal values – youth and peer group values – youth and social values – youth and family values – youth and religious values – youth and political values - value challenges in education, occupation and profession – Promotion of value based society.

Books for Reference

1. *Rajiv Azad, "Gender Discrimination: An Indian Perspective", Atlantic Publishers (2012)*
2. *Vani Kant Borooah, Nidhi S. Sabharwal and et al, "Caste discrimination and exclusion in Modern India"*
3. *Jagan Karade, "Caste Discrimination", Sage Publication, Rawat Books, (2015)*
4. *Peggy Froerer, "Religious division and Social Conflict", Social Science Press, New Delhi, (2007)*
5. *Ram Puniyani, "Religion, Power and Violence", Sage Publications, (2005)*
6. *Singh, R.P. (2004). Value education in Indian democracy. University News, 4294 l), October 1 1- 17,6-9.*
7. *Prahallada, (2000). Contemporary significance of value education. In Negi, U.R. (Ed.) Value education in India. New Delhi: Association of Indian Universities, 1-9.*
8. *Periodic articles and news reports published in print media*

POST GRADUATE & RESEARCH DEPARTMENT OF ZOOLOGY

PROGRAM FOR M. Phil. ZOOLOGY (2015-16 onwards)

SEM	S. No.	Course code	Course Title	Hours	Credits	Max marks
I	1	MPZ 6601	Research Methods	6	6	120
Project paper						
I	2	MPZ 6605	Environmental Science & Biotechnology	6	6	120
I	3	MPZ 6613	Insect Diversity			
I	4	MPZ 6615	Microbiology			
I	5	MPZ 6617	Probiotics			
I	6	MPZ 6619	Immunology			
I	7	MPZ 6651	Research Project-I	18	6	**
			Total	30		240
II	8	MPZ 6652	Research Project-II	30	6	240
			Grand Total	60	24	480

**Valued continuously till the end of Second Semester

MPZ 6613 Insect Diversity (6hrs/6cr)

This project paper is aimed to acquaint students with the basics of insect morphology, physiology and systematics. It is designed to impart knowledge on the ecology, abundance and their role in ecosystem. It will help to develop strong foundation in entomology by understanding the importance of insects to human society, concern related to disease, insecticide, their use in forensics and in biotechnology.

1. **Insect Morphology:** External morphology of insect- head, thorax, abdomen, appendages – functions and modifications.

2. **Insect Taxonomy:** Principles of systematics, classification, apterygotes, exopterygotes, endopterygotes – examples.

3. **Insect Physiology:** Digestive, circulatory, respiratory, excretory, nervous, sensory, reproductive system and endocrine glands.

4. **Insect Ecology:** Population dynamics, factors, dispersal, migration, seasonality, diapause, prey–predator interaction, mimicry, coloration, life history strategies, bees, butterflies Pollinators, decline, conservation and attracting native pollinators.

5. **Insect Biotechnology**: Genetic engineering in insects, insect vectors, transgenic mosquitoes, rDNA technology in sericulture.

6. **Agricultural Entomology:** Pest- biology, damage, life history, control - paddy, sugarcane, cotton, vegetables.

7. **Forest Entomology:** Insects and trees - diet, defence, coevolution, outbreak, pest of forest seed, nursery, standing trees and timber.

8. **Industrial Entomology:** Sericulture, apiculture, lac culture, insects as human food, predators, diseases, predators, control -stored pest.

9. **Medical Entomology:** Medically important insects - Diptera, Anoplura, Mallophaga, Hemiptera, biology & ecology of mosquitoes and control measures.

10. **Forensic Entomology** Insects of forensic importance - collection & analysis of entomological evidence - crime investigation.

11. **Insect Toxicology:** Insect growth regulators, microbial, botanical insecticides, insect resistance, Probit analysis, evaluvation of insect toxicity.

12. **Pest Management**: pesticide appliance, toxicity to beneficial insects. Biological control, biodiversity of biocontrol agents, parasitoids, predators and advances in IPM.

References:

1. Chapman (1998) The Insects Structure and Function. 4th Edition, Cambridge University Press London.
2. David BV and N Ramamurthy (2016) Elements of Economic Entomology. 8th Edition, Brillion Publishing.
3. David BV and T Kumarasamy (1982) Elements of Economic Entomology, Popular Book Depot Chennai.
4. Fennermore PG and Alkaprakash (1992) Applied Entomology, Wiley Eastern Ltd New Delhi.
5. Kunte K (2000) Butterflies of Peninsular India, University Press Hyderabad.
6. Richards OW and Davies RG (2013) Imms General Textbook of Entomology Vol 1 & 2, 10th edn Springer Science & Business media.
7. Srivastava KP and N Dhaliwal (2015) Textbook of Applied Entomology, Kalyani Publications New Delhi.
8. Wigglesworth V.B (2012) Principles of Insect Physiology, 7th edn, Springer Science & Business media.

MPZ 6615 Microbiology (6h/6cr)

This course deals with microorganisms and their applications. The main objective of the course is to emphasis the importance of microbial classification, role of microorganisms in industries, agriculture and medicine. This course also highlights the food borne microbes and environmental microbes.

1. **Introduction:** Members of microbial world microbial evolution, microbiology and its origins, preparation and staining of specimen - prokaryotes, bacterial and archaebacterial cell envelops – chemotaxis and endospore formation.

2. **Microbial Taxonomy:** Taxonomy ranks – techniques for determining microbial taxonomy and physiology, phylogenic trees, concept of microbial species. Bergey's Manual of Systematic Bacteriology - Classification of algae, fungi, protozoa and viruses.

3. **Microbial Nutrition:** Nutritional types of microbes – growth curve – growth factors and culture media – Bacterial cell cycle – measurement of microbial growth – pattern of microbial death – physical, chemical and biological control of microorganisms – microbial metabolism - oxidation and reduction reactions - glycolysis – TCA cycle-Electron transport system-enzymes, respiration and regulation of metabolism.

4. **Microbial physiology:** Principles of governing biosynthesis – amino acids, purine, pyrimidines and lipid biosynthesis – DNA as genetic material-flow of genetic information-nucleic acid and protein structure-DNA replication –gene structure – transcription – translation-regulation of transcription and translation.

5. **Microbial technology:** Mutations – detection and isolation of mutants – DNA repair – creating genetic variability – transposable elements – bacterial plasmids – bacterial conjugation – transformation – transduction – developments of recombinant DNA technology – PCR – Gel electrophoresis – cloning vectors – creating rDNA molecules – construction of genomic libraries – introducing rDNA into cells – expression of

foreign genes in host cells. Genome sequencing – Bioinformatics – Proteomics and metagenomics.

6. **Ecology and Symbiosis:** Biogeochemical cycles – global climate changes – assessing microbial diversity – microbial community activity – water as a microbial habitat – microorganisms in marine and fresh water ecosystems and coliform analysis.

7. **Soil and Agricultural Microbiology:** Soils as a microbial habitat, microorganisms in the soil environment – microbial association with vascular plants – sub surface biosphere – microbial interactions – human microbe interactions – normal microbiota of human body – microbes-plant associations and mycorhizza.

8. **Food microbiology:** Types of food for microbial growth – perishable – semiperishable and non-perishable foods – contamination – spoilage and preservation of foods. Food borne diseases – microbiology of fermented foods – detection of food borne pathogens – controlling food spoilage – microorganisms as food and food amendments – single cell proteins and applications of microbial products in human welfare.

9. **Industrial microbiology:** Microorganisms used in industrial microbiology- growing microbes in industrial settings – major products of industrial microbiology – microbes as products –fermentation industry – types of fermentors-raw materials – production strains and production of antibiotics, vitamins, enzymes and vinegar. Primary and secondary screening of industrially important microbes and scale up fermentations.

10. **Applied and Environmental Microbiology:** Water purification and sanitary analysis – waste water treatment – Biodegradation and Bioremediation by natural communities – Bioaugmentation – Sewage treatments and recycling waste

11. **Microbial diseases and their control:** The type of causative agents, diseases and control measures – bacterial, viral, fungal and protozoan diseases and their impacts. Development of chemotherapy general characteristics of antimicrobial drugs and determining the levels of antimicrobial activity – drug effectiveness and drug resistance.

12. **Epidemiology and public health microbiology:** Epidemiology, measuring infectious agent s in public places – frequency of infectious diseases – patterns of infectious diseases in population – emerging and reemerging infections – nosocomial infections – control of epidemics – bioterrorism – preparedness – global health considerations-air borne arthropod diseases-zoonotic, prion, direct contact and opportunistic diseases.

References:

Kingsbury, D.T., Wagner. G.E. (1990) Microbiology, NMS (series). 2nd edition. National medical series.

Kapil, A., Bhaskaran, C.S. (2013) Ananthanarayan and Paniker's Textbook of Microbiology. 9th Edition. University Press.

Willey, J.M., Sherwood, L.M., Woolverton, C.J. (2011) Prescott's Microbiology. 8th edition. McGraw Hill International publication.

MPZ 6617 Probiotics (6h/6cr)

This course is designed to understand and apply various strains probiiotics, their identification and their role in animal and human health. This course gives an idea for role of probiotics in immune response and stress. It also includes the application of probiotics in animal husbandry and aquaculture.

1. **Basics of probiotics:** Definition-scope – history of probiotics-FAO guidelines-microbes as food sources-contribution to proiotics-their applications-prebiotics.

2. **Mircrobes and their biological role:** Guidelines for assessment of probiotic microbes—selection of strains for human use future role in animal health – poultry farming and aquaculture.

3. **Classification and identification of microbes:** Identification of individual strains-FDA- beneficial microbes and their roles in human health-culture of Lactobacterium.*sp.,* Bifidarium s*p., a*nd other beneficial microbes.

4. **Commercial production and validation:** Various processes in commercial production-registration process-registration process-EFSA-identity and quality-safety and efficacy-functionality claims-clinical trials and approval.

5. **Various strains and consumption:** Roles of strains-dosage and product formulation-technical additives-sensory additives-nutritional additives-zoo technical additives- cocci diostats / history monostatus - digestability enhancer-gut microflora stabilizer.

6. **Probiotics in animal physiology:** Beneficial effects on mineral metabolism-increasing bone microbes-improvement of immune status.

7. **Probiotics in human health:** Improvement of gut microflora balance-diarrhoea prevention-improvement in feed efficacy-improvement in microflora establishment in siblings-improvement of digestive health and comfort.

8. **Probiotics and immune response:** Introduction-overview of immune system-effect on innate immunity-effect on cellular immunity-Reduction in food borne pathogen carritage-change in immune status-modifications in immunoglobulin synthesis-disease prevention-enhancement of immunity-reduced impact during stress.

9. **Probiotics and stress;** Introduction-physiological stress-pathways between stress and immune system-ill effects of stress and changes-hypertension-disturbance of digestive system-impact of stress hormones on immune responses and changes-probiotics in reducing impact of stress.

10. **Probiotics in animal husbandry:** Introduction- necessity of probiotics-modes of administration-direct and indirect methods-effect on intestinal microflora-hormone imbalance-immune protection of digestive tract-probiotics as growth promoters—therapeutic agents-maintenance of homeostatic condition.

11. **Probiotics in poultry farming:** Introduction-modes of action-criteria for selectingprobiotics-evaluating probiotic effects-growth performance due to probiotics-immune response-intestinal morphology-meat quality and other beneficial effects.

12. **Probiotics in aquaculture:** The need of probiotics-principles-mechanisms of action-screening process-previous research and methodology-probiotics in molluse aquaculture –developing probiotics for aquaculture-beneficial effects of probiotics.

Text book:
Fraunhofer JAV (2012) Prebiotics and Probiotics. Create space Independent Publishing Platform.

References:
1. Michail S (2008) Probiotics in Pediatric Medicine (Nutrition and Health). Humana Press.
2. Otele S (2013) Probiotics and Prebiotics in food, Nutrition and Healthm, CRS Press.

MPZ 6619 Immunology (6h/6cr)

The project paper on Immunology includes the following topics. Cells and organs of the immune system, antibody structure, antigen-antibody interactions and Major Histocompatibility Complex. Other topics are Histocompatibility testing by serological methods, testing by molecular biological methods, study of T&B lymphocytes, cell and antibody mediated immunity, control mechanisms, hypersensitivity reactions, autoimmunity, transplantation and tumor immunology are also included. This project paper also includes infectious diseases, vaccines, immunodeficiency diseases and animal experimental systems.

1. **Elements of Immunity:** Cells and molecules involved in innate and adaptive immunity, antigens, antigenicity and immunogenicity – B and T cell epitopes.

2. **Antibody:** Structure and function of antibody molecules – generation of antibody diversity, monoclonal antibodies, antibody engineering, Antigen –Antibody interactions.

3. **Major Histocompatibility Complex and Antigen presentation:** The structure and function of MHC molecules – General organization and inheritance of the MHC – The endogenous pathway of antigen processing and presentation – The exogenous pathway of antigen processing and presentation – Cross presentation of exogenous antigens – Presentations of non-peptide antigens.

4. **HLA Polymorphism and Typing:** HLA genetics – HLA Polymorphism and nomenclature – Inheritance – Serological methods in histocompatibility testing – Tissue typing by lymphocytotoxicity tests.

5. **Histocompatibility testing by molecular biological methods:** Molecular typing methods – gene amplification – SSP typing – SSOP typing – SBT – HLA typing for allogenic transplantation.

6. **Activation and differentiation of B and T lymphocytes:** T dependent B cell responses – T-independent B cell responses – T cell activation – T cell differentiation.

7. **Cell and antibody mediated immunity:** Antibody mediated effector functions – cell mediated effector functions – Primary and secondary immune modulation – Experimental assessment of cell mediated cytotoxicity.

8. **Control mechanism and Hypersensitivity reactions:** Major pathways of complement activation – Tolerance – Allergy – Type I hypersensitivity reactions – Antibody mediated (type II) hypersensitivity reactions – Immune complex mediated (type III) hypersensitivity reactions – delayed (type IV) hypersensitivity reactions.

9. **Autoimmunity, Transplantation and Tumor immunology:** Organ specific and systemic autoimmunity – Graft rejection – Immunosuppresive therapy – Immune response to tumour – Immunotherapy.

10. **Infectious diseases and vaccines:** Immune response to bacterial (tuberculosis), parasite (malaria) and viral (HIV) infections – vaccines.

11. **Congenital and acquired immunodeficiency:** Primary immunodeficiences – Secondary immunodeficiences – Immunological consequences of AIDS infection.

12. **Animal experimental systems:** Inbreed strains – congenic strains – adoptive transfer system – Transgenic animals – Knock-in and Knock-out – technologies – The *cre/lox* systems.

References:

1. Owen JA, Punt J and SA Stranford (2013) Kuby Immunology. 7th Ed. W.H. Freeman and Company, New York.
2. Parslow G, Stites DP, Terr AI and JB Imboden (2001) Medical Immunology. 10th Ed. McGraw Hill Company, New York.

DEPARTMENT OF HINDI

Syllabus For UG programme Under Part-I (S.F)
(Academic Year 2017 Onwards)

Objectives:

- To make the students proficient in Hindi language.
- To help them invest knowledge of Hindi in their career.
- To develop their communication skills.
- To enhance their ability in speaking, reading and writing Hindi.
- To acquire good pronunciation and to speak fluently.

Course structure: Prose, grammar, applied grammar, Official Correspondence, History of Hindi Literature, Short stories, Drama and Poetics

No of Papers: One per Semester

No of Lectures: One hour per day; Three hours per week.

Language Courses offered Under Part-I
(For 2017- onwards)

Sem	Part	Code	Course Title	Hr/wk	Credit	Marks
1	I	HIS1203	हिन्दी गद्य और व्याकरण Hindi Prose & Grammar	3	2	30
2	I	HIS1204	कार्यालय हिन्दी और अनुवाद Official Hindi and Translation	3	2	30
3	I	HIS2201	हिन्दी साहित्य का इतिहास Hindi Literature	3	2	30
4	I	HIS2202	लघुकथा, नाटक और काव्यशास्त्र Short stories, Drama and Poetics	3	2	30
			Total	**12**	**8**	**120**

Eligibility: This course is open to all students who have interested in learn Hindi.

Evaluation Pattern

Ratio of Marks awarded:

Internal: 100 Marks

Test-1(30 Marks) + Quiz-1(10 Marks) +Assignment-1(10 Marks) =50Marks
Test-2(30 Marks) + Quiz-2(10 Marks) +Assignment-2(10 Marks) =50Marks

Duration of the Internal Test: 1 Hour.
External: 60 Marks
Duration of External Examination: 2 Hours.
Total Marks: Internal + External.

- Two Academic years/Four semesters
- The course curriculum is divided into 3 Modules.
- Each Module for 15 Hours classroom teaching.

Department of Hindi
For UG programme Under Part III – B.A.(Hindi) S.F
Academic Year 2017 onwards

In the present day scenario of globalization, learning a language like Hindi is very essential. The importance of learning language is increasing day by day for global communication.

Literature is the best tool to make a real human being. It is an undisputed fact that world has started recognizing the importance of Language learning.

Hindi Language:

- Hindi is a National and official language of India. Majority of Indian States are Hindi speaking. Hence the knowledge of Hindi is essential for the effective communication all over the country.
- There is a lot of scope for employment in government sectors and Autonomous bodies in the field of Hindi language like Hindi Officer, Hindi Assistant, and Hindi Translator etc.
- There are rich resources in Hindi literature. (Prose, poetry, fiction, novel, drama.)
- Hindi is necessary in the Administrative, Academic, Official, Tourism and other Departments.

Aim and Objectives of the Programme.

- Bachelor Degree in Hindi Literature provides the detailed knowledge of Hindi Language, its history, poetics, prose, functional language, modern technologies etc.
- The Hindi Syllabus of undergraduate level is framed on the practical need of today.
- The students will acquire in-depth knowledge of Hindi literature and language.
- The courses like Functional Hindi; Hindi and Computer and Journalisam are introduced to build the students' career.

Eligibility:

- Those who have passed +2 with great interest in learn Hindi.

DEPARTMENT OF HINDI

Syllabus for UG programme Under Part III - B.A. Hindi (SF)

(Academic Year 2017 Onwards)

Sem	Part		Code	Title	Hr	Cr.	Marks
I	Part I		HIS1203	हिन्दी गद्य और व्याकरण (Hindi Prose and Grammar)	3	2	30
	Part II		ENS 1201	Conversational Skills	3	2	30
	Part III Major	Core	HIS1415	सामान्य निबन्ध (Samanya Nibandh)	4	4	60
			HIS1417	सामान्य व्याकरण (Samanya Vyakaran)	4	4	60
			HIS1519	कामकाज हिन्दी (Kamkaji Hindi)	5	5	75
		Supportive	HIS1421	हिन्दी भाषा का उद्भव और विकास(Origin and Evolution of Hindi language)	5	4	60
	Part IV	Non-Maj.Elect.	XXX xxx	Basic Tamil/ Advance Tamil/ Non -Major Elective	3	2	30
		Life skill	XXX xxx		3	2	30
	Total				**30**	**25**	**375**
II	Part I		HIS1204	कार्यालय हिन्दी और अनुवाद (Official Correspondence in Hindi and Translation)	3	2	30
	Part II		ENS1202	Reading & Writing Skills	3	2	30
	Part III Major	Core	HIS1516	कहानियाँ (Kahaniyan)	5	5	75
			HIS1418	उत्कृष्ट व्याकरण (Uthkrishta Vyakran)	4	4	60
			HIS1420	आदिकाल (Aadhikaal)	4	4	60
		Supportive	HIS1422	हिन्दी साहित्य का इतिहास Hindi Sahithya ka Ithihas	5	4	60
	Part IV	NonMaj. Elect.	XXXxxx	Basic Tamil/ Advance Tamil/ Non -Major Elective	3	2	30
		Life skill	XXXxxx		3	2	30
	Part V	Extension	XXXxxx	(NSS/SLP/PED)	2	1	-
	Total				**30+2**	**25+ 1**	**375**
III	Part I		HIS2201	हिन्दी साहित्य का इतिहास (History of Hindi Literature)	3	2	30
	Part II		ENS 2201	Study Skills	3	2	30
	PartIII Major	Core	HIS2515	कम्प्यूटर हिन्दी (Hindi in Computers)	5	5	75
			HIS2517	पत्र लेखन (Samanya Patra Lekhan)	5	5	75
			HIS2519	निर्गुण भक्तिकाल (Nirgun Bhaktikaal)	5	5	75
			HIS2421	नाटक और एकांकी (Natak aur Ekanki)	4	4	60
		Supportive	HIS2423	हिन्दी भाषा का इतिहास-सामान्य परिचय (Hindi Bhasha ka Ithihas samanya Parichaya)	5	4	60
				Total	**30**	**27**	**405**

Sem	Part		Code	Title	Hr	Cr.	Marks
IV	Part I		HIS2202	लघुकथा, नाटक, और काव्यशास्त्र (Short stories, Drama and Poetics)	3	2	30
	Part II		ENS 2202	Career Skills	3	2	30
	Part III Major	Core	HIS2516	भाषाविज्ञान का सामान्य परिचय (Bhasha Vighyan Samaanya Parichaya)	5	5	75
			HIS2518	सगुण भक्तिकाल (Sagun Bhaktikaal)	5	5	75
			HIS2420	कार्यालय हिन्दी (Karyalyeen Hindi)	4	4	60
			HIS2522	रीतिकाल (Ritikaal)	5	5	75
		Supportive	HIS2424	भारतीय काव्यशास्त्र - सामान्य परिचय (Bharathiya Kavya Sasthra Parichaya)	5	4	60
	V	Extension	XXX xxx	(NSS/SLP/PED)	2	1	-
Total					**30+ 2**	**27+ 1**	**405**
V	Part III Major	Core	HIS3615	उपन्यास (Upanyas)	6	6	90
			HIS3617	आधुनिक काल का सामान्य परिचय (Adhunik kal ka Samanya Parichay)	6	6	90
			HIS3619	अनुवाद सिध्दान्त (Anuvad Siddhanth)	6	6	90
		Innovative	HIS3521	निबन्ध साहित्य (Nibandh Sahithya)	5	5	75
	IV	Life skill	XXXxxx		3	2	30
		VAL	XXXxxx		4	2	30
Total					**30**	**27**	**405**
VI	Part III Major	Core	HIS3616	नई कविता (Nayee Kavitha)	6	6	90
			HIS3618	नारीवाद - सामान्य परिचय (Narivad Samaanya Parichay)	6	6	90
			HIS3620	महाकाव्य और खड़काव्य (Mahakavya aur Khandakavya)	6	6	90
		Innovative	HIS3522	विशेष साहित्यकार - प्रेमचन्द	5	5	75
	IV	EVS	HIS3200	Environmental Studies	4	2	30
		Life skill	XXXxxx		3	2	30
				Total	**30**	**27**	**405**
				Grand Total for semesters I- VI	**180**	**158 +2**	**2370**

Part-III-Supportive course

Sem	Dept.	Code	Course Title	Hr	Cr.	Marks
1	French	HIS1421	हिन्दी भाषा का उद्भव और विकास(Hindi Bhasha ka Udhbhav aur Vikas)	5	4	60
2	French	HIS1422	हिन्दी साहित्य का इतिहास **(**Hindi Sahithya ka Ithihas)	5	4	60
3	Hindi (Self)	HIS2423	हिन्दी भाषा का इतिहास - सामान्य परिचय (Hindi Bhasha ka Ithihas Samanya Parichaya)	5	4	60
4	Hindi (Self)	HIS2524	भारतीय काव्यशास्त्र का सामान्य परिचय (Bharathiya Kavya Sasthra Samanya Parichaya)	5	4	60
			Total	**20**	**16**	**240**

HIS 1203 **हिन्दी गद्य और व्याकरण** **3Hrs/2Crs**

Hindi Prose & Grammar

Objectives:

- To make the students learn from words to sentences.
- To impart Basic Hindi Grammar Knowledge.
- The course aims at helping the students converse in Hindi.
- It provides the learners in with conversations so that they can fluently use Hindi.

इकाई -1 : गद्य(Prose)

लोभ– आचार्य महावीर प्रसाद दिवेदी

हार की जीत - सुदर्शन

अब्दुल कलाम

इकाई -2 : बोलचाल हिन्दी (Bhol chal Hindi)

शरीर के अंग

फल

तरकारीयाँ

सप्ताह के नाम

महिनों का नाम

इकाई -3 : व्याकरण (Grammar)

लिंग

वचन

गिनती

काल

इकाई -4: संवाद लेखन (Dialog writing)

कक्षा में (In the class)

बाजार में (In the market)

आस्पताल में (In the Hospital)

बैंक में (In the Bank)

इकाई -5 गंद्यांश (Comprehension)

भाग - 1 किताब से पाँच अभ्यास (From Translation Book Part _ I)

References :

1 VyakaranPradeep, Ram Dev, Logbharati Publication, Allahabad, 2008
2 Naveen Gadya Chayanika-1, Dhakshin Bharat Hindi Prachar Sabha, Chennai, 2009
3 Kavya Kusum-2, Dhakshin Bharat Hindi Prachar Sabha, Chennai, 2009
4 Hindi Vatayan Dr. K.M. Chandramohan V.V. Prakashan, Varanasi, 2011
5 Hindi Vatayan Dr. K.M. Chandramohan V.V. Prakashan,Varanasi, 2010.
6 Naveen Gadya Chayanika-1, Dhakshin Bharat Hindi Prachar Sabha, Chennai.2013.

HIS 1204 **कार्यालय हिन्दी और अनुवाद** **3Hrs/2Crs**

Official Hindi and Translation

Objectives:

- Make the students practice the sentences through spoken Hindi.
- The course aims to provide students to write letter promptly.
- Develop their ideas in written forms.
- To make them know about the importance of Terminology.
- The students shall be able to understand the purpose Terminology.

इकाई 1: वाक्य रचना (Sentence making)

शब्द - बनावट के अनुसार, आकार के अनुसार

उच्चारण के नियम

सम्युक्ताक्षर

वाक्य

इकाई 2 : व्याकरण (Grammar)

संज्ञा

सर्वनाम

विशेषण

क्रिया विशेषण

इकाई 3: पत्र लेखन (Letter Writing)

मित्र को पत्र

आदेश पत्र

छुट्टी पत्र

इकाई 4: पारिभाषिक शब्दावली (TECHNICAL TERMS)

तकनीकि शब्दावली

मंत्रालयों का नाम

सरकारी कार्यालयों का नाम

इकाई 5: अनुवाद (Translation)

भाग - 2 किताब से पाँच अभ्यास

References :

1 Vyakaran Pradeep, Ram Dev.logbharati publication, Allahabad,2008
2 Hindi Vatayan Dr. K.M. Chandramohan, V.V. Prakashan, Varanasi.2011
3 Hindi AnuvadhAbhyas Part-1Dhakshin Bharat Hindi PracharSabha chennai.2008

HIS 2201 **हिन्दी साहित्य का इतिहास** **3Hrs/2Crs**

Hindi Literature

Objectives:

- To make the students appreciate the history of Hindi literature.
- To develop their art of writing essays.
- To enhance the students to know literature.
- The students shall be able to understand the purpose of literature.

इकाई 1: आदि काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Aathi Kaal)

इकाई 2: भक्ति काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Bakthi Kaal)

इकाई 3: रीतिकाल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ (Reethi Kaal)

इकाई 4: आधुनिक काल - प्रसिध्द लेखक, रचनाएँ और सामाजिक परिस्थतियाँ(Adhunik kaal)

इकाई 5: संक्षिप्तकरण (Precis Writing)

References :

1 Hindi Sahithya ka Saral Itihas, Rajnath Sharma.Vinod Pushtak Mandir Agra.2009.
2 Shivanee Books, Ansari Road, Dariyaganj, New Delhi.2008.
3 Hindi sahithya ka vasthunist Ithihas, kusum Rai, vesvavidyalaya prakashan, Varanasi - 2011

HIS 2202 **लघुकथा, नाटक, और काव्यशास्त्र** **3Hrs/2Crs**

Short stories, Drama and Poetics

Objective:

- To have an idea of poetic words.
- To promote the students to express their understanding and writing skill.
- To develop the reading, spoken and writing skills in Hindi.
- Create the poem writing skills.

इकाई 1: प्राचिन काव्य **(Ancient Poem)**

कबिर के दोहे -5

तुलसी के दोहे -5

इकाई 2: लघुकथा (Short Stories)

वापसी - उषा प्रियंवता

कफ़न - प्रेमचन्द

पुरस्कार - जयशंकर प्रसाद

जीफ की दावत - भीष्म साहनी

इकाई 3: नाटक (Drama)

स्वर्ग की झलक

इकाई 4: आधुनिक कविता (Modern Poem)

पुष्प की अभिलाषा - माखनलाल चतुर्वेती

खिलौना - सियाराम शरण गुप्त

राजा रानी - दिनकर

सन्धया सुन्दरी - निराला

इकाई 5:काव्य शास्त्र (Poetics) - रस, छंद, अलंकार

References :

1 Hindi Sahityaka Saral Ithihas, Rajnath Sharma, Vinod Pushtak Mandir, Agra.2010
2 Kavya Prakasan, Purushottam Das Modi. V.V. Prakashan, Chowk, Varanasi.2009
3 Hindi Vatayan Dr. K.M. Chandramoh, V.V. Prakashan, Varanasi.2008
4 Bharathiya kavya sasthra, Dr. Udhaya banu, Thathabi prakashan, Dehli. 2009.
5 kavya sasthra, Dakshini Bharat Hindi Prachar sabha Chennai, 2014.

HIS1415 सामान्य निबन्ध 4Hrs/4Crs

(Samanya Nibandh)

The course helps the students understand the language used in the Essay writing. The course also promotes the understanding of simple communicative language.

इकाई 1 - निबन्ध का सामान्य परिचय

इकाई 2 - साहित्कार के बारे में निबन्ध

इकाई 3 - सामाजिक निबन्ध

इकाई 4 - पर्यटन निबन्ध

इकाई 5 - वैज्ञानिक निबन्ध

References:

1 Hindi Nibandh Sowrab , Shyam Chandar Kabur, Grath Academy, New Delhi, 1998,
2 Vividh Nebandh , Bharathi Kubalkar,- Sahani Publication , Delhi, 2011.
3 Rajneethi Evam Sanskrithi Nibandh,- Bharathi Kubalkar , Sahani Publication , Delhi, 2011,
4 Saras Nibandh Praba Joshi , Sahani Publication, Delhi, 2012.

HIS1417 **सामान्य व्याकरण** **4Hrs/4Crs**

(Samanya Vyakran)

The course trains the student with basic Grammar Hindi. It also guides in equipping themselves in utilization of Hindi language without grammatical error. The course covers the fundamentals of Hindi language.

इकाई.1 **संज्ञा**, **सर्वनाम**

इकाई.2 **क्रिया, विशेषण**,

इकाई.3 **क्रिया विशेषण**, **संबंधबोधक**,

इकाई.4 **समुच्चयबोधक**, **विस्मयादिबोधक**

इकाई.5 **लिंग**, **वचन**

References :

1 Sri Saran Aadhunik Hindi Vyakaran, Aalok kumar Rastogi, Madura Books Publication, Delhi, 2011.
2 Shudha Hindi Thatha Vyakaran, Sarojini Gupta, Saint Joseph Publication, A Div.of D.P.S.Publication House Private Ltd.,Delhi, 2009 .
3 Vyakaran Pradeep, M.A. Ramdev, Lok Bharathi, Publication, Allahabad, 2014
4 Hindi Bhasha evam Vyakaran, Dr.SambunathTiwari, Pooja Publication, Kanpur, 2014
5 Hindi Vyakaran Bodh, Dr.Rajendra Prasad Pandy and Dr.Srimathi Geetha.Rajendra Prasad, Jawahar Publication, Madura, 2009
6 Hindi Vyakaran Praveshika, Dakshin Bharath Hindi Prachar Sabha, Chennai, 2009

HIS1519 **कामकाजी हिन्दी** **5Hrs/5Crs**

(Kamkaji Hindi)

The aim of this course is to develop an independent out look towards the study of language and communication. The course encourages the student to learn Hindi for effective communication in different fields in day-to-day life and analyze the problems and challenges of effective communication in Hindi.

इकाई -1 आत्म संस्कार

इकाई -2 शब्द भंडार

इकाई -3 बोलचाल में व्याकरणिक प्रयोग

इकाई -4 अभिवादन / प्रत्यभिवादन

इकाई -5 स्थितिजन्य बातचीत

References :

1 Kamkaji Hindi, Dr.P.M.Thomas, Samiksha Publications, Mathura, 2013
2 Sabari speaking course, Prof. Chandrasekaran, Sabari Book House, Salem,2010
3 Nayi Hindi Rachana, Dakshina Bharat Hindi Prachar Sabha, Chennai, 2009
4 Speech Master, Prof.Poonam Agarwal, Mudra publication, Mumbai,2007
5 Sabari Colloquial Hindi, Dr. Chandramohan, Sabari Book House, Salem,2010

HIS1421 **हिन्दी भाषा का उद्भव और विकास** **5Hrs/4Crs**

(Hindi Bhasha ka Udhbhav aur Vikas)

The course aims to give students a basic understanding about the historic aspects of Hindi language. The evolution of Hindi language from Vedic period and its individual identity is explained. The course helps the students attain knowledge about the "Devanagri Lipi" (the script used for Hindi) and its proper pronunciation. The introduction to gradual origin development of the Hindi language as Indo-Aryan a branch of Indo-European family of languages is explained in the course.

इकाई I - हिन्दी भाषा का उद्भव और विकास

इकाई 2 - हिन्दी भाषा के विभिन्न आयाम

इकाई 3 - मानक हिन्दी खड़ीबोली और उसका विकास

इकाई 4 - काल का सामान्य परिचय

इकाई 5 - क्रिया, संज्ञा, सर्वनाम और विशेषण

References :

1.Hindi Bhasha ka Ithikas , Dr.Bholanath Thiwari, Vani Prakashan, New Delhi, 2014
2.Rastra Bhasha, Raj Bhasha, Jan Bhasha , Shankar Thayal Sing, Kitab Ghar Prakashan, Dehli, 2011
3. Sarkari Karyai me Hindi , Gopinath Srivasthav , Lok Bharathi Prakashan, Allahabad, 2013
4. Hindi Bhasha Aur Nagari Lebi, Dr. Bolanath Thiwari, Lok Bharathi Prakashan, Allahabad, 2000
5. Rastra Bhasha, Raj Bhasha, ka Vekas, Muhamand, Praveen Prakashan, Jaipur, 2007

HIS1516 **कहानियाँ** **5Hrs/5Crs**

(Kahaniyan)

The course aims to develop language skill and analysis of Hindi literature. This course helps to develop the art of criticism. To familiarize the students with different forms and styles used in Hindi Fiction which helps the students to understand the Theme, Characterisation, Emotions, Language and Acting.

इकाई I - कहानी का उद्भव और विकास

इकाई II - ऐतिहासिक कहनियाँ

इकाई III - सामाजिक कहानियाँ

इकाई IV - मनोविश्लशण कहानियाँ

इकाई V - पारिवारिक कहानियाँ

References :

1. Premchand ki Kahani, Jagathram and Sons. Allahabad, 2012
2. Kahani Manjari - Dakshin Bharath Hindi Prachar Sabha, Chennai. 1998
3. Kahani Kunj – Markant, Lokbharathi Prakashan. Allahabad,2009
4. Hindi ki Prathinithi Khahaniyan, Dr. Veerat, Jawahar Publication, Mathura, 2005
5. Bharathiya Sahithya me Sarva Shresta Khahaniyan , Vinith Dandan, Kithab Ghar Prakashan,. New Delhi, 2010.

HIS1418 **उत्कृष्ठ व्याकरण** **4Hrs/4Crs**

(Uthkrishta Vyakran)

The course aims at understanding of communicational language with proper Grammar. The course trains the student with advanced grammar. It also guides in equipping themselves in utilization of Hindi language without grammatical error. This will helps develop communication skills in the students.

इकाई 1 - काल और 'ने' प्रयोग

इकाई 2 - उपसर्ग और प्रत्यय

इकाई 3 - कारक

इकाई 4 - वाच्य, शुद्ध कीजिए

इकाई 5 - गंद्यांश और सारलेखन

References :

1 Hindi Vyakaran Praveshika, Dakshin Bharath Hindi Prachar Sabha, Chennai, 2009
2 Shudha Hindi Thattha Vyakaran, Sarojini Gupta, Saint Joseph Publication, Delhi, 2009
3 Sri Saran Aadhunik Hindi Vyakaran, Aalok kumar Rastogi, Madura Books Publication, Delhi, 2011.
4 Vyakaran Pradeep, M.A. Ramdev, Lok Bharathy Publication, Allagabad, 2014
5 Hindi- Bhasha Evam Vyakaran, Dr.SambunathDivari, Pooja Publication, Kanpoor, 2014
6 Hindi Vyakaran, Bodh, Dr.Rajendra Prasad Pandy and Dr.Srimathi Geetha.Rajendra Prasad, Jawahar Publication, Madura, 2009

HIS1420 **आदिकाल** **4Hrs/4Crs**

(Aadhikaal)

The brief introduction to History of Hindi literature is given in this course. The different classification of Hindi literature into periods by different authors and their naming were explained.

इकाई I - हिन्दी साहित्य के इतिहास की लेखन परंपरा

इकाई 2 - काल विभाजन और नामकरण

इकाई 3 - सिध्द - नाथ - जैन साहित्य,

इकाई 4 - रासो काव्य

इकाई 5 - आदिकाल की विशेषताएँ

References :

1 Hindi Sahitya ka Itihas, Dr.Nagendrababu, Neha Publication, New Delhi,2010
2 Kaal Vibhajan, Dr. Bholanath Tiwari, Raj&Sons, Varnasi,2006
3 Hindi Sahitya Ka Itihas ,Shyam Chandra Kapoor, Granth Academy, New Delhi 2007 ,
4 Hindi Sahitya Ka Itihas,Acharya Ramchandra, Log Bharati Prakasan, Alahabad,2009

HIS1422 **हिन्दी साहित्य का इतिहास** **5Hrs/4Crs**

(Hindi Sahithya ka Ithihas)

The aim of the course is detailed study of different classification of Hindi literature into periods by different authors and their naming were explained. To familiarize the students with different genre of Literature

इकाई I - हिन्दी साहित्य के इतिहास की लेखन परंपरा

इकाई 2 - आदिकाल

इकाई 3 - भक्तिकाल

इकाई 4 - रीतिकाल

इकाई 5 - आधुनिककाल के विभिन्न आयाम

References :

1 Hindi Sahitya ka Itihas, Dr.Nagendrababu, Neha Publication, New Delhi, 2010
2 Kaal Vibhajan, Dr. Bholanath Tiwari, Raj&Sons, Varnasi, 2006
3 Hindi Sahitya Ka Itihas ,Shyam Chandra Kapoor, Granth Academy, New Delhi 2007
4 Hindi Sahitya Ka Itihas,Acharya Ramchandra, Log Bharati Prakasan, Allahabad, 2009

DEPARTMENT OF FRENCH (UG)
French – Part - I
Study plan for UG students (SF) (2017 batch onwards)
Courses offered for UG Programme under Part I

Semester	Category	Code	Course Title	Hr/ wk	Cr.	Marks
I	**Part I**	FRS 1203	**General French - I**	**3**	**2**	**30**
II	**Part I**	FRS 1204	**General French - II**	**3**	**2**	**30**

EVALUATION PATTERN

Distribution of Marks for both I semester & II Semester

Internal = 20 + 60 + 20 = 100
External = 60 (Duration of Examination: 2 Hrs)

Section A:	Comprehension	10 Marks
	Translation (English to French)	5 Marks
	Dialogue	5 Marks
Section B:	Grammar exercises	25 Marks
Section C:	Civilization	15 Marks
		---
		60 Marks

FRS 1203 GENERAL FRENCH – I 3hr / wk: 2cr

This course aims to develop the students' proficiency in the four basic skills of listening, speaking, reading and writing French, with equal thrust on vocabulary building and cultural awareness.

Objectives:

Upon successful completion of this course the students will be able to

i. Acquire the four basic language skills of speaking, reading, writing and listening.
ii. Become familiar with the sound pattern of French Language
iii. Improve their vocabulary and grammar skills by understanding the structures of the language
iv. Appreciate the beauty of the language learning to speak and write with fluency and accuracy in every day situation.
v. Have an exposure to French culture and the society.

Unit I	Bonjour : Saluer - Épeler en français - Se présenter- La Francophonie
Unit II	Bonne journée : Demander et dire l'identité - Fiche d'inscription
Unit III	Bon weekend : Parler de ses goûts - Décrire quelqu'un - Une famille française
Unit IV	Bonne fête : Prendre rendez-vous - Donner des conseils - se situer -localiser- Les fêtes françaises
Unit V	Bon appétit : Situations pratiques au restaurant - Les repas français

Manual:

A. Chinnadurai Pandian, B. Vijaya, G. Victor Packiyaraj, A. Josephine Dheena, S. Sountharya, **Les Bons Pas**, Department of French, The American College, Madurai, 2017.

Grammar book for reference :

1. Évelyne SIRÉJOLS, Giovanna TEMPESTA, *Grammaire 450 nouveau exercices*. (niveau débutant), CLE International, 2012.

Dictionaries:

1. Bilingual: **The Concise Oxford-Hachette French Dictionary**
2. Monolingual French: **Le Petit Robert**.

FRS 1204 GENERAL FRENCH –II 3hr / wk: 2cr

This course aims to develop communicative competence of the students in French, to create cultural awareness, to promote autonomy in learning French

Objectives:

Upon successful completion of the course, the students will be able to

i. Enhance their linguistic skills by a deeper understanding of the language structure and the vocabulary.
ii. Apply the language skills on a range of everyday situations.
iii. Understand routine information and get a grasp of the practical life in France.
iv. Get an insight into the cultural background of France
v. Understand the difference between formal and informal writing using appropriate format

Unit I	Bonne soirée : Proposer une sortie - Accepter, refuser la proposition – Le divertissement – Jeu de rôle
Unit II	Bons achats: Faire les courses - Demander le prix – Commander - Payer- Les grands magasins, Raconter un souvenir – Conversation.
Unit III	Bon voyage : Réserver des billets - Demander des renseignements - Les villes importantes en France, Raconter au passé (Expression écrite)
Unit IV	Bon courage : Raconter la vie quotidienne – Les jeux et les sports – Expression orale
Unit V	Bonne chance : Le système de l'éducation, Parler de ses études.

Manual:
A. Chinnadurai Pandian, B. Vijaya, G. Victor Packiyaraj, A. Josephine Dheena, S. Sountharya, **Les Bons Pas**, Department of French, The American College, Madurai, 2017.

Grammar book for reference :

1. Évelyne SIRÉJOLS, Giovanna TEMPESTA, *Grammaire 450 nouveau exercices*. (niveau débutant), CLE International, 2012.

Dictionaries:

1. Bilingual: **The Concise Oxford-Hachette French Dictionary**
2. Monolingual French: **Le Petit Robert**.

Undergraduate Department of English (SF)
BA English Programme(SF)
2015 – 2016 onwards

Vision of the Department of English (SF)

Students will

i. **develop a passion for reading literatures;**
ii. **appreciate their ability to elicit feeling, cultivate the imagination, and call us to account as humans;**
iii. **cultivate a capacity to judge aesthetic and ethical values of literary texts and be able to articulate the standards behind their judgments; and**
iv. **prepare for a life of learning as readers and writers.**

Mission of the Department of English (SF)

Students of English shall demonstrate

i. **familiarity with genres, movements, works, and authors in British & American literatures, African-American literature, Indian Literature in English, and New Literatures in English**
ii. **the ability to read, write, and think critically**
iii. **knowledge of theoretical and critical methods**
iv. **an understanding of English language and linguistics**

UNDERGRADUATE DEPARTMENT OF ENGLISH (SF)

Programme for B.A. English (SF) from 2015 batch onwards

Sem	Part		Code	Title	Hr/ Wk	Cr.	Marks
I	Part I		TAM/FRS/HIS		3	2	30
I	Part II		ENS 1201	Conversational Skills	3	2	30
	Part III Major	Core	ENS 1461	Prose I	4	4	60
			ENS 1463	English in Use	4	4	60
			ENS 1565	Short Story and One Act Play	5	5	75
		Supportive	ENS 1467	Literary Forms and Vocabulary	5	4	60
	Part IV	*Non-Maj. Elect.	TAM xxxx ENS 1221	Basic Tamil/Adv. Tamil/NME Film Appreciation	3	2	30
		Life Skill I	ENS 1223	Word Power	3	2	30
				Total	**30**	**25**	**375**
II	Part I		TAM/FRS/HIS		3	2	30
II	Part II		ENS 1202	Reading & Writing Skills	3	2	30
	Part III Major	Core	ENS 1562	Poetry I	5	5	75
			ENS 1464	Fiction I	4	4	60
			ENS 1466	Drama	4	4	60
		Supportive	ENS 1468	History of English Literature	5	4	60
	Part IV	*Non-Maj. Elect.	TAM xxxx ENS 1222	Basic Tamil/Adv. Tamil/NME Science Fictions	3	2	30
		Life Skill II	ENS 1224	Spoken English	3	2	30
	Part V	Extension	XXX xxxx	(NSS /PED, SLP)	2	1+1	
				Total	**30+2**	**25**	**375**
III	Part I		TAM/FRS/HIS		3	2	30
III	Part II		ENS 2201	Study Skills	3	2	30
	Part III Major	Core	ENS 2561	Poetry II	5	5	75
			ENS 2463	Fiction II	4	4	60
			ENS 2565	Indian Literature in English	5	5	75
			ENS 2567	Shakespeare	5	5	75
		Supportive	ENS 2469/ FRS xxxx	English Phonetics & Phonology/ Introduction to French Language	5	4	60
			Total		**30**	**27**	**405**

Sem.	Part		Code	Title	Hr/ Wk	Cr.	Marks
IV	Part I		TAM/FRS/HIS		3	2	30
	Part II		ENS 2202	Career Skills	3	2	30
	Part III Major	Core	ENS 2466	Prose II	4	4	60
			ENS 2562	American Literature	5	5	75
			ENS 2564	Translation–Theories and Problems	5	5	75
			ENS 2478	Advanced Grammar	5	5	75
		Supportive	ENS 2470 FRS xxxx	Theories of Translation / Introduction to French Literature	5	4	60
	Part V	Extension	XXX xxxx	Extension Activity (NSS/PED, SLP)	2	1	
				Total	**30+2**	**27+1**	**405**
V	Part III Major	Core	ENS 3671	New Literatures	6	6	90
			ENS 3673	Literary Criticism and Approaches	6	6	90
			ENS 3675	Fiction III	6	6	90
		Innovative	ENS 3577	English for Media	5	5	75
	Part IV	Life Skill Course	ENS 3279	Creative Writing in English	3	2	30
	Part IV	VAL	VAL xxxx	Value Education	4	2	30
				Total	**30**	**27**	**405**
VI	Part III Major	Core	ENS 3672	Teaching English as a Second Language	6	6	90
			ENS 3674	Basics of Linguistics	6	6	90
			ENS 3676	Contemporary Literature	6	6	90
		Innovative	ENS 3578	English at Work Place	5	5	75
	Part IV	Life Skill Courses	ENS 3280	English for Placement	3	2	30
			ENS 3200	Environmental Studies	4	2	30
				Total	**30**	**27**	**405**
				Grand Total for semesters I-VI	**180+4**	**158+2**	**2370**

***Courses offered to Non-Major Students by the Department of English**

PART III Supportive

SEM	COURSE NO	COURSE TITLE	Hrs.	Cr.	Marks	Students of
I	ENS 1467	Literary Forms and Vocabulary	5	4	60	ENS
II	ENS 1468	History of English Literature	5	4	60	ENS
III	ENS 2469	English Phonetics and Phonology	5	4	60	FRS
IV	ENS 2470	Theories of Translation	5	4	60	FRS
	Total		20	16	240	

PART IV Non-Major Electives

SEM	COURSE NO	COURSE TITLE	Hrs.	Cr.	Marks
I	ENS 1221	Film Appreciation	3	2	30
II	ENS 1222	Science Fictions	3	2	30
	Total		**6**	**4**	**60**

PART IV Life Skills Courses

SEM	COURSE NO	COURSE TITLE	Hrs.	Cr.	Marks
I	ENS 1223	Word Power	3	2	30
II	ENS 1224	Spoken English	3	2	30
V	ENS 3279	Creative Writing in English	3	2	30
VI	ENS 3280	English for Placement	3	2	30
			12	**8**	**120**

ENS 3671 New Literatures in English 6 Hrs. / 6 Cr.

This course aims to expose students to the study of colonial and postcolonial writing which emerged in former British colonies such as: parts of Africa, Australia, Bangladesh, Canada, Caribbean countries, India, Malaysia, Malta, New Zealand, Pakistan, Singapore, islands in the South Pacific, and Sri Lanka.

At the successful completion of the course the students shall be able to

i. define and differentiate New Literatures from British Literature.
ii. interrogate the writers' search for identity and cultural specificity.
iii. analyse the patriarchal and colonial norms.
iv. identify major themes of New Literatures.
v. evaluate the writers' styles and techniques.

Unit 1 – Introduction to New Literatures in English

Backgrounds, Definitions, Themes, Attitudes towards English and Styles

Unit 2 – Poetry

A. D. Hope	The Death of The Bird
Margaret Atwood	Journey to The Interior
Chinua Achebe	Butterfly
Derek Walcott	A Far Cry from Africa
Judith Wright	Five Senses

Unit 3 – Drama

Wole Soyinka	The Lion and The Jewel
Ola Rotimi	Gods Are Not to Blame

Unit 4 – Prose

Chinua Achebe	The Nature of Individual and His Fulfilment
Edward Said	The Orient and The East
Shirley Geok-Lin Lim	Gods Who Fail

Unit 5 – Fiction

Carl Muller – Grandeur of the Lion
Aamer Hussein – Another Gulmohar Tree

Self Study:

Ola Rotimi Gods Are Not to Blame
Aamer Hussein – Another Gulmohar Tree

References:

Begum, Jameela & Dutt, Maya. (Ed) *South Asian Canadia*. Madras: Anuchitra Publications, 1996

King, Bruce. *The New English Literatures: Cultural Nationalism in a Changing World.* London: The Macmillan Press, 1980.

Narasimhiah,C.D. (Ed.) *Commonwealth Literature*. Delhi: Oxford University Press, 1976.

Walsh, William

ENS 3673 Literary Criticism and Approaches 6 Hrs. / 6 Cr.

This course aims at familiarizing students with literary criticism helping them to identify a prescriptive grammar for literary works based on the expressed opinions of author-critics starting from Plato up to T.S. Eliot. This course further deals with some critical approaches and their application to literary texts.

At the end of the course the students will be able to:

1. critically view literary artifacts with the help of tools / concepts offered by Classical and Renaissance thinkers.
2. acknowledge restraint as a virtue under Neoclassicism and reason, giving way to emotion under Romanticism
3. apply 'high seriousness' and disinterestedness as guiding principles in appreciating literature as during Victorian and Modern periods
4. analyse psychologically works of art through Freud's theories
5. appreciate myths and archetypes while reading literary works through Jungian principles

Unit 1: Classical & Renaissance Criticism

Plato, Aristotle, Sidney, Ben Jonson

Unit 2: Neo-Classical & Romantic Criticism

John Dryden, Samuel Johnson, William Wordsworth and S.T. Coleridge

Unit 3: Victorian & Modern Criticism

Mathew Arnold & T.S.Eliot

Unit 4:Psychological approach

Uses, abuses and misunderstandings of the psychological approach and Freud's theories

Application: Hamlet: The Oedipus complex; "Young Goodman Brown": Id vs. superego

Unit 5:Mythological and archetypal approaches

Images, archetypal motifs or patterns, and archetypes as genres

Application: Jungian shadow, persona, and anima in "Young Goodman Brown"; myth criticism and the American Dream: Huckleberry Finn as the American Adam

Recommended Texts

Enright, D.J. and Ernst De Chickera. (eds.). *English Critical Texts*. Delhi: OUP, 2005.

Habib, M.A.R. *A History of Literary Criticism*. Oxford: Blackwell, 2006.

Guerin, Wilfred L. et al. *A Handbook of Critical Approaches to Literature*. Delhi: OUP, 1999.

References

Bloom, Harold. *The Western Canon: The Books and School of the Ages*. London: Papermac, 1995.

Drabble, Margaret (ed.). *The Oxford Companion to English Literature*. Oxford: OUP, 1995.

Macey, David. *The Penguin Dictionary of Critical Theory*. London: Penguin, 2001.

Rollason, Christopher and Rajeshwar Mittapalli (ed.). *Modern Criticism*. New Delhi: Atlantic Publishers, 2002.

Wolfreys, Julian (ed.). *Introducing Literary Theories: A Guide and Glossary.* New Delhi: Atlantic Publishers, 2005.

ENS 3675 Fiction III 6 Hr. / 6 Cr.

This course includes novels of the 20th century and attempts to study the major representative novelists of this period. The course would present the various changes in beliefs and political ideas after the events of the First World War and the disappearance of the British Empire.

Objectives

At the completion of this course, students shall be able to

i. analyze stories, plot, setting and characters and be able to respond to issues of literature as well as facts and events
ii. identify distinct features of various genres (Fiction & Nonfiction)
iii. apply strategies to comprehend words and ideas
iv. interrogate the use of word choice, simile & metaphors
v. view fiction critically and reflect based on themes, motifs

Unit 1: Stream of Consciousness

Virginia Woolf - To the Lighthouse

Unit 2: Science Fiction

H. G. Wells - The Invisible Man

Unit 3: Political Satire

George Orwell - Animal Farm

Unit 4: Dystopia

William Golding - Lord of the Flies

Unit 5: Religious Novel

Graham Greene - Burnt Out Case

SELF STUDY

Graham Greene - Burnt – Out Case

REFERENCE:

Stevenson, Randall. *The British Novel since the Thirties*: An Introduction. Athens: The University of Georgia Press, 1986.

Malcolm, Bradbury. *Novel Today*. London: Fontana Press, 1990.

ENS 3577 English for Media 5Hrs. /5Cr.

This innovative course aims at developing the students' ability to use the English language for different forms of Media. This course introduces the key concepts in Language and Media.

Objectives

At the end of the course, students will be able to

i. understand and identify the concept and types of mass communication
ii. become familiar with the key concepts in language and media
iii. appreciate media language
iv. analyze the media language
v. engage themselves in media reading.

Unit 1: Introduction to Communication and its Types

Personal Conversation, Group Discussion, Mass Communication, Role of Mass Communication in the present day world

Unit 2: English Language and Media

Mediated Communication, Media Discourse, Media Rhetoric, Media Vocabulary, Web Communication

Unit 3: The Print Media

Writing Headlines, Analyzing Newspaper articles, Planning and Writing Newspaper Articles, Composing Magazine Cover, Planning and writing a cover story

Unit 4: The Broadcast Media

The language of Radio and Television programmes, Writing Screen Plays, Writing Film Reviews, Writing Jingles for Advertisements

Unit 5: Internet English

Mobile Assisted Language Learning (MALL), English and Social Media, Communication through Social Media, Writing Content for Web Pages, Using Blogs and Webinars

References

Ahuja, B.N. (2005). *Audio visual journalism*. Delhi: Surjeet Publications.
Ceramella, N. & Lee, E. (2008). *Cambridge English for the media*. Cambridge: CUP.
Durant, A. & Lambrou, M. (2009**).** *Language and media***.** London: Routledge
Marshall, J. & Werndly, A. (2005). *The language of television*. London: Routledge
Reah, D. (2008). *The language of newspapers*. London: Routledge.

ENS 3279 Creative Writing in English 3 Hrs. / 2 Cr.

This course will help develop a keen sense of observation, lateral thinking, creative imagination and effective communication. The course material would help demonstrate the flexibility of the English language and show how language can accommodate diverse cultural elements. The students would do individual and group exercises with the teacher as facilitator. They would attempt creative writing based on each kind of writing as part of the course requirement.

Objectives

At the end of the course, students shall be able to

i. understand the concept of creativity and techniques in writing
ii. attempt different forms of poetry
iii. develop plot and distinguish it from story, and characters
iv. appreciate the role of observation in feature and travel writings
v. edit and revise writings for better readability

Unit 1: **The Art and Craft of Writing**

Inspiration, Imagination, Creativity, Figures of Speech

Unit 2: **Poetry & Prose**

Lyrics, songs, free verse, memoir, diary writing and literary prose

Unit 3: **Fiction & Drama**

Character, Plot, Point of View, Milieu, Verbal and Non-Verbal Elements, Screenplay

Unit 4: **Feature & Travel Writing**

Concepts, Elements and Characteristics

Unit 5: **Substantive Content Editing**

Revising and Rewriting, Proof Reading, and Editing

References

Dev, Anjana Neira, Anuradha Marwah, Swati Pal. Creative Writing: A Beginner's Manual. New Delhi: Pearson Longman, 2009.
Brooks, Cleanth and Robert Penn Warren. *Modern Rhetoric*. New York: Harcourt Brace Jovancvich, 1979.
Simms, Norman. *Creative Writing*. Allahabad: New Horizon Publication, 1986.

ENS 3672 Teaching English as a Second Language 6 Hrs/6 cr.

Course aims at introducing some of the salient features of English language education so that students can meaningfully contextualize English language education both as a medium and as a subject of study. It includes the colonial history of ELE in India, place of English in Indian Educational Reports, paradigm shifts in English language curriculum, approaches, methods, and techniques, testing and evaluation, and concepts.

At the end of the course, students shall be able to

i. analyze the colonial English language policies
ii. critically review the observations and recommendations of the various educational reports in Independent India
iii. relate the various macro-skills and micro-skills to today's needs and contexts
iv. synthesize various approaches and methods of teaching, learning, and assessment; and
v. become familiar with the recent ELT concepts

Unit 1: **History of English Language Education**

Charles Grant, Macaulay's Minutes, Charles Wood's Despatch, Calcutta University Report, and Report, From Secondary Education Report of 1950-52 to Knowledge Commission Report of 2007

Unit 2: **English Language Curriculum**

Macro-Skills: Listening, Speaking, Reading, & Writing; Micro-Skills, Grammar, Role of Literature

Unit 3: **Teaching-Learning Approaches, Methods, & Techniques**

Grammar Translation, Direct, Communicative Language Learning, Task-based Instruction, Content-based Instruction

Unit 4: **ELT Concepts**

Learner strategies, Learning Styles, Fluency vs. Accuracy, Scaffolding, Motivation, Learner Autonomy, Teacher Cognition, Cooperative & Collaborative Learning, Learner-Centred,

Unit 5: **Internship Programme**

Internship involves practical teaching and teaching related experience

Self-Study

Unit 1

Books for Reference

Krishnaswamy, N. & Krishnaswamy, L. 2006. *The story of English in India*. Delhi: Foundation Books.

Aslam, M. 2003. *Teaching of English: A practical Course for B.Ed. Students*. Delhi: Foundation Books.

Books for further reading

Anderson, N.J. 1999. *Exploring Second Language Reading: Issues and Strategies*. Boston,MA: Heinle & Heinle

Bailey, KM. and L. Savage (eds) 1994. *New Ways in Teaching Speaking*. Alexandra, VA: TESOL.

Beatty, K.(2003). *Applied Linguistics in Action*: CALL. London: Pearson

Benson, P. 2001. *Teaching and Researching Autonomy in Language Learning*. London:Longman

Mendelsohn, D. and J.Rubin (eds) 1995. *A Guide for the Teaching of Second Language Listening*. San Diego, CA: Dominie Press

Nunan,D. !999. *Second Language Teaching and Learning*. Boston, MA :Heinle & Heinle

Richards J. and W. Renandaya (eds) 2002. *Methodology in Language Teaching*. Cambridge: Cambridge University Press

ENS 3674 Basics of Linguistics 6 Hrs. / 6 Cr.

The course aims at offering students a set of basic tools and a framework which will enable them to understand the basic concepts in language and Linguistics. It also aims at introducing various branches of Applied Linguistics.

Objectives

After the completion of this course the students shall be able to

i. learn the chief theories of human speech
ii. gain knowledge in various branches of linguistics
iii. recognize the acceptable system of sound and pronunciation
iv. differentiate the patterns of sounds
v. understand the concepts of linguistics

Unit 1: Origins of Language

Origin and development of human language, the bow-wow theory, the ding-dong theory, the pooh-pooh theory, the gesture theory.

Unit 2: Definition and Branches of Linguistics

Methods of Applied Linguistics: Synchronic, Diachronic and Panchronic studies of language, Paradigmatic and Syntagmatic relationship, Linguistics Analysis

Unit 3: Phonetics

The production of speech sounds, vowels,consonants and Transcription

Unit 4: Phonology

Introduction, Phoneme and allophone, syllable, stress, intonation

Unit 5: Modern Concepts in Theoretical & Applied Linguistics

Words and Morphemes, Morphophonemics, Syntax, Semantics, Stylistics

Self Study

Unit 1: Origins of Language

Recommended Text

Verma, S.K. and N. Krishnaswamy. *Modern Linguistics: An Introduction*. Delhi: OUP, 2000.

Jeyalakshmi, G. 2007. *A Text Book on the English Sounds: Vowels and Consonants*. Madurai: Tharvas.2007

Wood, Frederick, T. An Outline History of the English Language. Delhi: Macmillan. 1984.

ENS 3676 Contemporary Literature 6H/6Cr

This course aims at introducing students to literatures around the world from the 1980s to the present. This course envisages a comprehensive study of the major writers in English across cultures. This course covers representative works from all the four major genres of literature.

Objectives:

At the completion of this course ,students shall be able to

i. familiarise various works in contemporary literature
ii. learn various literary and socio- cultural issues in contemporary literature
iii. evaluvate critical perspectives of these works
iv. analyse the works based on the themes and motives
v. textually appreciate the literature of the contemporary age

Unit 1: Poetry

Carol Ann Duffy – "Valentine"(1984)
Maya Angelou – "I Shall not be moved" (1990)
Bruce Meyer – "The Snow" (1991)
Thom Gunn – "The Bed" (2010)

Unit 2: Drama

Tom Murphy – "She Stoops to Folly" (1995)
Norm Forster – "Mending Fences" (2007)

Unit 3: Prose

Alice Walker – "Second Words: Selected Critical Prose" (1982)
John Updike – "The Bankrupt Man" (1983)
Ngugi Wa Thiong'o – "Decolonising The Mind" (1986)

Unit 4: Fiction

Nadaine Gordimer – "July's People" (1981)
Gloria Naylor – "The Women of Brewster Place" (1982)
Gabriel Gracia Marquez – "Love in the Time of Cholera"(1988)

Unit 5: Short Story

Jose Emilio Pacheco – "Battles in the Desert"(1980)
Stephen King - – "The Monkey "(1988)
Naina Allan – "The Silver Wind"(2011)

Self - Study

Ngugi Wa Thion'o – "Decolonising The Mind" (1986)
Nina Allan – "The Silver Wind"(2011)

References

Bell, Michael. *Gabriel Garcia Marquez: Solitude and Solidarity*. Hampshire: Macmillan, 1993

Gates, Jr., Henry Louis (ed). *Black Literature and Literature Theory*. New York: Routledge, 1984

King, Bruce. *The New English Literatures: Cultural Nationalism in a Changing World*. London: Macmillan, 1980

McLeod, A.L. (ed.). *Commonwealth and American Nobel Laureates in Literatures: Essays in Criticism*. New Delhi: Sterling Publishers, 1998.

Walsh, William (ed.). *Readings in Commonwealth Literature*. Oxford: Clarendon Press, 1973

ENS 3578 English at Work Place 5 Hrs. / 5 Cr.

This course is intended to develop the English language skills required for students to communicate effectively at their workplaces in the future professional careers. Subject Leader/

Objectives

After the completion of this course, students will be able to

i. perceive various kinds of business communication skills
ii. understand various language registers of the professional world
iii. actively participate and conduct interviews and group discussions
iv. Draft business correspondence letters and other professional content
v. acquire other professional skills of the twenty first century

Unit 1 - English for Teaching

Teaching Learning context - Material production - Sources of learning - Assessment (Testing and Evaluation) - Language analysis and awareness - Language skills: Teaching LSRW - Enhancement of teaching skills and professionalism

Unit 2 - English for Media

Report Writing - Review writing - letters to the editor - Script writing - Sports Journalism - Columns - Writing for commercial advertisements - Interviews - Talk shows - Debates - Hosting a TV show - News Reading

Unit 3 - English for BPOs

Communication Skills - effective telephoning skills - Active Listening Skills - Paraphrasing Skills - Empathy - Probing Skills - Problem Solving Skills - Task rapport Balance - Customer Service Skills

Unit 4 - English for Content Writing

Advertising, Copy writing, SEO, instructions, Flyers, brochures

Unit 5 - English for Business & Insurance

Business and insurance vocabulary expansion - presentations - effective communication skills for meetings and negotiations - effective participation in discussions - written communication including email, reports and letters - effective telephoning skills - hosting visits, socialising skills

Reference

Celcie-Murcia, M. (ed). *Teaching English as a Second or Foreign Language*. 3rd ed.Boston.
Kalkar, Anjali et al. Textbook of Business Communication. Hyderabad, Orient Blackswan, 2010
MA; Heinle & Heinle,2001Nunan,D. *Second Language Teaching and Learning*.Boston, MA:Heinle & Heinle, 1999
Richards J. and W. Renandaya (eds). *Methodology in Language Teaching*. Cambridge: Cambridge University Press, 2002Benson, P. Teaching and Researching Autonomy in Language Learning. London:Longman, 200Bailey, K. Learning about Language Assessment.Boston, MA:
Mohan, Krishna and Meera Banerji. Developing Communication Skills. Madras: Macmillan, 2009.
Rubin, W. Harvey Dictionary of Insurance Terms.New York: Barron's Educational Series, 2003
Hannah, Michael and Gerald C.Wilson. Communicating in Business and Professional Settings Singapore: Mc-Graw-Hill International Editions, 1998.
Sekar, J.John. Career Skills. Madurai: The American College, 2015

ENS 3280 English for Placement 3 Hrs. / 2 Cr.

This course aims to familiarize students with the distinctive ways in which nonverbal and verbal communicative skills could be developed in preparation for competitive exams and careers in professional organizations. It would also prepare students through training in speed and accuracy, fluency and competence in English. It also trains them in the modalities of test of English.

At the end of this course, students shall be able to

i. understand the various types and channels of communication
ii. develop the skill to effectively approach reading passages in exams
iii. identify common errors in English and to make error free sentences
iv. communicate professionally in a work environment
v. write different forms of writing

Unit 1: Dyadic Communication

Face to face Conversation, and Telephonic Conversation

Unit 2: Oral Communication

Group Discussion and Interviews

Unit 3: Reading Comprehension

Strategies for reading comprehension and enhancing word power, cloze reading, analogy and rearranging jumbled sentences

Unit 4: Spotting errors

Concord, verb, causative, tense, adjective, conditional, subjunctive, passive, preposition, determiner, conjunction, parallel structure, redundancy,

Unit 5: Written Communication

Formal Reports, Memo, Minutes, Resume Writing, and Business letters

Texts

Mohan, Krishna and Meera Banerji. *Developing Communication Skills*. Madras: Macmillan, 2009.

Gopalan, R and Rajagopalan, V. *English for Competitive Examinations*. Noida: McGraw Hill Education.2nd Edition, 2007

References

Hannah, Michael and Gerald C.Wilson. *Communicating in Business and Professional Settings*. Singapore: Mc-Graw-Hill International Editions, 1998.

Mohan, Krishna and N. P. Singh. Speaking English Effectively. New Delhi: Macmillan, 1995.

Pease, Allan. *The Definitive Book of Body Language*. London: Orion, 2004.

Ray, Reuben. *Communication Today*. Mumbai: Himalaya Publishing House, 1997.

Bhatnagar, R.P. and Rajul Bhargava. *English for Competitive Examinations*. New Delhi: Macmillan, 1994.

Prasad, Hari Mohan and Uma Rani Sinha. *Objective English*. New Delhi: Tata McGraw-Hill, 1999.

Swan, Michael. *Practical English Usage*. ELBS, 1994.

ENS 3200 Environmental Studies 4 Hr. / 2 Cr.

This course aims to create and promote environmental awareness in students. It defines the scope and importance of the discipline. The course material will help students understand the basic concepts relating to renewable/non-renewable resources, ecosystems, environmental pollution, and biodiversity. The course also focuses on people in the environment, social issues relating to development, environmental degradation, control measures and ethics. Literary texts are introduced to sensitize the students to the urgent ecological concerns that threaten everyday life. The course would stress the role of an individual in the conservation of natural resources.

Objectives

At the end of the course, students shall be able to

i. identify and understand environmental literary studies as a genre
ii. apply environmental ethics in literature
iii. locate deep ecology in nature writing
iv. connect women with nature
v. read texts eco-critically

Unit 1: Environmental Literary Studies

Cheryll Glotfelty "Literary Study in an Age of Environmental Crisis"

Rachel Carson Excerpts from Silent Spring

Unit 2:Environmental Ethics

John Muir	- "God's First Temples: How Shall We Preserve Our Forests"
Tom Regan	-"Animal Rights, Human Wrongs"
Suketu Mehta	-"Bhopal Lives"
Arundhati Roy	-The Greater Common Good

Unit 3: Deep Ecology

Nissim Ezekiel	-"Poet, Lover, Birdwatcher"
John Steinbeck	-"Chrysanthemums"
Salim Ali	-"Stopping by the Woods on a Sunday Morning"
D.H. Lawrence	-"Snake"
Alexander Frater	-Excerpts from *Chasing the Monsoon*

Unit 4: Eco Feminism

Vandana Shiva - Women's Indigenous Knowledge and Biodiversity Conservation

Unit 5: Eco-Criticism

- Select Essays from The Living Plant: A Collection of Writing on the Environment

Self-Study

Arundhati Roy - The Greater Common Good

References

Bharucha, Erach. *Environmental Studies for Undergraduate Courses*. Hyderabad: UGC Universities Press, 2005.

Garrard, Greg. *Ecocriticism* (New Critical Idiom). New York: Routledge, 2004.

Glotfelty, Cheryll and Harold Fromm (ed.) *The Ecocriticism Reader: Landmarks in Literary Ecology*. London: University of Georgia Press, 1996.

Graham Jr., Frank. *Since Silent Spring*. Boston: Houghton Mifflin Co., 1970.

Green, Mary. *The Living Planet: A Collection of Writing on the Environment*. Cambridge: CUP, 2011.

DEPARTMENT OF MATHEMATICS

Program for B.Sc. Degree in Mathematics (SF)

(w.e.f 2015-2016)

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
1	I	XXX xxxx	TAM/FRE/HIN	3	2	30
1	II	ENS 1201	Conversational Skills	3	2	30
1	III C	MAS 1511	Classical Algebra	5	5	75
1	III C	MAS 1411	Analytical Geometry -3D	4	4	60
1	III C	MAS 1413	Differential Calculus	4	4	60
1	III S	PHS xxxx	Physics for Mathematics - I	5	4	60
1	IV LS	XXX xxxx	Life Skill - I	3	2	30
1	IV NME	XXX xxxx	Non-major Elective - I	3	2	30
			Total	**30**	**25**	**375**
2	I	XXX xxxx	TAM/FRE/HIN	3	2	30
2	II	ENS 1202	Reading & Writing Skills	3	2	30
2	III C	MAS 1512	Algebra- I	5	5	75
2	III C	MAS 1412	Analysis -I	4	4	60
2	III C	MAS 1414	Integral Calculus	4	4	60
2	III S	PHS xxxx	Physics for Mathematics - II	5	4	60
2	IV LS	XXX xxxx	Life Skill - II	3	2	30
2	IV NME	XXX xxxx	Non-major Elective - II	3	2	30
2	V	XXX xxxx	Ext. Activity NSS/PED/SLP		1	15
			Total	**30**	**26**	**390**

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
3	I	XXX xxxx	TAM/FRE/HIN	3	2	30
3	II	ENS 2201	Study Skills	3	2	30
3	III C	MAS 2511	Algebra -II	5	5	75
3	III C	MAS 2513	Analysis -II	5	5	75
3	III C	MAS 2515	Differential Equations	5	5	75
3	III C	MAS 2411	Statistics- I	4	4	60
3	III S	COS xxxx	Programming in C	5	4	60
			Total	**30**	**27**	**405**
4	I	XXX xxxx	TAM/FRE/HIN	3	2	30
4	II	ENS 2202	Career Skills	3	2	30
4	III C	MAS 2512	Algebra- III	5	5	75
4	III C	MAS 2514	Analysis- III	5	5	75
4	III C	MAS 2516	Vector Calculus & Trigonometry	5	5	75
4	III C	MAS 2412	Statistics- II	4	4	60
4	III S	COS xxxx	Programming in C++	5	4	60
4	V	XXX xxxx	Ext. Activity NSS/PED/SLP		1	15
			Total	**30**	**28**	**420**

Sem	Part	Course Code	Course Title	Hr/ wk	Cr.	Marks
5	III C	MAS 3611	Mechanics	6	6	90
5	III C	MAS 3613	Graph Theory	6	6	90
5	III C	MAS 3615	Operations Research- I	6	6	90
5	III C	MAS 3511	Combinatorics	5	5	75
5	IV LS	XXX xxxx	Life Skill- III	3	2	30
5	IV	MAS 3200	Environmental Studies	4	2	30
			Total	**30**	**27**	**405**
6	III C	MAS 3612	Number Theory	6	6	90
6	III C	MAS 3614	Complex Analysis	6	6	90
6	III C	MAS 3616	Operations Research- II	6	6	90
6	III C	MAS 3512	Fuzzy Mathematics	5	5	75
6	IV LS	XXX xxxx	Life Skill - IV	3	2	30
6	IV	VAL xxxx	Value Education	4	2	30
			Total	**30**	**27**	**405**

Courses offered to Non-major students by the Department of Mathematics (UG)

Supportive

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	III	MAS 1431	Maths for Physics- I	5	4	60
1	III	MAS 1433	Discrete Mathematics (BCA)	5	4	60
1	III	MAS 1435	Maths for Chemistry - I	5	4	60
1	III	MAS 1437	Business Statistics(BBA)	5	4	60
2	III	MAS 1432	Maths for Physics- II	5	4	60
2	III	MAS 1434	Discrete Mathematics (COS)	5	4	60
2	III	MAS 1436	Maths for Chemistry - II	5	4	60
2	III	MAS 1438	Statistics (BIT)	5	4	60
3	III	MAS 2431	Operations Research (BIT)	5	4	60
3	III	MAS 2433	Business Statistics (CME)	5	4	60
3	III	MAS 2435	Business Statistics (CMC)	5	4	60
3	III	MAS 2437	Business Statistics (CIT)	5	4	60
3	III	MAS 2439	Quantitative Techniques (BBA)	5	4	60
3	III	MAS 2465	Graph Theory and O.R. (COS)	5	4	60
4	III	MAS 2434	Business Mathematics (CME)	5	4	60
4	III	MAS 2436	Business Mathematics (CMC)	5	4	60
4	III	MAS 2438	Business Mathematics (CIT)	5	4	60
4	III	MAS 2440	Operations Research (BCA)	5	4	60
4	III	MAS 2452	Biostatistics (MIC)	5	4	60
4	III	MAS 2454	Biostatistics (BCH)	5	4	60

Non-Major Elective

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	IV	MAS 1221	Arithmetic & Mathematical Logic	3	2	30
2	IV	MAS 1222	Recreational Mathematics	3	2	30

Life Skill Courses

Sem	Part	Course Code	Course Title	Hr/wk	Cr.	Marks
1	IV	MAS 1231	Mathematics for Life	3	2	30
2	IV	MAS 1232	Mathematical Reasoning	3	2	30
5	IV	MAS 3231	Mathematics for Competitive Exam.	3	2	30
6	IV	MAS 3232	Developing Quantitative Aptitude	3	2	30

MAS 3611 **MECHANICS** **6 hr/6Cr**

Objectives:

The course mainly deals with two major areas of applied mathematics namely Statics and dynamics. Statics is the branch of mechanics that is concerned with the analysis of loads (force and torque, or "moment") acting on physical systems that do not experience an acceleration (a=0), but rather, are in static equilibrium with their environment. Whereas the dynamics is a branch of applied mathematics (specifically classical mechanics) concerned with the study of forces and torques and their effect on motion. Brief introduction to central forces to the learners becomes essential as we live in the era of satellites, missiles and space explorations.

On successful completion of the course the student will be able to

- develop mathematical models for statical and dynamical systems.
- appreciate the tools that were developed and apply in the relevant context.
- convert mathematical conclusions in to physical realities.
- inculcate the scientific temper among the learner.
- appreciate the contemporary scientific developments.

Unit I: Introduction – Forces acting at a point – Lami's theorem – Components of force – Parallel forces and moments – Moment of a force.

Unit II: Couples– Equilibrium of three forces acting on a rigid body.

Unit III: Coplanar forces – Friction.

Unit IV: Collision of elastic bodies – Principles of conservation of momentum– Direct impact– Oblique impact.

Unit V: Motion under the action of central forces– Law of inverse squares–Moment of inertia.

References:

1. Venkatraman. M.K, Statics, Agasthiar publications, 2002.
2. Venkatraman. M.K, Dynamics, Agasthiar publications, 2002.
3. Loney. S.L, Dynamics, Mac Millan India Edition, 1998.
4. Rajeshwari. I, Mechanics, Sarah's publications, 2016.
5. Vasistha and Agarwal, Dynamics of a particle, Krishna prakash mandir, Meeret, 2001.

MAS 3613 GRAPH THEORY 6 hr/6Cr

Objectives:

A graph is a symbolic representation of a network and of its connectivity. It implies an abstraction of the reality so it can be simplified as a set of linked nodes.

Graph theory is a branch of mathematics concerned about how networks can be encoded and their properties measured. It has been enriched in the last decades by growing influences from studies of social and complex networks. The origins of graph theory can be traced to Leonhard Euler who devised in 1735 a problem that came to be known as the "Seven Bridges of Konigsberg".

On successful completion of the course the student will be able to

- demonstrate knowledge of the syllabus material
- write precise and accurate mathematical definitions of objects in graph theory
- use mathematical definitions to identify and construct examples and to distinguish examples from non-examples
- validate and critically assess a mathematical proof
- use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory
- construct mathematical proofs
- write about graph theory in a coherent and technically accurate manner.
- hone the ability to communicate mathematics.

Unit I: Graphs– Sub graphs– Isomorphism and degrees – Degree sequence – Walks and connected graphs – Cycles in graphs – Cut vertices and cut edges – Connectedness – Ramsay number – Matrices associated with the graph – Operations on graphs.

Unit II: Eulerian graphs – Hamiltonian graphs –Properties.

Unit III: Bipartite graph – Trees.

Unit IV: Colouring – Vertex colouring – Edge colouring – Five colour theorem and Four colour conjecture – Chromatic number and chromatic polynomials.

Unit V: Independence number – Covering number – Planar graph–Dual graph of planar graph –Directed Graph.

References:

1. Choudum .S.A., A First Course In Graph Theory, McMillan India Ltd, 1987.
2. Arumugam. S and Ramachandran. S, Invitation to Graph Theory, New Gamma Publishing House, 1996
3. John Clarke & Derek Allan Holton, A first Look at Graph Theory, World Scientific Publishing Co. Ltd., 1995.
4. Murugan. M, Graph Theory, Muthali Publications, 2000.

MAS 3615 OPERATIONS RESEARCH – I 6 hr/6Cr

Objectives:

Operations research- I and II are the courses that deal with the application of advanced analytical methods to help make better decisions. It was initially used in military operations to obtain better solutions which would otherwise give bad solutions. In the recent years it is adopted to management sciences and decision making. This course aims to introduce students to use quantitative methods and techniques for effective decisions–making; model formulation and applications that are used in solving real life problems.

On successful completion of the course the student will be able to

- convert real life problems into mathematical models by making use of inequalities
- use Mathematical tools to solve problems in the analytical form and will be able to interpret in the common man's language
- understand the limitations of solving by graphical method and will appreciate the simplex method
- appreciate the two-phase method or Big-M method, an alternate for overcoming the problem of surplus variable
- appreciate the nexus between the dual problem and its primal
- able to build and solve transportation and assignment problems, and interpret such solutions.
- appreciate the theory of game as it is ever prevalent in every environment.
- hone the ability to do reality checks on calculations.

Unit I: Introduction– Formulation of L.P.P. – Graphical solution of L.P.P. and its special cases – Canonical form, Standard form and Basic solution – Basic feasible solution – Reduction of feasible solution to a basic feasible solution.

Unit II: The Simplex method – Introduction – Simplex method – Big M method – Two phase Method.

Unit III: Duality in Linear Programming – Concept of duality – Formulation of dual linear problem – Formulation of primal-dual pairs – Dual simplex method – Revised simplex method.

Unit IV: The Transportation Problem - Introduction- Mathematical formulation- Loops in a transportation table- Finding IBFS- moving towards optimality – Degeneracy – Unbalanced transportation problems. The Assignment problem – Introduction – Hungarian method - Variations of the Assignment problem – Multiple optimal solutions – Maximization case - Travelling salesman problem –Unbalanced assignment problem- Restrictions.

Unit V: Introduction to theory of Games – Saddle Point – Graphical solution for 2 x m, n x 2 – Dominance property – Solution of game by linear programming method.

References:

1. Kantiswarup, Gupta P.K. & Manmohan, Operations Research, Sultan Chand & Sons, 2010.
2. Hadley.G, Linear Programming, Narosa Book Distributors Private Ltd. ,1963.
3. Taha.H.A. Operations Research – An Introduction (8th Edition) Prentice Hall of India, New Delhi. 2007
4. Bronson.R, Operations Research 2nd Edition, Schaum's Outline Series, 1997.
5. Sharma.J.K. Operations Research, Theory and applications, Macmillan, New Delhi, 2003.
6. Wagener.H.M., Principles of Operations Research 2nd Edition, Prentice – Hall of India, 1975
7. Hillier.F.S and Lieberman.G.J. Operations Research, CBS Publishers and Distributors, New Delhi. 1998
8. Goel. B.S. and Mittal, S.K. Operations Research, Pragati Prakashan, Meerut, 2000
9. Kapoor. V.K., Operations Research (Quantitative techniques for Management) 9th Edition, Sultan Chand & Sons. 2014.
10. Sharma S.D., Operations Research, 11th Edition, Kedarnath, Ramnath Company, 2002.
11. Vohra N.D., Quantitative Techniques in Management 4th Edition, Tata McGraw Hill co. 2009.
12. Aditham B. Rao, Operations Research, Jaico Publishing House, Mumbai, 2008.

MAS 3511 COMBINATORICS 5 hr/5Cr

Objectives:

Combinatorics is a branch of mathematics concerning the study of finite or countable discrete structures. Aspects of combinatorics include counting the structures of a given kind and size (enumerative combinatorics), deciding when certain criteria can be met, and constructing and analyzing objects meeting the criteria. Many combinatorial questions have historically been considered in isolation, giving an ad hoc solution to a problem arising in some mathematical context. In the later twentieth century, however, powerful and general theoretical methods were developed, making combinatorics into an independent branch of mathematics in its own right. Combinatorics is used frequently in computer science to obtain formulas and estimates in the analysis of algorithms.

On successful completion of the course the student will be able to

- apply algorithms taught in the course
- understand the fundamental combinatorial structures that naturally appear in various other fields of mathematics and computer science
- use these structures to represent mathematical and applied questions

- use the combinatorial tools that are used to analyze such structures
- know how to prove the existence or non-existence of the object, compute the number of such objects, and understand their underlying structure
- use generating functions to solve a variety of combinatorial problems.

Unit I: Two basic principles – Simple arrangement and selections with or without repetition – Distributions – Binomial coefficients.

Unit II: Generating functions - Calculating coefficients of generating functions – Exponential generating function – Summation method – Partitions.

Unit III: Recurrence relations – Divide and conquer relations – Dearrrangement – Solution of linear recurrence relation.

Unit IV: Fibonacci number - Stirling number of first and second kind – Catalan number– Ménage number.

Unit V: Inclusion and Exclusion principle – Pigeon hole principle – Ramsey theorem.

References:

1. Tucker A.W., Applied Combinatorics, Wiley, 2000.
2. Cohen D., Combinatorics, Wiley, 1978.
3. Hall M., Combinatorial Mathematics, McGraw Hill, 1968.
4. Liu C.L., Introduction to Combinatorial Mathematics, McGraw-Hill, Newyork, 1994
5. Ryser H.J., Combinatorial Mathematics, Carus Mathematical monograph, 1965.
6. Krishnamurthy, Combinatorics, PHI, 1998.
7. Balakrishnan V.K., Combinatorics, Schaum's outline series, Tata McGraw Hill, 2005

MAS 3612 NUMBER THEORY 6 hr/6Cr

Objectives:

The study of number theory inevitably includes knowledge of the problems and techniques of elementary number theory, however the tools which have evolved to address such problems and their generalizations are both analytic and algebraic, and often intertwined in surprising ways. This course covers topics from classical number theory including discussions of mathematical induction, prime numbers, division algorithms, congruences, and quadratic reciprocity.

On successful completion of the course the student will be able to

- state fundamental results in number theory and prove rigorously mathematical statements concerning prime numbers and modular arithmetic
- determine greatest common divisors by prime factorizations or Euclid's algorithm
- solve linear Diophantine equations and linear congruences
- describe properties of common arithmetical functions, including the Euler phi function
- apply methods and techniques of number theory to a range of applications

- hone the ability to do reality checks on calculations.

Unit I: Divisibility– Euclidean algorithm – Primes – Fundamental theorem of arithmetic.

Unit II: Congruences – Fermat, Euler and Wilson theorem – Lagrange theorem – Chinese remainder theorem – Solution of congruences.

Unit III: Quadratic residues – Euler's criterion – Gauss lemma – Quadratic reciprocity law.

Unit IV: Arithmetic functions – Number of divisors– Sum of divisors – Euler's phi function –Mobius function – Mobius inversion formula – Greatest integer function – Related problems.

Unit V: Numbers of special form – Perfect Numbers – Mersenne primes and amicable numbers – Fermat numbers – Pepin's test – Diophantine Equation – Pythagorean triplets.

References:

1. Andrews. G. E, Number theory, Hindustan Publishing Corporation, 1994.
2. Apostol. T. M, Introduction to analytic number theory, Narosa publishing house, 1998.
3. Burton. D. M, Elementary Number theory, Universal book stall, 2012.
4. Niven. I and Zuckerman.H.S, An introduction to the theory of numbers, Wiley eastern, 2015.
5. Narayanan. K.S and Manicavachagom Pillay. T.K, Algebra, Vol. I, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1982.

MAS 3614 COMPLEX ANALYSIS 6 hr/6Cr

Objectives:

Complex analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex numbers. It is useful in many branches of mathematics, including algebraic geometry, number theory, analytic combinatorics, applied mathematics; as well as in physics, including hydrodynamics and thermodynamics and also in engineering fields such as nuclear, aerospace, mechanical and electrical engineering.

On successful completion of the course the student will be able to

- understand how complex numbers provide a satisfying extension of the real numbers;
- appreciate how throwing problems into a more general context may enlighten one about a specific context (e.g. solving real integrals by doing complex integration; Taylor series of a complex variable illuminating the relationship between real function that seem unrelated -- e.g. exponentials and trig functions);
- learn techniques of complex analysis that make practical problems easy (e.g. graphical rotation and scaling as an example of complex multiplication);

- continue to develop proof techniques;
- appreciate how mathematics is used in design (e.g. conformal mapping);
- unlearn (if ever learned) the notion that mathematics is all about getting "the right answer";
- hone the ability to do reality checks on calculations.
- hone the ability to communicate mathematics.

Unit I: Geometry of complex numbers – Elementary transformations – Bilinear transformations – Cross Ratio – Fixed points of bilinear transformation.

Unit II: Analytic function – Differentiability – The Cauchy Riemann equation – Conformal mappings.

Unit III: Definite Integral – Cauchy's Theorem – Cauchy's Integral formula – Cauchy's Inequality – Morera's theorem – Liouville's theorem and fundamental theorem of Algebra – Maximum modulus theorem.

Unit IV: Taylor's and Laurent's theorem – Zeros of an analytic function.

Unit V: Singularities – Cauchy Residue theorem – Arguments Principle – Rouche's theorem – Contour Integration.

References:

1. Arumugam.S, Thangapandi Issac.A , Somasundaram. A**,** Complex Analysis , SCITECH publications private limited, 2007.
2. Shanti Narayanan, Complex Analysis, S. Chand & Co, 1999.
3. Duraipandian.P, Lakshmi Duraipandian and Muhilan.D**,** Complex Analysis, Emerald Publishers, 1994.
4. Ponnuswamy.S, Foundations of Complex Analysis, Narosa Publishing House, 2004.
5. Karunakaran.V , Complex Analysis, Narosa Publishing House, 2006.

MAS 3616 OPERATIONS RESEARCH - II 6 hr/6Cr

Objectives:

Student will be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type. To build and solve Transportation Models and Assignment Models. To design new simple models, like CPM to improve decision-making and develop critical thinking and objective analysis of decision problems.

On successful completion of the course the student will be able to

- convert real life problems into mathematical models by making use of inequalities
- communicate effectively and to function well on multi-disciplinary teams.

- appreciate post optimal analysis/sensitivity of the optimal solution for small changes in the initial parameters
- design new simple models, like: PERT, CPM to improve decision –making and develop critical thinking and objective analysis of decision problems.
- describe the scope of project planning, and use appropriate techniques to represent and analyse projects with a view to managing resources, minimising costs, and coping with uncertainty.
- solid understanding of the many ways applied mathematics can be used to extract data information and for making decisions.
- learn and understand the types of Inventories and objectives of Inventory Control. This would help them to understand the major reasons for holding inventories and also to differentiate between independent and dependent demand.
- recognise the basic types of queuing model, derive and calculate steady state system performance characteristics for these types.
- get an understanding of the factors and restrictions involved in building and using models for planning and management problems.

Unit I: Introduction to sensitivity Analysis – Changes in the cost vector, requirement vector – Coefficient matrix – Addition and deletion of variables - related problems.

Unit II: Introduction to Integer programming – Gomary's all-IPP Method – construction of Gomary's cut – fractional cut method-all Integer and mixed Integer - related problems.

Unit III: Network Scheduling by PERT/CPM- Introduction – Network and Basic components – Rules of network construction – Time calculations in networks – Critical Path Method (CPM)- PERT:PERT calculations - Negative float and Negative slack – advantages of network (PERT/CPM)

Unit IV: Inventory Control- Introduction – Reasons for carrying inventory – Types of inventory – The inventory decisions – Economic Order Quantity- Four EOQ models – EOQ problem with price breaks- Multi item deterministic problem.

Unit V: Queueing Theory- Introduction – Queueing system – Characteristics of Queueing Systems - Classification of Queueing models – Solution of Queueing models- {(M/M/1): (∞/FIFO)}**,** {(M/M/1): (N/FIFO)},{(M/M/C): (∞/FIFO},{(M/M/C): (C/FIFO)}.

References:

1. Kantiswarup, Gupta P.K. & Manmohan, Operations Research, Sultan Chand & Sons, 2010.
2. G. Hadley, Linear Programming, Narosa Book Distributors Private Ltd. ,1963.
3. Taha, H.A. Operations Research – An Introduction (8th Edition) Prentice Hall of India, New Delhi. 2007
4. Bronson R, Operations Research 2nd Edition, Schaum's Outline Series, 1997.
5. Sharma, J.K. Operations Research, Theory and applications, Macmillan, New Delhi, 2003.

6. Wagener H.M., Principles of Operations Research 2nd Edition, Prentice – Hall of India, 1975
7. Hillier, F.S and Lieberman, G. J. Operations Research, CBS Publishers and Distributors, New Delhi. 1998
8. Goel, B.S. and Mittal, S.K. Operations Research, Pragati Prakashan, Meerut. 2000
9. Kapoor V.K., Operations Research (Quantitative techniques for Management) 9th Edition, Sultan Chand & Sons. 2014.
10. Sharma S.D., Operations Research, 11th Edition, Kedarnath, Ramnath Company, 2002.
11. Vohra N.D., Quantitative Techniques in Management 4th Edition, Tata McGraw Hill co. 2009.
12. Aditham B. Rao, Operations Research, Jaico Publishing House, Mumbai, 2008.

MAS 3512 FUZZY MATHEMATICS 5 hr/5Cr

Objectives:

Fuzzy mathematics forms a branch of mathematics related to fuzzy set theory and fuzzy logic. It started in 1965 after the publication of Lotfi Asker Zadeh's seminal work Fuzzy sets. The quest for imitating human brain (artificial intelligence) since the invention of computers has propelled this area of Mathematics to a large extend as the human brain does not see things in black and white but rather in rainbow colors.

On successful completion of the course the student will be able to

- distinguish between the crisp set and fuzzy set concepts through the learned differences between the crisp set characteristic function and the fuzzy set membership function
- draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions respectively
- define fuzzy sets using linguistic words and represent these sets by membership functions
- know how to perform mapping of fuzzy sets by a function and also use the α-level sets in such instances
- know fuzzy-set-related notions; such as α-level sets, convexity, normality, support, etc.
- know the concept of a fuzzy number and how it is defined
- understand the extension principle, its compatibility with the α-level sets and the usefulness of the principle in performing fuzzy number arithmetic operations (Additions, multiplications, etc.)
- know the fuzzy relations and the properties of these relations
- analyze the distinction between binary logic and fuzzy logic at the conceptual.

Unit I: Crisp sets and fuzzy sets– basic concepts of fuzzy set – classical and fuzzy logic.

Unit II: α-cuts – properties of α-cuts – representations of fuzzy sets – Extension principle of fuzzy sets.

Unit III: Operations on fuzzy sets – fuzzy complements – fuzzy union – fuzzy intersection.

Unit IV: Fuzzy numbers – Arithmetic operation on intervals – Arithmetic operation on fuzzy numbers – fuzzy equations.

Unit V: Crisp and fuzzy relations – Binary fuzzy relations – Binary relation on a single set – Equivalence and similarity relation – Fuzzy relation equation.

References:

1. Klir.G.J and Folger T.A, Fuzzy sets Uncertainty and information, Prentice Hall of India, 1995.
2. Klir G.J and Bo Yuan, Fuzzy Sets, Fuzzy Logic, Theory and Applications, Prentice Hall of India, 1997.

MAS 3200 ENVIRONMENTAL STUDIES 4 hr/2Cr

Objectives:

An environmental study is a multidisciplinary academic field which systematically studies human interaction with the environment in the interests of solving complex problems. Environmental study brings together the principles of sciences, commerce/ economics and social sciences so as to solve contemporary environmental problems. It is a broad field of study that includes the natural environment, built environment, and the sets of relationships between them. The field encompasses study in basic principles of ecology and environmental science, as well as associated subjects such as ethics, geography, policy, politics, law, economics, philosophy, environmental sociology and environmental justice, planning, pollution control and natural resource management.

On successful completion of the course the student will be able to

- locate and comprehend relationships between the natural, social and cultural environment
- create cognitive capacity and resourcefulness to make the students curious about social phenomena, starting with the family and moving on to wider spaces
- nurture the curiosity and creativity of the students particularly in relation to the natural environment (including artifacts and people)
- engage the students in exploratory and hands-on activities to acquire basic cognitive and psychomotor skills through observation, classification, inference, etc.
- create awareness towards environmental issues and their social responsibility as a major stakeholder in the system
- appreciate the eco diversity of the sub continent and its resources

- know the need for sustainable development and optimal utilization of natural resources
- introduce to mathematical tools that may be used solve environmental issues

Unit I: Understanding eco-system –Food chain –Ecological pyramids – Introduction to different eco-system – Bio-geographical classification of India – Hot spots of bio-diversity – Conservation of bio-diversity.

Unit II: Introduction to Environmental Pollution – Causes and effects of air, water, noise, soil, thermal and nuclear pollution – Measures of control and management – Oil slick and its effects on the marine eco system – Global warming and climate change – Acid rain– Ozone layer depletion – Nuclear accident and holocaust.

Unit III: Energy sources – Renewable- Non renewable energy sources – Nuclear energy – Bio fuels – Non conventional energy sources – Pollution free energy.

Unit IV: Social Issues – Urbanization and pollution – Hazard identification – Air quality standards – Major pollutants and their effects in an urban environment – Permissible limits and methods of control – Environmental ethics – Environmental protection act – Environmental auditing (Air, water, wildlife protection, forest conservation acts) – Public awareness on solid waste management – House hold environment and health.

Unit V: Mathematical modeling for environmental issues –Weather/ disaster predictions – mathematical models using differential equations, linear programming and chaos theory.

References:

1. Erach Bharucha, Textbook of Environmental Studies, Universities Press, 2005.
2. Rana, essentials of ecology and Environmental science S.V.S. PHI, 2003.
3. Subramanian,N.S. & Sambamoorthy-A.V.S.S Ecology, Narosa publishing house, 2000.
4. Raman Sivakumar, Introduction to environmental science and energy, 2005.
5. Raman Sivakumar, Introduction to Environmental Science and Engineering, 2005
6. Ravikrishnan.A, Environmental Science and Engineering, Sri Krishna Hitech Publishing Company Pvt. Ltd, 2010
7. Arumugam.N, Kumaresan.V, Environmental studies, Saras Publication,2010.

MAS 3231 MATHEMATICS FOR COMPETITIVE EXAMINATIONS 3hr/2Cr

Objectives:

This course is designed for non major students who intent to apply for various competitive examinations . Though, no new concepts in mathematics are introduced whatever the students have learnt till their secondary level are recalled. Adequate training is given so that they will overcome the fear of numbers with the required level of speed and accuracy.

This will provide strategies and methods to solve problems in Mathematics section of any competitive examinations.

On successful completion of the course the student will be able to

- appreciate the techniques and tools in mathematics to solve problems in life
- read between the lines and understand the logic behind it
- increase the speed and accuracy in performing problems in competitive examinations
- improve the efficiency in dealing with numbers
- appreciate the techniques and tools in mathematics to solve problems in life

Unit I: Numbers - problems on numbers - H.C.F and L.C.M – Divisibility –Simplification.

Unit II: Arithmetic mean - Geometric mean – Harmonic mean.

Unit III: Mathematical logic – conjunction –disjunction – negation – implications – Equivalence of statements – disjunctive and conjunctive normal forms.

Unit IV: Venn diagram – Inclusion and exclusion principle.

Unit V: Measures of standard geometric objects.

References:

1. Aggarwal R.S , Quantitative Aptitude, S. Chand & company Ltd., 2006.
2. Discrete Mathematics, Schaum's outline series, McGraw Hill, 1996.
3. Set theory and Logic, Schaum's outline series, McGraw Hill, 1996.

MAS 3232 DEVELOPING QUANTITATIVE APTITUDE 3 hr/2Cr

Objectives:

This course will enable the students to develop their quantitative skills that strengthen their edge over others in competitive examinations. This course covers the area related to problems on numbers, logical concepts, alligation and mixture.

On successful completion of the course the student will be able to

- appreciate the techniques and tools in mathematics to solve problems in life
- read between the lines and understand the logic behind it
- increase the speed and accuracy in performing problems in competitive examinations
- improve the efficiency in dealing with numbers

- appreciate the techniques and tools in mathematics to solve problems in life

Unit I: Simple equation - simultaneous simple equations - Number of solution - Application on age –fraction – average - partnership.

Unit II: Ratio and proportion- Variation- Profit and loss.

Unit III: Time and work- Pipes and cistern-Time and distance.

Unit IV: Simple interest- Compound interest-Alligation and mixture.

Unit V: Indices - Surds - Logarithms.

References:

1. Aggarwal R.S.Quantitative Aptitude,S.chand & company Ltd., 2006
2. Sundaresan.V & Jeyaseelan.S.D, An Introduction to Business Mathematics, S.Chand & company Ltd., 2003.

Undergraduate Department of Physics (SF)

Programme for B.Sc Physics from 2015 series

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
1	I	TAM/FRE/HIN		3	2	30
1	II	ENS 1201	Conversational Skills	3	2	30
1	IIIC	PHS1331	Physics Lab – I	3	3	45
1	IIIC	PHS1553	Mechanics	5	5	75
1	IIIC	PHS 1555	Geometrical Optics	5	5	75
1	IIIS	MAS1471	Mathematics – I	5	4	60
1	IVLS1	PHS 1231	Life Skill – I	3	2	30
1	IVNME1	PHS 1233	NME – I	3	2	30
			Total	**30**	**25**	**375**
2	I	TAM/FRE/HIN		3	2	30
2	II	ENS1202	Reading & Writing Skills	3	2	30
2	IIIC	PHS1332	Physics Lab – II	3	3	45
2	IIIC	PHS1554	Electricity & Magnetism	5	5	75
2	IIIC	PHS 1556	Analog Electronics	5	5	75
2	IIIS	MAS1472	Mathematics – II	5	4	60
	IVLS2	PHS 1232	Life Skill – II	3	2	30
2	IVNME2	PHS 1234	NME – II	3	2	30
2	V	XXXxxxx	Extension Activity(NSS/PED,SLP)	2	1+1	
			Total	**30**	**25**	**375**
3	I	TAM/FRE/HIN		3	2	30
3	II	ENS2201	Study Skills	3	2	30
3	IIIC	PHS2661	Physics Lab – III	6	6	90
3	IIIC	PHS2463	Thermodynamics& Statistical Physics	4	4	60
3	IIIC	PHS2445	Astrophysics& Relativity	4	4	60
3	IIIC	PHS 2547	Physical Optics	5	5	75
3	IIIS	CHE2471	Chemistry – I	5	4	60
			Total	**30**	**27**	**405**
4	I	TAM/FRE/HIN		3	2	30
4	II	ENS2202	Career Skills	3	2	30
4	IIIC	PHS2662	Physics Lab – IV	6	6	90
4	IIIC	PHS2464	Classical & Quantum Physics	4	4	60
4	IIIC	PHS2446	Digital Electronics	4	4	60
4	IIIC	PHS 2548	Mathematical Physics	5	5	75
4	IIIS	CHE2472	Chemistry – II	5	4	60
4	V	XXXxxxx	Extension Activity(NSS/PED,SLP)	2	1+1	
			Total	**30**	**27**	**405**

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
5	III C	PHS 3661	Physics Lab – V	6	6	90
5	III C	PHS 3663	Atomic Physics and Molecular Spectroscopy	6	6	90
5	III C	PHS 3665	Renewable Energy & Storage	6	6	90
5	III C	PHS 3559	Medical Physics	5	5	75
5	IV LS3	PHS 3231	Physics in Music	3	2	30
5	IV VE	PHS3200	Environmental Studies	4	2	30
			Total	**30**	**27**	**405**
6	III C	PHS 3662	Project	6	6	90
6	III C	PHS 3664	Communication system and Microprocessor	6	6	90
6	III C	PHS 3556	Nuclear Physics	5	5	75
6	III C	PHS 3668	Solid State Physics	6	6	90
6	IV LS4	PHS 3232	Digital Photography	3	2	30
6	IV VE	VAL0000	HVS	4	2	30
			Total	**30**	**27**	**405**
			Grand Total for Semester I - VI	**180**	**158**	**2370**

Courses offered to Non-Major Students by the Department of PHYSICS

Part III Major Supportive Courses

SEM	Course No.	Course Title	Hours	Credits	Marks
I	PHS1471	Physics for Mathematics – I	5	4	60
II	PHS1472	Physics for Mathematics – II	5	4	60
III	PHS 2473	Microcontroller and programming	5	4	60
III	PHS2471	Physics for Chemists – I	5	4	60
IV	PHS2472	Physics for Chemists – II	5	4	60
		Total	**20**	**16**	**240**

Part IVLS Life Skill Courses:

SEM	Course No.	Course Title	Hours	Credits	Marks
I	PHS1231	Maintenance of Home Appliances	3	2	30
II	PHS1232	FM Radio theory & practice	3	2	30
V	PHS 3231	Physics in Music	3	2	30
VI	PHS 3232	Digital Photography	3	2	30
		Total	**12**	**8**	**120**

Part IVE Non Major Elective Courses

SEM	Course No.	Course Title	Hours	Credits	Marks
I	PHS1233	Basic Electronics	3	2	30
II	PHS1234	Wonders of Sky	3	2	30
		Total	**6**	**4**	**60**

PHS 3661 PHYSICS LAB V (6 credits, 6 hrs)

Objectives: This practical course intends

- To impart skills in measurement
- To design and plan experimental procedures
- To record and process the results to reach non-trivial conclusion about significance of results of the experiments
- To enable the students to have hands on experience with modern instrumentation

1. Troubleshooting the given instrument
2. Design of Digital to Analog Convertor using network circuit
3. Design of Analog to Digital Convertor
4. Execution of Microprocessor programmes using 8086/88(Addition, Subtraction, Multiplication and Division)
5. Construction of Synchronous Counter
6. Construction of asynchronous counter
7. Study of Amplitude and Frequency Modulation
8. Measurement of Dielectric Constant
9. Measurement of Numerical aperture of a given optical Fibre
10. Measurement of wavelength of the spectral lines using Constant Deviation Spectrometer
11. Determination of wavelength of the monochromatic source using Michelson's Interferometer
12. Determination of efficiency of Solar Cooker
13. Determination of Susceptibility – Quinke's method
14. Measurement of e/m ratio of electron-CRT Method
15. Measurement of the Charge of Electron - Milliken's oil drop Method
16. Study of Microprocessor interfacing
17. Construction of Random Access Memory (RAM)
18. Construction of Read Only Memory (ROM)

A minimum of **any sixteen** experiments shall be carried out.

REFERENCE

Practical Physics and Electronics, *C.C.Ouseph,U.J.Rao,V.Vijayendran,S.Visvanathan*, Printers and Publishers Pvt.Ltd. 2007.

PHS 3663 ATOMIC PHYSICS & MOLECULAR SPECTROSCOPY (6 Cr, 6hrs)

Objectives: To enable the students

- To understand the fine structure of the atom
- To correlate atomic structure when treated with external fields
- To know the basics of molecular spectroscopy
- To analyse the information derived from various spectroscopic techniques

UNIT I: Vector Atom Model and Coupling schemes

Bohr's theory – Its drawbacks – Sommerfeld's atom model – fine structure of H_α line in Balmer series of hydrogen atom – Limitations of Sommerfeld atom model – Vector atom model – Spinning Electron – Space Quantization-Various quantum numbers associated with vector atom model– LS and jj coupling –Pauli's exclusion principle – Electronic Configuration

UNIT II: Atomic Spectra and X-ray Spectra

Spectral terms – selection rules – intensity rules – Spectra of alkali metals – doublet fine structure – Penetrating and Non-Penetrating Orbits – Zeeman Effect– Paschen-Back Effect – Stark Effect .Origin of X-rays – Properties of X-rays-continuous and characteristic X- ray spectrum- Moseley's law – X-ray Diffraction, Bragg's Law

UNIT III: Molecular Spectra and Microwave Spectroscopy

Spectroscopy – Origin and Nature of Molecular Spectra – Factors affecting Line Width, Intensity of spectra – Born-Oppenheimer Approximation Classification of Molecules – Rotation of Molecules-Rotational energy levels – Selection Rules – Rigid Diatomic Molecule – Non-rigid Rotator – Microwave Spectra of symmetric and asymmetric top molecules – Microwave Spectrometer Instrumentation

UNIT IV: Infrared Spectroscopy

Infrared Spectra – Vibrating Diatomic molecule – Vibrational energy levels – Selection Rules – Simple Harmonic Oscillator – Anharmonic Oscillator –Diatomic Vibrating Rotator – vibration-rotation(IR) spectrum of carbon monoxide CO – Breakdown of the Born-Oppenheimer approximation-interaction of rotation and vibration - Vibrations of polyatomic molecules – FTIR Spectrometer

UNIT V: Raman Spectroscopy

Raman Scattering – Classical and Quantum theory of Raman Effect –Pure rotational (Linear molecules), vibrational (Spherical Top) Raman spectra – Raman activity of vibrations – Mutual Exclusion Principle - Raman Spectrometer

TEXT

1. **Introduction to Modern Physics**, *F. K. Richtmyer, E. H. Kennard and John N. Cooper*,McGraw-Hill Book Company, 6thEdition, 1969.
2. **Fundamentals of Molecular Spectroscopy,***C.N. Banwell, E.M.Mccash*, Tata McGraw-Hill Book Company,4th Edition, 2016.

REFERENCE

1. **Concepts of Modern Physics**,*Arthur Beiser*, McGraw-Hill Book Company, 6thEdition, 1987.
2. **Introduction to Atomic Spectra,***Harvey Elliott White*, Harcourt, Brace & World Inc.1968
3. **Molecular Structure and Spectroscopy,***G. Aruldhas*, Prentice Hall India, 2007.

PHS 3665 RENEWABLE ENERGY AND STORAGE (6 Cr, 6 Hrs)

Objectives: To enable the students

- To know the abundance of Solar radiation
- To understand the principle of conversion of solar energy into thermal and electrical energy
- To get exposed to various types of non-conventional energy sources
- To know the methods of energy storage and need for energy conservation

UNIT I: Energy Sources, Solar Radiations and its Measurements

Energy consumption – World's reserve of commercial energy sources and their availability – various forms of energy – renewable and conventional energy systems – fossil fuel availability – applications – merits and demerits

Solar constant –solar radiation at the earth's surface – solar radiation geometry – solar radiation measurements – pyranometer – pyrheliometer– sunshine recorder

UNIT II: Thermal and optical conversion methods

Solar water heating systems – solar cooling and refrigeration – solar thermal electric conversion (Low, Medium, High) – solar still – solar dryers – solar cooking – Photo voltaic conversion – Solar cell principle – types of solar cell – efficiency of solar cell – Solar Green houses

UNIT III: Solar Energy Collectors

Flat plate collectors(FPC) – concentrating collectors – working principle – Thermal loss in FPC – collector efficiency factor – Flow factor – effects of various parameters on performance – evacuated tube solar collectors – types of evacuated tube collector – working principle

UNIT IV: Non-Conventional Energy Sources

Wind energy: type of wind mills – their performance – total, maximum power & forces on the blades– Ocean Energy: OTEC – Open & Closed OTEC system – Waves: energy & power from waves – wave energy conversion by floats – Tides: energy from tides – single pool and modulated single pool tidal systems – Geothermal energy: Nature of Geothermal field – Geothermal sources – Biomass Energy: Photosynthesis – Biomass – Biogas generation – ethanol from wood – wood Gasification

UNIT V: Energy Storage and Energy Conservation

Solar pond – Energy extraction from solar pond – Solar energy storage – Types of storage: thermal – Electrical – Chemical – Mechanical – Hydrogen as a fuel – Fuel cells – working principle – super capacitors – Energy conservation and energy audit

TEXT

1. **Solar Energy Principles of Thermal Collection and Storage**, *S.P. Sukhatme*, 2nd Ed. McGraw Hill Publications, New Delhi, 2004.
2. **Non-conventional Sources of Energy,** *G. D. Rai*, 4th Edition, Khanna Publications, New Delhi, 2004.

REFERENCES

1. **Solar energy Fundamentals and Applications, *H.B.Garg and J.Prakash*,** First revised reprint,Tata McGraw-Hill Publications, 2016.
2. **Solar Energy Utilization**, *G. D. Rai*, Khanna publication, 1996.
3. **Power Plant Technology,** *M.M.El-Wakil*,Published by Tata McGraw-Hill Education, 1984.
4. **Solar Energy - Fundamentals, Design , Modeling and Applications,***G. N. Tiwari*, Narosa Publishing House, New Delhi, 2004.

PHS 3559 MEDICAL PHYSICS (5 credits, 5hrs/wk)

Objectives: To enable the students

- To understand the physical principles involved in biomedical instrumentation
- To know the principle and working of diagnostic instruments
- To understand the working of bio-potential recorders
- To know the working of modern imaging systems

Unit I: Bio-potential Electrodes

Transport of ions through the cell membrane – Bio-electric potential – design of Medical instruments – components of the bio-medical instrumentation systems – Electrodes

Unit II: **Bio signal Acquisition**

Transducers – Biomedical pre-amplifier – isolation amplifier – instrumentation amplifier – bridge amplifier – line driving amplifier – current amplifier – chopper amplifier – Bio-signal analysis

Unit III: Bio-potential Recorders

Characteristics of recording systems – Electrocardiograph(ECG) – Introductory idea about Electroencephalography – Electromyography, Electroretinography – Therapeutic instruments: Pace maker – Batteries – Artificial heart valves – Heart-Lung machine – Kidney machine

Unit IV: Specialized Medical Equipment and Safety Instrumentation

Blood flow meters – gas analyzers – Oxy-meter – Gluco meter – blood cell counters – Radiation detectors – digital thermometer - radiography – angiography – endoscopy. Radiation safety instrumentation – Physiological effects due to 50Hz current passage – microshock and macroshock

Unit V: Advances in Biomedical Instrumentation

X-ray machines and computer tomography – Magnetic resonance imaging system – Ultrasonic imaging systems – Computers in medicine – Lasers in medicine - biomaterials

TEXT

1. **Biomedical Instrumentation**, *Dr.M.Arumugam*, 2nd Ed, Anuradha Publications, 2006.
2. Biomedical Instrumentation and Measurement, *Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer,* Prentice Hall India Learning Private Limited; 2 edition, 2011.

REFERENCES

1. **Handbook of Biomedical Instrumentation**, *R.S.Khandpur***,**AvadhPrakashan, 1999.
2. **Instrumental methods of Analysis**, *Willard, Merritt, Dean and Settle*, 4th Ed, Hill Valley, California, 1996.

PHS3200 ENVIRONMENTAL STUDIES 4 Hrs – 2 Credits

Objectives:

- To provide knowledge about Eco system
- To understand bio diversity and conservation
- To learn about the consequences of various types pollution
- To acquire knowledge about the importance of environmental conservation and audit

UNIT 1: Ecosystem

Ecosystem / Biodiversity and its conservations – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Energy flow in the ecosystem – food chain, food webs and ecological pyramids. Introduction, types, characteristics features, structure and functions of pond ecosystem, forest ecosystem, Grass land ecosystem and Desert ecosystem.

UNIT 2: Biodiversity

Biogeographical classification of India – values of biodiversity – biodiversity at global, national and local levels – India as a mega diversity nation – Hot spots of biodiversity – conservation of biodiversity.

UNIT 3: Pollution and impacts

Pollution and environmental impacts: Fossil fuels and the environment – impacts due to non conventional energy sources – Green house effect – CFC – global warming and ozone depletion – Air pollution – effects – criteria of pollutants.

UNIT 4: Types of Pollution

Pollution and meteorology – Indoor air quality – water pollution – Noise pollution – Thermal pollution – nuclear hazards – acid rain – solid waste management – role of an individual in prevention of pollution – Disaster management – floods, earthquake, cyclone and landslides.

UNIT 5: Environmental conservation and Audit

Social issues / Human population and the environment –Water conservation assessment of risks – Environmental ethics – waste land reclamation – Environmental protection Act (Air Act, Water Act, Wildlife protection Act, Forest Conservation Act) – Environmental auditing – Public awareness.

TEXT:

1. Dr.Raman Sivakumar, Introduction to environmental science and engineering, Tata McGraw-Hill 2005.

REFERENCES

1. Erach Bharucha, Text Book of Environmental studies for under Graduate Courses, Universities Press, 2005.
2. Anjanayalu, A, Introduction to Environmental Science, BS Pub, Hyderabad,2004.

PHS 3662 PROJECT (6 cr, 6 hrs)

Objectives:

- To provide the students with an opportunity to acquire knowledge from various areas of physics and correlate their learning to specific areas of interest.
- To be able to work independently and also in collaboration with others.
- To work towards a time-bound goal.
- To learn to analyze the results and to communicate the outcomes, preparing them for the world outside.

Implementation

Students are given the freedom of choosing the topic of the project. It may be either theoretical or experimental. After getting approval for the proposed project work within first 5 sessions, students are supposed to carry out these projects in about 15 x 3 = 45 hrs in laboratory. After the first 5 classes, they must present the first report (Oral & Written). Then the second progress report and the final report are to be submitted at appropriate intervals of time.

Students are encouraged to take the work as a challenge, in order to facilitate the publication of their results leading scientific Journals.

Mark Distribution

		Marks	**Weightage**
Presentation of project proposal	-	20	10.0%
Continuous assessment for each class	-	100	50.0%
First progress report	-	10	5.0%
Second progress report	-	15	7.5%
Final progress report	-	25	12.5%
For the written & bound report	-	30	15.0%
		200	100%

PHS3664 COMMUNICATION SYSTEMS AND MICROPROCESSOR (6cr, 6hrs)

Objective: Enable the Students

- To understand the basic principles of modulation & demodulation
- To gain knowledge in digital communication, fibre optics communication and satellite communication
- To understand the architecture of microprocessor, the different instructions in microprocessor along with the assembly language
- To gain knowledge of interfacing techniques with microprocessor

Unit I: Amplitude and Frequency Modulation

Modulation – need for modulation – Amplitude modulation theory-frequency spectrum of AM – Representation of AM – Power relation in the AM wave – Generation of AM wave – Frequency modulation – Mathematical representation of FM – Frequency spectrum of the FM wave – FM Receivers – Basic FM Demodulators – Receiver types – Introduction to Phase modulation

Unit II: Digital Communication

Digital data transmission systems – coding and error control – Digital system classifications – Digital Communication – Modem classification, Modem interfacing, Network organizations, Switching systems, Network protocols – Pulse Amplitude Modulation – Pulse Width Modulation – Pulse Position Modulation

Unit III: Optical and Satellite Communication

Optical communication – Optical fibre characterization – Optical transmitters and receivers – Satellite Communication – the INTELSAT network – Satellite classes and Station keeping – TDMA-TDMA Synchronization techniques

Unit IV: Architecture and Instructions of 8088 Microprocessor

Internal architecture of 8088 microprocessor and pin diagram – pipelining, memory timing diagram – Addressing modes – Data transfer instruction, Arithmetic and logic instructions, Program Control instruction – Simple assembly language programs

Unit V: Basic I/O Interface

Programmable Peripheral interface PPI 8255A, Programmable Interval Timer 8253 (PIT) – Programmable Direct Memory Access Controller 8237 A – Stepper motor and Seven Segment Display interface

TEXT

1. **Electronic communication systems,** *George Kennedy*, 3rd Ed, Tata-McGraw-Hill New Delhi, 2001.
2. **Intel Microprocessors – Architecture programming and interfacing,** *Barry B.Brey*,4th Ed, Prentice Hall of India Pvt. Ltd., 1997.

REFERENCES

1. **Analog and Digital Communication Systems,** *Martin S. Roden*, 3rd Edition, Prentice – Hall, India,1999
2. **Communication Systems,** *B.P.Lathi*, Wiley Eastern Limited, India,2002
3. **Fibre Optics through Experiments,** *A.K.Ghatak and M.R.Shenoy*, Viva Books Private Limited, New Delhi, 2005.
4. **The 8088 and 8086 Microprocessors Programming, interfacing software hardware and applications,** *Walter A. Tribal and Avtar Singh*,Prentice Hall of India Pvt. Ltd., 1997.

PHS 3556 NUCLEAR PHYSICS (5credits, 5 hrs/wk)

Objective: Enable the students

- To know about radiation detector and nuclear reactors
- To understand nuclear structure
- To understand the phenomenon of radioactivity
- To know about the basics of elementary particles

Unit I: Structure and properties of Nucleus

Nuclear mass – Bainbridge mass spectrometer – mass defect – binding energy – packing fraction – stability – size – nuclear forces – meson theory – isotopes – isobars – liquid drop model – semi empirical mass formula –predictions of shell model – Fermi Gas model

Unit II: Radioactive Decay

Law of radioactive disintegration – law of successive disintegration - transient and secular equilibrium – carbon dating – age of earth – alpha decay: Gamow theory – beta decay: Fermi theory – neutrino theory – gamma decay: nuclear isomerism – internal conversion

Unit III: Radiation detectors and accelerators

GM counter – bubble chamber – Wilson cloud chamber – photographic emulsion – accelerators: – linear accelerators – cyclotron – synchrocyclotron – betatron

Unit IV: Nuclear reactors

Q value equation for nuclear reaction – types of nuclear reactions - nuclear transmutation - nuclear fission – chain reaction – nuclear reactor – four factor formula – safety featurers – atom bomb – nuclear fusion thermonuclear reactions

Unit V: Elementary particles

Classifications of elementary particles – particle interactions – conservation laws – CPT theorem - elementary particle symmetry –quark model

TEXT

1. **Nuclear Physics,** *D.C.Tayal*, Himalaya Publishing House, Mumbai, 1995
2. **Elements of Nuclear Physics** , *M.L. Pandya and R.P.S Yadav*, Kedar Nath Ram Nath publications,2017

REFERENCE

1. **Nuclear Physics -An Introduction,** *S. B. Patel*, Wiley Eastern Ltd, 2012.
2. **Nuclear Physics,** *H.S Hans*, New Age International publishers, 2001.
3. **Introductory to Nuclear Physics**, *Samuel S.M.Wong*, Wiley India Pvt Ltd; Second edition 2013.

PHS 3668 SOLID STATE PHYSICS (6credits, 6hrs/wk)

Objectives: To Enable the Students

- To know various Bravais lattice crystals
- To understand the theory of crystal binding and phonon
- To gain knowledge in the Physics of semiconductor devices
- To understand the theory of super conductors

Unit I: Crystal Structure

Crystal lattice – basis - Bravais lattice - crystal planes and Miller indices – unit cells – typical crystal structures – packing fraction – diffraction of waves by crystals – Bragg's law – reciprocal lattice vectors – diffraction condition – Brillouin zones – reciprocal lattice to SC, BCC and FCC lattice – structure factor of BCC and FCC lattice – atomic form factor

Unit II: Crystal Binding and Phonon

Crystals of inert gases – cohesive energy – ionic crystals – covalent crystals – metallic crystals – hydrogen-bonded crystals - Vibrations of crystals with mono-atomic and diatomic basis – phonons – primary scattering mechanisms

Unit III: Energy Bands

Free electron theory in 1D and 3D – Fermi-Dirac distribution – Fermi energy – heat capacity of electron gas – electrical conductivity and Ohm's law – motion of electrons in magnetic field – Hall effect – energy bands - nearly free electron model – origin of band gap – Bloch functions – Kronig-Penney model – classification of materials into metal, semiconductor and insulator

Unit IV: Superconductors

Destruction of superconductivity by magnetic field – Meissner effect – isotope effect – type-I and type-II superconductors – London equation – coherence length – BCS theory of superconductivity – flux quantization – DC and AC Josephson effect – high temperature superconductors

Unit V: Defects and Dislocations

Lattice Vacancies – Diffusion - Colour centers – strength of alloys – general considerations – Hume - Rodhery rules – order - disorder transformation – phase diagram – Kondo effect

TEXT

1. **Introduction to Solid State Physics**, *Charles Kittel,*7^{th} edition, John – Wiley, 1996
2. **Principles of Solid State ,** *H.V.Keer***,** New Age International (P) Limited, Publishers, First edition 2005.

REFERENCES

1. **Solid State Physics,** *S.O. Pillai,*New Age International (P) Limited, Publishers, 1997
3. **Solid State Physics**, *M. A.Wahab,*Narosa Publishing House, Delhi, 1999.
4. **Introduction to Superconductivity**, *A.C. Rose-innesand E.H. Rhodrick,* Paramount Press, 1978

PHS 3231 PHYSICS IN MUSIC (2credits, 3hrs/wk)

Objectives: To Enable the Students

- To know the basics of sound production and perception
- To understand the theory of acoustic waves
- To acquire knowledge about the sound characteristic of musical instruments
- To understand the properties of sound waves

Unit I: Characteristics of sound waves

Vibrations – periodicity – pitch and frequency – Vibrations in musical instruments – digital sampling– waveforms –resonance – Harmonics (overtones) – spectra and timbre

Unit II: Waves and Properties of Sound

Waves– wave motion – sound propagation – echoes – interference and beats – Sound intensity – Decibel Hearing and the human ear – loudness and intensity – dependence of loudness on pitch

Unit III: Musical Instruments

Piano keyboard – scales and intervals – Natural modes of vibration – standing waves percussion instruments – Strings – Pipes – woodwinds – brass – digital synthesis

Unit IV: Acoustics

Acoustics of buildings: Reverberation and time of reverberation – Absorption co-efficient – Sabine's formula – Measurement of Reverberation time – Acoustic aspects of halls and auditoria

Unit – V: Human Voice – Production and Perception

The human voice – Sound perception and illusion – Binaural effects – Critical bands – masking

TEXT

1. **Musical Acoustics**, *Donald E. Hall*, 3rd edition, Brooks-Cole Publishing Co., California, 2002

REFERENCES

1. **Waves and oscillations**, *Brij Lal and N Subrahnamyam*, Vikas Publishing House Pvt Limited, 2009
2. **The Science of Sound**, *Thomas D. Rossing*, 3rdEdition, Addison-Wesley, 2002
3. **The Acoustical Foundations of Music**, *John Backus*, 2ndEdition, (Norton and Co. 1977
4. **The Physics of Musical Instruments**, *N.H. Fletcher and T.D. Rossing*, 2ndEdition, Springer 1998

PHS 3232 Digital Photography (2 credits, 3 hrs/wk)

Objective: Enable the students

- To comprehend the principle and accessories of Photography
- To understand the fundamentals of digital photography
- To comprehend and apply the basic tools of digital editing
- To impart technical knowledge

Unit I: History of photography

Camera, Pin hole camera – Different types of camera, Dark room, Dark room accessories – developer – fixer – Printing machine – developing film and paper.

Unit II: Lenses and Defects

Lens types –normal, wide angle, telephoto and zoom lenses – lens defects– spherical aberration – chromatic aberration – coma - astigmatism – flare

Unit III: Digital Photography fundamentals

Light Magnification – Power of lenses- Brightness and f-ratios – Field of view – Aperture and stops – shutter speed – Exposure triangle – Focus modes – Light – Flash - Composition – Framing and Layering.

Unit IV: Modern Techniques

Image recording using video camera – editing – mixing – recording using digital camera - pixel– transfer to computer – use of Photoshop –Digital Printers - printing images

Unit V: Digital Editing

Images and Graphic design – to open images from multiple sources – work with layers – masking – other non-destructive edits –adjusting the luminance – correcting color – retouching and healing- sharpening images.

Text

1. **Fundamentals of Photography**, C.B. Neblette van NostrandReinttold Co., 1970.
2. **Abode Photoshop 6 Studio**, Prentice Hall of India Pvt. Ltd.2000
3. **The digital photography**, *Scott Kelby*, published by New Riders, 2008.

References

1. **The Art of Photography**, *Bruce Barnbaum*,published by Rocky Nook, 2011
2. **The Photoshop CS book for Digital Photographers**, *Scott Kelby*,published by New Riders (2003).

U.G. DEPARTMENT OF CHEMISTRY (SF)

Program for Choice Based Credit System - 2015 – 2016

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
1	I	TAM/FRE/HIN		3	2	30
1	II	ENS 1201	Conversational Skills	3	2	30
1	IIIC	CHS 1511	Physical Chemistry – 1	5	5	75
1	IIIC	CHS 1513	Inorganic Chemistry – 1	5	5	75
1	IIIC	CHS 1331	Inorganic Quantitative Analysis	3	3	45
1	IIIS	PHY	Physics	5	4	60
1	IV	NME 1	Non Major Elective-1	3	2	30
1	IV	LS 1	Life Skill-1	3	2	30
1	V		NSS/PED/SLP			
			Total	30	25	405
2	I	TAM/FRE/HIN		3	2	30
2	II	ENS 1202	Reading & Writing Skills	3	2	30
2	IIIC	CHS 1512	Organic Chemistry –1	5	5	75
2	IIIC	CHS 1514	Inorganic Chemistry – 2	5	5	75
2	IIIC	CHS 1332	Organic Analysis and Preparation	3	3	45
2	IIIS	PHY	Physics	5	4	60
2	IV	NME2	Non Major Elective-2	3	2	30
2	IV	LS 2	Life Skill-2	3	2	30
2	V		NSS/PED/SLP			
			Total	30	25	405
3	I	TAM/FRE/HIN		3	2	30
3	II	ENS 2201	Study Skills	3	2	30
3	IIIC	CHS 2511	Organic Chemistry – 2	5	5	75
3	IIIC	CHS 2513	Inorganic Chemistry – 3	5	5	75
3	IIIC	CHS 2515	Physical Chemistry – 2	5	5	75
3	IIIC	CHS 2431	Inorganic Qualitative Analysis	4	4	60
3	IIIS	MAT/BCH		5	4	60
3	V		NSS/PED/SLP			
			Total	30	27	435
4	I	TAM/FRE/HIN		3	2	30
4	II	ENS 2202	Career Skills	3	2	30
4	IIIC	CHS 2512	Organic Chemistry – 3	5	5	75
4	IIIC	CHS 2514	Inorganic Chemistry – 4	5	5	75
4	IIIC	CHS 2516	Physical Chemistry – 3	5	5	75
4	IIIC	CHS 2432	Organic Estimation & Gravimetric Analysis	4	4	60
4	IIIS	MAT/BCH		5	4	60
4	V		NSS/PED/SLP			
			Total	30	27	435

SEM	Part	Course No.	Course Title	Hours	Credits	Marks
5	IIIC	CHS 3611	Organic Chemistry - 4	6	6	90
5	IIIC	CHS 3613	Inorganic Chemistry - 5	6	6	90
5	IIIC	CHS 3615	Physical Chemistry - 4	6	6	90
5	IIIC	CHS 3531	Physical Chemistry Lab	5	5	75
5	IV	CHS 3200	Environmental Studies	4	2	30
5	IV		Life Skill - 3	3	2	30
			Total	30	27	405
6	IIIC	CHS 3612	Organic Chemistry - 5	6	6	90
6	IIIC	CHS 3614	Applied Chemistry	6	6	90
6	IIIC	CHS 3616	Physical Chemistry - 5	6	6	90
6	IIIC	CHS 3532	Special Lab Techniques	5	5	75
6	IV	VAL	Value Education	4	2	30
6	IV		Life Skill - 4	3	2	30
			Total	30	27	405
			Grand Total	180	158	2430

LIFE SKILL COURSES

Sem	Part	Course No	Course Title	Hours	Credits	Marks
1	IV	CHS 1271	Cosmetics and Consumer Products	3	2	30
2	IV	CHS 1272	Chemistry in Crime Investigation	3	2	30
5	**IV**	**CHS 3215**	**Medicinal Chemistry**	**3**	**2**	**30**
6	**IV**	**CHS 3218**	**Food processing and preservation**	**3**	**2**	**30**

CHS3611 ORGANIC CHEMISTRY – IV 6 credits/6 hours

The primary objective of this course is to learn and appreciate the role of chemistry in nature. It is designed to systematically study the various biological aspects pertaining to proteins, enzymes, lipids, nucleic acids, carbohydrates, alkaloids and terpenoids.

Unit – I Proteins and Enzymes 15 hrs

Aminoacids – classification, structure and stereochemistry – Zwitter ion – isoelectric point – electrophoresis – preparation and reaction of amino acids – structure and Nomenclature of peptides and proteins – classification – determination of structure of peptide – end group analysis – classical peptide synthesis – solid phase peptide synthesis – protein structure (1^o, 2^o, 3^o and 4^o) – protein denaturation and renaturation.

Enzymes – specificity – prosthetic group – co-enzyme, apoenzyme, holoenzyme, co-factor – nomenclature and classification of enzyme – typical enzymes – sources – mode of enzyme action – enzyme inhibition – application of enzymes.

Unit – II Nucleic acids and Lipids 15 hrs

Constituents of nucleic acids – bases, sugars, nucleotides, nucleosides – laboratory synthesis of nucleosides and nucleotides – DNA, RNA – genetic code and heredity.

Lipids – classification – oils and fats – structure, chemical reactions, physical characteristics, rancidity, acid value, saponification value, iodine value, RM value, hydrogenation of oil

Unit – III Carbohydrates 15 hrs

Classification and nomenclature – monosaccharide and their configuration – erythro and threo – diasteromers – epimers – anomers – cyclic structure of monosaccharides – determination of ring size – mechanism of mutarotation – glycosides and their hydrolysis – formation of ethers and esters – reducing and non – reducing sugars – mechanism of osazone formation – interconversion of aldoses and ketoses – ascending and descending the sugar series – an introduction to disaccharide (sucrose, maltose and lactose) and polysaccharide (starch and cellulose).

Unit – IV Alkaloids 15 hrs

Nomenclature and classification – occurrence and extraction – general methods of structural elucidation of Coniine, Nicotine, Piperine and Atropine.

Unit – V Terpenoids 15 hrs

Occurrence of terpenoids – classification – isoprene rule – structural elucidation of Citral, Limonene, Menthol and Camphor.

Text Book:

M.K. Jain and S.C. Sharma, Textbook of Organic Chemistry, Vishal publishing Co, 2012, IV (Revised edition).

Reference:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemistry, Pearson publication, 7th edition, 2012.
2. B. Mehta and M. Mehta, Organic Chemistry, Prentice – Hall of India Private limited,2007.
3. P.L. Soni and H.M. Chawla,Textbook of Organic Chemistry , Sultan Chand and Sons, 28th edition, 2007.
4. I.L. Finar, Organic Chemistry, Vol.I, ELBS publication, 6th edition, 2002.

CHS 3613 INORGANIC CHEMISTRY – V 6 credits/6 hours

This course exposes the students to the developing areas of organometallic catalysis and bioinorganic chemistry. It also imparts knowledge about the radioactivity and nuclear reactions**.**

Unit – I Organometallic chemistry 15 hrs

Organometallic ligands – types of organometallic compounds – organometallic compounds of group 12 – 15 elements – metal complexes with pi – acceptor ligands – π acidity – metal carbonyls – types – EAN rule – theoretical basis – synthetic methods, reactivities, structure and bonding in $Ni(CO)_4$, $Fe(CO)_5$, $Cr(CO)_6$, $Co_2(CO)_8$ and $Mn_2(CO)_{10}$ – synergism – vibrational spectra – mixed carbonyls – compounds with multinuclear centres – alkene complexes – carbocyclic systems – ferrocene – preparation, properties, structure and bonding (VB explanation).

Unit – II Reactions and mechanism of coordination compounds. 15 hrs

Lability and inertness – interpretation in terms of VBT – acid hydrolysis of octahedral complexes – S_N^1 and S_N^2 mechanism – factor influencing – base hydrolysis of octahedral complexes – S_N^1CB mechanism – evidences – stereochemistry of intermediate of base hydrolysis – trans effect – π-bond theory – applications – transition metal complexes as catalyst – Wilkinson's catalyst – Ziegler-Natta catalyst – their catalytic cycles.

Unit – III Bioinoganic chemistry 15 hrs

Essential and non – essential metals – oxygen carriers – hemoglobin, myoglobin, hemocyanin – metalloenzymes – cyanocobalamine – carbonic anhydrase ,cytochrome P-450 – role of alkali metals – sodium ion pump – alkaline earth metals – toxicity of Hg, Pb, Cr – metals in medicine and diagnosis – chelate therapy, invivo fixation of nitrogen.

Unit – IV f – Block elements 15 hrs

Lanthanide series – occurrence – properties – electronic configuration, oxidation state – ionic radii – lanthanide contraction – colour , spectra, magnetic properties – complexes of lanthanides – separation of lanthanides – Actinide series – transuranic elements – properties – electronic configuration, oxidation state, ionic radii, colour – comparison with lanthanides – extraction of thorium– extraction of uranium – compounds of uranium – uses of lanthanides – plutonium as source of energy.

Unit – V Nuclear chemistry 15 hrs

Nuclear particles – nuclear forces – packing fraction – mass defects and binding energy of nucleus – stability of nucleus – nuclear models – liquid drop model – nuclear reactions – Q values – spallation – nuclear fission – atomic bomb – the concepts of critical mass – nuclear fusion – Hydrogen bomb – radioactivity – artificial transmutation – half life period – radioactive displacement laws – modes of decay – applications of radioactivity – nuclear reactors – measurement of radioactivity – GM counter – Wilson cloud chamber – nuclear accelerator – cyclotron.

Text book:

B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers (2012)

References:

1. Lee. J.D, Concise Inorganic chemistry, V edition, Chapman and Hall Ltd, London (2000)
2. Cotton F.A., Wilkinson G., Basic Inorganic Chemistry, III Edition, John Wiley and Sons, Singapore (2004)
3. James. E. Huheey., Keiter E.A., Keiter R.L, Inorganic chemistry, IV edition, Pearson Education, (Singapore), Delhi (2005)
4. Gopalan R., Ramalingam V, Concise Coordination Chemistry, Vikas Publishing house, New Delhi, (2006)
5. Hay R.W, Bioinorganic Chemistry, Ellis Horwood (1984)
6. Bertini, Lippard, Gray, Bioinorganic Chemistry, Viva Book Pvt. Ltd (1998)
7. Arniker H .J., Essentials of Nuclear Chemistry, IV Edition, New Age International Ltd., New Delhi (1995)

CHS3615 PHYSICAL CHEMISTRY – IV 5 credits/6 hours

This course provides basic information regarding classical and quantum mechanical treatment of atom and nature and behavior of light. Nano chemistry gives an overall view on the concepts and applications in day today life. Outline on the macromolecule is dealt along with various methods of analysis of the same. Along with introducing phase rule, examples of each system have been covered.

Unit – I Quantum Mechanics – I 15 hrs

Dual nature of light – photoelectric effect, Compton effect – dual nature of electron – de Broglie relationship – Davison and Germer experiment – Heisenberg's uncertainty principle – Electron, Charge, Mass – Milliken's oil drop technique – Rutherford's experiment – Mosley's experiment – Rutherford's model – Radiant energy – electromagnetic spectrum – black body radiation – Plank's distribution law – hydrogen spectrum – Ritz combination principle – Bohr's model of hydrogen atom and their comparison – Sommerfeld's extension of Bohr theory – failure of Sommerfeld theory.

Unit – II Quantum Mechanics – II 15 hrs

Time independent Schrödinger equation – Postulates of quantum mechanics – Operators in quantum mechanics – interpretation of wave function – operators – eigen values – orthonormal function – discussion of particle in a box problem (1D and 3D) – rigid rotor – simple harmonic oscillator(no derivation) – Bohr's correspondence principle – hydrogen atom problem – Schrödinger equation in polar coordinates – separation of variables – electron spin – Zeeman effect – spherical harmonics – radial distribution curve

Unit – III Macromolecules 15 hrs

Different types of polymers – classification of polymers – molecular weight of polymers – number average and weight averages – determination of molecular weight of polymer – viscosity, osmotic pressure – ultracentrifuge, sedimentation methods and light scattering methods – Conducting polymers: elementary ideas – polyacetylene, poly anilines.

Unit – IV Phase Diagram 15 hrs

Introduction – terminology – Gibb's phase rule and its derivation – one component system – water, sulphur, helium systems – freezing point curves – two component system – simple eutectic systems – Lead-Silver, Potassium Iodide-water system – two component system with compound formation – congruent and incongruent melting points – Zn-Mg, Ferric Chloride-water, sodium sulphate-water systems, Copper sulphate-water systems, industrial applications.

Unit – V Nano Chemistry 15 hrs

Nano and Nature – Nano: The beginning (1D, 2D and 3D) – Fullerenes – introduction – experimental set up to detect C_{60} – Carbon nanotubes – types – physical properties and applications – Difference between Langmuir Blodgett and self assembly techniques – Applications of Self assembled monolayers (SAMs) – Nanomedicines – nanoshells – nanopores – tectodendrimers

Text book:

Principles of Physical Chemistry, B. R. Puri, L. R. Sharma, and M. S. Pathania, 44th edition, Vishal Publishing company, 2010.

References:

1. Principles of Physical Chemistry, Puri, Sharma and Pathania, Vishal Publishing Co., 2014.
2. Textbook of Physical Chemistry, P.L. Soni, O.P. Dharmandam,
3. Essential of Physical Chemistry, Arun Bahl, B.S. Bahl and G.D. Tuli, S. Chand, 2014,
4. Physical Chemistry, G.W. Castellan, 3rd edition, Addison – Wesley, 1983.
5. Physical Chemistry, 8th edition, P.W. Atkins and J.de Paula, Oxford University press, 2008.
6. Inorganic Chemistry, 5th edition, P.W. Atkins, Oxford University press, 2009.
7. Nano: The essentials: Understanding Nanoscience and Nanotechnology, T. Pradeep, Tata McGraw Hill publishing company, 2008.

CHS3531 PHYSICAL CHEMISTRY LAB 5credits/5hrs

This laboratory course imparts knowledge in the various fields of physical chemistry such as adsorption, chemical kinetics, phase equilibria, potentiometric and conductivity measurements etc.

1. Equivalent conductance – verification of Onsager equation
2. Conductometry – i) Titration of strong acid Vs strong base
   ii) Titration of weak acid Vs strong base
3. Potentiometry – redox titrations
4. Validity of Freundlich adsorption isotherm
5. Kinetics of acid catalysed hydrolysis of ester
6. Kinetics of Iodination of acetone
7. Critical solution temperature – phenol – water system
8. Phase diagram – simple eutectic system
9. Transition temperature – Thermometric method
10. Heat of solution – Solubility method

CHS3612 ORGANIC CHEMISTRY – V 6 credits/6 hours

This course is designed to study the application of basic spectroscopic techniques in structural elucidation of organic compounds. Students will be trained in theoretically analyzing the photochemical and thermal changes of organic compound. This course will also provide basic knowledge on uses and preparation of dyes, organometallic and active methylene compounds

Unit – I UV-Vis, IR spectroscopy and Mass spectrometry 15 hrs

UV- Visible spectroscopy

Types of electronic transitions – Beer Lambert's law – terminologies used in UV Visible spectrum – seleection rules – effect of conjugation – effect of solvent – Woodward – Fieser rules – dienes and enones – applications of UV – Visible spectra.

IR Spectroscopy

Selection rules – Hooke's law – different molecular transitions – factors affecting vibrational frequencies – characteristic frequencies of important functional groups – Finger print region – Examination of IR spectra.

Mass Spectrometry

Basic principle – molecular ion peak – nitrogen rule – terms used in mass spectra (m/e, $M^{+\cdot}$ etc..) – isotopic pattern – even– electron rule – general rules of fragmentation – fragmentation pattern (alkane, alcohol, alkyl halide, aryl halide, aldehyde and ketone)

Unit – II NMR spectroscopy 15 hrs

^{1}H NMR Spectroscopy

Theory – relaxation processes – shielding, deshielding and chemical shift – factors affecting chemical shift – peak area and proton counting – splitting of signals and coupling constants – chemical and magnetic equivalence – simple problems in ^{1}H NMR.

^{13}C NMR Spectroscopy

Basic principles – Off resonance and Broad band decoupling techniques

Unit – III Pericyclic reactions 15 hrs

Photochemical vs thermal reactions – MO theory – LCAO method – bonding and antibonding MO's – electronic configuration of some molecules – 1,3 – butadiene – allyl systems – benzene – Woodward – Hofmann rules – electrocylic, cycloaddition and sigmatropic reactions using FMO

Unit – IV Dyes, Color and Constitution 15 hrs

Color and structure – Witt theory – Quinonoid theory – Modern theory – Classification of dyes (based on structure, based on its mode of application on fabrics) – Preparation and application of dyes – Methyl orange, Congo red, Bismuth brown, Malachite green, Phenolphthalein, Eosin, Fluorescein

Unit – V Organometallic and Active methylene compounds 15 hrs

Organometallic reagents – organomagnesium, oganozinc, organolithium, organocopper, and organosilicon – preparation and reactions.

Reactions and synthetic applications of active methylene compounds – diethylmalonate, ethyl acetoacetate, cyanoacetic ester

Text Book:

M.K. Jain and S.C. Sharma, Textbook of Organic Chemistry, Vishal publishing Co, IV (Revised edition), 2012.

Reference:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemistry, Pearson publication, 7th edition, 2012.
2. B. Mehta and M. Mehta, Organic Chemistry, Prentice – Hall of India Private limited,
   2007.
3. P.L. Soni and H.M. Chawla,Textbook of Organic Chemistry , Sultan Chand and Sons, 28th edition, 2007.
4. JagMohan, Organic spectroscopy: Principles and applications, Narosa publishing House, 2nd edition, 2005

CHS3616 PHYSICAL CHEMISTRY – V 6 credits/6 hours

The students get to know the principles of various spectroscopic analytical tools available for analysis of chemical compounds. Derivations of the spectroscopic methods are taught at basic level to enhance the student's knowledge on the roots of these available techniques. The chemistry point of group theory is presented at the introductory level with some applications. It also covers various photo chemical pathways and their applications.

Unit – I Spectroscopy – I 15 hrs

Molecular Spectroscopy: Introduction – regions of the spectrum – basic elements of practical spectroscopy – signal to noise ratio – resolving power – the width and intensities of spectral lines.

Microwave Spectroscopy: The rotation of the molecules – rotational spectra of diatomic molecules – linear polyatomic molecules.

IR Spectroscopy: Vibrating diatomic molecules – simple harmonic and unharmonic – diatomic vibrating rotator –Born Oppenheimer approximation – breakdown – vibrations of polyatomic molecules – overtones and combinations – analysis of IR spectra – skeletal vibrations and characteristic group vibrations – Instrumentation

Unit – II Spectroscopy – II 15 hrs

Raman Spectroscopy: Introduction – molecular polarizability – selection rules – pure rotational Raman spectra – linear molecules – vibrational Raman spectra – mutual exclusion principle – structural determination from Raman and IR spectra - nitrate, carbonate

Electronic spectra of diatomic molecules – Franck-Condon principle – dissociation constant of a diatomic molecule.

PES – principles of photoelectron spectroscopy and its applications

Unit – III Spectroscopy – III 15 hrs

NMR spectroscopy: basic principle – instrumentation – chemical shifts – spin – spin coupling

ESR spectroscopy: basic principle – hyperfine structure – presentation of ESR spectra – nitrogen rule – g-factor – splitting – applications of ESR spectroscopy – comparison between ESR and NMR

Mossbauer Spectroscopy: introduction, principle and applications

Unit – IV Group Theory 15 hrs

Properties of a group – group multiplication table – cyclic groups – subgroups – classes – symmetry elements and operations and its relation to optical activity – symmetry point groups – identification of point groups – matrices of geometric transformations – representations of groups – reducible and irreducible representations – rules governing irreducible representation and their characteristics – relationship between reducible and irreducible representations – character tables C_{2v}, C_{3v}, C_{2h} – group theoretical selection rule in vibrational spectroscopy.

Unit – V Photochemistry 15 hrs

Photochemical and thermal reactions – comparison – Jablonski diagram – laws of photochemistry – Grotthus-Draper law – Stark- Einstein law – photochemical reactions in solution – Beer-Lambert's law – limitations – Quantum yields – Determination of Quantum yields – Photochemical rate law – kinetics of HBr and HCl formations – photochemical equilibrium – Photochemical process – secondary photochemical processes – photosensitization – Quenching – Stern-Volmer equation – photosynthesis – chemiluminescence – laser and maser – applications of laser

Text book:

Principles of Physical Chemistry, B. R. Puri, L. R. Sharma, and M. S. Pathania, 44th edition, Vishal Publishing company, 2010.

References:

1. Principles of Physical Chemistry, Puri, Sharma and Pathania, Vishal Publishing Co., 2014.
2. Textbook of Physical Chemistry, P.L. Soni, O.P. Dharmandam,
3. Essential of Physical Chemistry, Arun Bahl, B.S. Bahl and G.D. Tuli, S. Chand, 2014.

4. Physical Chemistry, G.W. Castellan, 3rd edition, Addison – Wesley, 1983.
5. Physical Chemistry, 8th edition, P.W. Atkins and J.De Paula, Oxford University press, 2008.
6. Fundamentals of Molecular Spectroscopy, 4th edition, C.N. Banwell, Tata McGraw Hill publications, 1995.
7. Chemical applications of Group theory, 3rd edition, F.A. Cotton, Wiley, 1990.

CHS 3614 APPLIED CHEMISTRY 6 credits/6 hrs

This course deals with the application of various chemical concepts in different fields. Ideas pertaining to the techniques of water treatment for domestic purpose, polymers and paints in our daily life are discussed. Also the chemistry behind fertilizers, ceramics and refractory materials will be covered. Through this course the students will be able to appreciate the significance of their knowledge of chemistry in their day to day life.

Unit – I : Water Treatment 15 hrs

Hardness of water – temporary hardness, permanent hardness – Units of hardness – Estimation of hardness – EDTA method – Estimation of total hardness – Water softening methods – Lime–Soda process, Zeolite process, Ion – exchange – Desalination – Reverse osmosis – Potability of water – Plumbosolvency – Nano filters

Unit – II : Polymers 15 hrs

Synthetic polymers – Preparation, properties and uses of Polyethylene, PVC, Teflon, Nylon, Phenol formaldehyde, Urea Formaldehyde, Epoxy resin

Rubber – natural and synthetic – vulcanisation

Biodegradable polymers – classification – biomedical applications – medical sutures, pins, dental implants

Biostable polymers – Biomedical applications – cardiovascular applications – bones, joints, dental polymers – contact lenses and IOL – hemodializer materials – tissue engineering polymers – controlled release of drugs – polymeric blood substitutes – Nano biopolymers and application

Unit – III : Fertilizer 15 hrs

Plant Nutrients – nutrients functions – need and requirements of fertilizers – classification – Nitrogenous fertilizers – types, preparation and uses – Phosphate fertilizers – types, preparation and uses – Potassium fertilizers – NPK fertilizers – ill effects of fertilizers – Biofertilizers – manures, compost, sawdust, biogas manures – Nano fertilizers – elementary ideas and uses

Unit – IV : Ceramics and Refractories

Ceramics – properties and types – basic raw materials – Clay – formation, types, properties – Glazing – Porcelain and China

Refractories – classification, properties – super refractories – preparation, properties and uses of Silicon carbide, graphite, oxides, Cermets, insulating refractories

Nano ceramics – elementary ideas and applications

Unit – V : Paints and Explosives **15 hrs**

Paints – classification – constituents – Pigment Volume Concentration – Distember – Varnishes – Lacquers - Pigments – name and formula of different coloured pigments and their uses – Toners – Nano paints

Explosives – classification – characteristics – chemistry of Nitrocellulose, nitroglycerine, gun powder, RDX – Toxic chemicals – important requirements – mustard gas, phosgene, nerve gas, adamsite, chloroacetophenone, chloropicrin – Screening smokes – Incendiaries - Pyrotechniques

Text book:

1. Industrial Chemistry, B.K.Sharma, 7th edition, 1995, ISBN – 8185842531, GOEL publishing house.

Reference books:

1. Environmental Chemistry, A.K. De, 4th edition, 2000, New Age International (P) Ltd.
2. Applied Chemistry, K. Bagavathi Sundari, 2006, ISBN 818094025X, MJP publishers. (Unit – 2)
3. Contemporary Polymer Chemistry, Harry R. Allcock, Frederick W. Lampe, James E. Mark, 3rd edition, 2005, Pearson Prentice hall. (Unit – 2)
4. Fundamental Concepts of Applied Chemistry, Jayashree Ghosh, 2nd edition, 2006, S. Chand publishing. (Unit – 3)

CHS 3532 SPECIAL LAB TECHNIQUES 5 credits/5hrs

This course deals with the various techniques like chromatography, viscosity, optical, emf and pH measurements etc. Students will be trained in analyzing commercial samples.

1. Column chromatography
2. Paper chromatography
3. Thin layer chromatography
4. Polarimetry – Inversion of sucrose
5. Ostwald viscometer – Measurement of Viscosity of liquids
6. Potentiometry – Dissociation constant of weak acid
7. Spectrophotometer – Validity of Beer – Lambert's law
8. Standardisation of pH meter and dissociation constant of weak acid
9. Conductometry – Titration of strong acid and weak acid in a mixture Vs strong base
10. Saponification value of an oil.

CHS 3200 ENVIRONMENTAL STUDIES 2 Credits/4 hrs

In this course various types of pollutions, different types of pollutants the need and ways of controlling them will be discussed. Socio-environmental issues will also be dealt with.

Unit – I Introduction 10 hrs

Definition, scope, awareness – concept of environmental receptors, sink, pathways of pollutants speciation, environmental segments.

Composition of the atmosphere – atmospheric structure – formation of inorganic and organic particulate matters – photochemical reactions

Unit – II Ecology 10 hrs

Definition and kinds, biological cycles – Natural resources, renewable and non – renewable resources – food resources – mineral resources – forest resources – role of an individual in conservation of natural resources.

Unit – III Water and Soil Pollution 10 hrs

Source – BOD, COD, sewage treatment, primary and secondary treatment – industrial waste water treatment. Potable water and their standards. Soil pollution – treatment of soil pollution – disposal of radioactive waste

Unit – IV Air Pollution 10 hrs

Pollutants –particulate pollution – smog, acid rain – global warming – green house effect – metal pollution – monitoring of air pollution. Thermal and radioactive pollution – source – nuclear power plant. Noise pollution – source and effect. Noise level index

Unit – V Socio-environmental issues 10 hrs

Environmental act: air and water – wild life protection act – forest conservation act – issues involved in enforcement of environmental legislation. Human population and environment – population growth – variation among nations – population explosion – family welfare program – environment and human health – human rights – women and child welfare – value education – role of information technology in human health – case study.

References:

1. B.K. Sharma and H. Kaur, Environmental Chemistry, Goel Publishing House, Meerut, 1996.
2. H.Kothandaraman and G.Swaminathan. Principles of Environmental Chemistry. B.I. Publications, Chennai, India. 1997.
3. A.K.De, Environmental Chemistry. 4th Edition, New Age International (P) Ltd., New Delhi, India. 2000.
4. Abnubha Kaushik, C.P.Kaushik "Perspectives in Environmental Studies" New Age International Publishers, 3rd Edition, 2009.
5. S.S. Dara, A Textbook of Environmental Chemistry and Pollution Control, 8th Edition, S. Chand and Sons, New Delhi, 2008.

CHS 3215 MEDICINAL CHEMISTRY 2 Credits/3 hrs

This course intended to impart knowledge about the development of drugs and the need for conversion of drugs into medicines. This course also deals with pharmacokinetics, pharmacodynamics and pharmaceutical marketing.

Unit – 1 Basic Concepts 8 hrs

Drug – definition – requirements of an ideal drug – history of drug development – nomenclature of drugs – classification of drugs based on Sources, Chemical structure and Therapeutic actions. – Terminologies – pharmacology, pharmacy, pharmaceutics, toxicology, chemotherapy, pharmaco – dynamics, pharmaco – kinetics.

Unit – II Need for Drugs 8 hrs

Deficiency, disorder and diseases – Disease causing organisms – bacteria – types, fungi, virus and their activities – differences between them – specific diseases caused by various organisms – Immunity, Vaccination – Adverse drug reactions, types and minimisation.

Unit – III Pharmacokinetics and Pharmacodynamics 8 hrs

Pharmacokinetics: Introduction – Absorption, distribution, metabolism and excretion (ADME) – LD_{50}, ED_{50} Therapeutic index.

Pharmacodynamics: Elementary treatment of drug action, mechanism – enzyme stimulation, enzyme inhibition and drug design – Lead, analog, prodrug, Significance of drug metabolism in medicinal chemistry.

Unit – IV Formulation of Drug 8 hrs

Need for conversion of drugs into medicine – additives and their role – classification of formulations – route wise and form wise: tablets, capsules, syrups, suspensions, powders, ointment, creams, gels, lotions, sprays suppositories, injections.

Unit – V Pharmaceutical Marketing: **8 hrs**

Manufacture, packaging, distribution and stocking. Pharmaceutical Market, Pharmacy – Channels of distribution – Wholesaler and retailer – Departmental stores and chain stores – mail order business – Drug house management.

Traits and demands of medical representatives –Salesmanship – Uniqueness of pharma selling– Theories of selling – Planning – Detailing of products.

References:

1. G L David Krupadanam, D Vijaya Prasad, K Varaprasad Rao, K L N Reddy C Sudhakar, Drugs, Universities Press, Hyderabad (2001).
2. Graham Patrick, Instant notes – Medicinal chemistry, Pragati Prakashan Viva books (pvt) Ltd, 2002.
3. Alka and Gupta, Medicinal chemistry, Pragati Prakashan, II Edn , 2008.
4. Sekhar mukhopadhyay, Pharmaceutical selling – A text book, Sterling publishers private Ltd.1997.

CHS 3218 FOOD PROCESSING AND PRESERVATION 2credits/3 hours

This course aims at enabling the students to realize the scope of food processing industry in India. It deals with various food additives, flavours, food colours and role of enzymes in food industry. This course includes the various food processing, preservation techniques and canning of fruits and vegetables.

Unit-1

Introduction – history of preservation and canning industry- scope of fruit and vegetable preservation in India - product mix-availability - man power-capital- lack of awareness-marketing facilities – transport facilities-availability of containers – publicity -role of Government.

Enzymes in the food industry- important properties of enzymes in fruit and vegetable technology – enzymes used in the food industry- immobilized enzymes.

Unit-II

Food additives - functions and uses of food additives -classification of food additives - B.V.O - substances prohibited in foods-additives to be used with caution

Flavours - flavour compounds – flavonoids – terpenoids - sulfur compounds - other volatile components - types of flavor - developed flavor - processed flavor - added flavour- Texturing agents – gelatin- Sweeteners- artificial sweeteners

Unit-III

Food colors

Natural coloring matters – chlorophylls – carotenoids – anthoxanthines – flavonoids – anthocyanins – tannins - quinines and xanthones- betalains

Synthetic colors - banned colors

Spoilage - Microbial spoilage - bacteria, yeast, moulds-enzymatic spoilage - spoilage by insects, parasites and rodents - characteristics and storage conditions of food.

Unit-IV

Principles and methods of preservation – Asepsis - preservation by high temperature – pasteurization – sterilization - Aseptic canning – preservation by low temperature - chemicals, sulphur dioxide, benzoic acid – drying – filtration – carbonation – sugar – fermentation – salt – acids - oils and spices – antibiotics - irradiation.

Canning and bottling of fruits and vegetables - principles and process of canning - different methods - canning of fruits - canning and bottling of vegetables - canning of curried vegetables - specific requirements for canning of fruits and tomatoes.

Unit-V

Fruits and vegetables drying/dehydration-techniques-advantages of dehydration over sun drying

Freezing of fruits and vegetables - methods of freezing - sharp freezing - quick freezing - cryogenic freezing - dehydro-freeze drying

Quality control in food processing industry

F.P.O specification - storage life - permissible limits of preservatives – classification and their ill effects of food toxins.

References:

1. R. P. Srivatsava, Sanjeev Kumar, Fruits and vegetable preservation, International book distributing company, 2006.
2. L. H. Meyer, Food Chemistry, CBS Publications & Distributors, 2004.
3. H.K.Chopra, P.S.Panesar, Food Chemistry, Narosa Publishing House Pvt Ltd, 2010.

UG DEPARTMENT OF INFORMATION TECHNOLOGY

B.Sc. INFORMATION TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (Batch -2015)

Sem	Part	Course No.	Course Title	Hrs	Credits	Marks
1	I	TAM/ FRE/HIN	Language	3	2	30
1	II	ENS 1201	Conversational Skills	3	2	30
1	IIIC	BIT 1501	C Programming	5	5	75
1	IIIC	BIT 1403	C Programming Lab	4	4	60
1	IIIC	BIT 1405	Principles of IT	4	4	60
1	IIIS	BIT 1407	Digital Principles and Applications	5	4	60
1	IVNME-I	BIT 1201	e –Commerce	3	2	30
1	IVLS - I	BIT 1203	HTML 5	3	2	30
			Total	**30**	**25**	**375**
2	I	TAM/ FRE/HIN	Language	3	2	30
2	II	ENS 1202	Reading & Writing Skills	3	2	30
2	IIIC	BIT 1502	C++ Programming	5	5	75
2	IIIC	BIT 1404	C++ Programming Lab	4	4	60
2	IIIC	BIT 1406	Data Structures using C (TL)	4 (2+2)	4	60
2	IIIS	MAS xxx	Statistics	5	4	60
2	IVNME-I	BIT 1202	Cyber law & Cyber security	3	2	30
2	IV LS-II	BIT 1204	Emerging Computing paradigms And Technologies	3	2	30
2	V		PED/NSS/SLP		1	15
			Total	**30**	**26**	**390**
3	I	TAM/ FRE/HIN	Language	3	2	30
3	II	ENS 2201	Study Skills	3	2	30
3	IIIC	BIT 2501	SAD (TL)	5(3+2)	5	75
3	IIIC	BIT 2503	Software Testing	5	5	75
3	IIIC	BIT 2505	Java Programming	5	5	75
3	IIIC	BIT 2407	Java Programming Lab	4	4	60
3	IIIS	MAS xxx	Operational Research	5	4	60
			Total	**30**	**27**	**405**
4	I	TAM/ FRE/HIN	Language	3	2	30
4	II	ENG2202	Career Skills	3	2	30
4	IIIC	BIT 2502	Operating System	5(3+2)	5	75
4	IIIC	BIT 2504	Computer Networks	5	5	75
4	IIIC	BIT 2506	Relational Database Management Systems	5	5	75
4	IIIC	BIT 2408	RDBMS Lab	4	4	60
4	IIIS	BIT 2410	S/W Project Management	5	4	60
4	V		PED/NSS/SLP		1	15
			Total	**30**	**28**	**420**

5	IIIC	BIT 3601	Web Programming(TL)	6(3+3)	6	90
5	IIIC	BIT 3603	S/W Development Lab I	6	6	90
5	IIIC	BIT 3605	Software Engineering	6	6	90
5	IIIC	BIT 3607	Enterprise Resource Planning	5	5	75
5	IVLS–III	BIT 3209	Internet Technologies	3	2	30
5	IVVE	VAL	Value Education	4	2	30
			Total	**30**	**27**	**405**
6	IIIC	BIT 3602	.NET Programming(TL)	6(3+3)	6	90
6	IIIC	BIT 3604	S/W Development Lab II	6	6	90
6	IIIC	BIT 3606	DM & DW	6	6	75
6	IIIC	BIT 3508	Mobile Technologies	5	5	90
6	IVEVS	BIT 3200	Environmental Studies	4	2	30
6	IVLS - IV	BIT 3210	Cloud Computing	3	2	30
			Total	**30**	**27**	**405**
Grand Total (Semester I – VI)				**180**	**160**	**2400**

C: MAJOR CORE S: MAJOR SUPPORTIVE I: INNOVATIVE
NME: NON MAJOR ELECTIVE VAL : VALUE EDUCATION LS:LIFE SKILL
Course Offered to Non-Major Students by the Department of Information Technology

Part IV Non-Major Electives

Sem	Course No.	Course Title	Hours	Credits	Marks
1	BIT 1201	E –Commerce	3	2	30
2	BIT 1202	Cyber Law& Cyber Security	3	2	30
		Total	6	4	60

Part IV Life Skill Courses

Sem	Course No.	Course Title	Hours	Credits	Marks
1	BIT 1203	HTML 5	3	2	30
2	BIT 1204	Emerging Computing Paradigms And Technologies	3	2	30
3	BIT 3209	Internet Technologies	3	2	30
4	BIT 3210	Cloud Computing	3	2	30
		Total	12	8	120

BIT 3601 WEB PROGRAMMING TL (3+3)Hrs / 6 Cr

Objective:

The objective of this course is to gain the knowledge of creating dynamic web pages using HTML5, CSS3, JavaScripts, PHP and MySQL.

Unit 1:

HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5

Unit 2:

Style Sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3

Unit 3:

JavaScript: Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, DHTML : Combining HTML, CSS and Javascript, Events and buttons

Unit 4:

PHP: Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions

Unit 5:

PHP & MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs –Report generation.

Text Books:

1. HTML 5, Black Book, Dreamtech Press, 2nd edition, 2016
2. PHP, MySQL, JavaScript & HTML5 All-in-One for Dummies, Steve Suehring, Janet Valade, John Wiley and Sons, Inc, 2013.

References:

1. Web Technologies, Black Book , Dreamtech Press, edition 2010
2. Web Design , Joel Sklar, Cengage Learning, 6th edition, 2015
3. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill, 2010

BIT 3603 SOFTWARE DEVELOPMENT LAB I 6 Hrs / 6 Cr

Objective:

The main objective of this software development lab is to improve the acquired technical skills of the student by giving required lab practices. It supports them to work efficiently in the latest technologies. It improves the student's problem solving ability.

Based on case study of the following lab components need to be done by students

1. Planning a problem
2. Analyzing the problem
3. Requirement analysis
4. Designing prototype.
5. Table Design
6. Dataflow diagram
7. Coding
8. Testing.
9. Implementation.
10. Maintenance.

Suggested case study topics:

Student may take any one of the topics listed below

1. Client/server application
2. Network security
3. Embedded system
4. Image processing
5. Data mining
6. Distributed networks
7. Software engineering
8. Internet of things
9. Mobile applications.
10. Cloud Computing.
11. Web application development

Evaluation pattern

It adopts the evaluation pattern of a lab course of our college which contains 75% marks allotment for the continuous assessment using project reviews and 25% marks allotment for final report submission.

BIT 3605 SOFTWARE ENGINEERING 6 Hrs / 6 Cr

Objective:

The aim of the course is to train the students to understand the basic software engineering concepts and make them to analyze, estimate & design new software with quality standards.

Unit 1:

Introduction to Software Engineering: Software Characteristics - size factors - Factors influencing quality and productivity – Planning a Software Project- Defining the problem, Goals & Requirements - Developing a solution strategy – Planning the Development Process – Planning an Organization Structure–Project Structure – Project Team Structure - Software Cost Estimation.

Unit 2:

Software Requirements and Specifications: Value of a good SRS - Requirements Specification - Formal Specification Techniques – Requirement Engineering – Requirements Documents – Requirements Elicitation – Requirements Analysis and Negotiation – Requirements Validation – Requirements Management.

Unit 3:

Fundamentals Design concepts: Modules and modularizing Criteria- Design Notations – Design techniques –Detailed Design Consideration –Real time and distributed system design –Test plan- Mile stones walk through and inspection –Design guide lines.

Unit 4:

Coding: Programming Practice – Top-down and Bottom-up - structured programming – Information Hiding – Programming style-Verification and validation Techniques - Quality assurance - Unit testing and Debugging –System testing – Formal Verification.

Unit 5:

Software Maintenance: Issues in Maintenance – Enhancing maintainability during development - Configuration management – Source code metrics – Other maintenance tools and Techniques.

Text Books:

1. Richard Fairley, " Software Engineering " Tata Mcgraw Hill 2012 Edition.
2.Roger S Pressman, " Software Engineering A Practisener Approach" McGrawHill,7th Edition,2010.

References:

1. Ian SommerVille, "Requirements Engineering",Johnwilley,1998.
2. Stephen R. Schach, "Object Oriented and Classical Software Engineering", TataMcgrawHill 5th Edition.
3. Watts S. Humphrey, " A Discipline for Software Engineering", Pearson Education,2001.
4. Boriz and Beizer, "Software Testing Techniques", DreamTech, 2nd Edition – 2000.

BIT 3607 ENTERPRISE RESOURCE PLANNING 5Hrs / 5Cr

Objective:

The aim of this course is to understand the business process of an enterprise and ERP project management cycle. It also helps students to learn business modules and ERP market. It also deals with emerging trends in ERP.

Unit 1:

RP and technology: Introduction – Related Technologies – Business Intelligence – E-Commerce and E- Business – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM.

Unit 2:

ERP implementation methodology: Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration – Project management– Post Implementation Activities.

Unit 3:

Business modules in ERP: Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.

Unit 4:

ERP market: Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intutive.

Unit 5:

Trends in ERP: Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

Text Books:

1. Alexis Leon, “ERP DEMYSTIFIED”, Tata McGraw Hill, Second Edition, 2008.
2. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007.

References:

1. Jim Mazzullo,”SAP R/3 for Everyone”, Pearson,2007.
2. Enterprise Resource Planning Paperback – 26 Sep 2007 by Alexis Leon 2nd edition.
3. Biao Fu, “SAP BW: A Step-by-Step Guide”, First Edition, Pearson Education,2003

BIT 3209 INTERNET TECHNOLOGIES 3Hrs /2 Cr

Objective:

The objective of this course is to gain knowledge about the Internet, various network protocols, internet connectivity and other internet technologies behind the screen.

Unit 1:

Introduction to Internet: Internet, Growth of Internet, Owners of the Internet, Anatomy of Internet, ARPANET and Internet history of the World Wide Web, basic Internet Terminology, Net etiquette. Internet Applications – Commerce on the Internet, Governance on the Internet, Impact of Internet on Society – Crime on/through the Internet.

Unit 2:

TCP/IP – Internet Technology and Protocol: Packet switching technology, Internet Protocols: TCP/IP, Router, Internet Addressing Scheme: Machine Addressing (IP address), E-mail Addresses, Resources Addresses

Unit 3:

Internet Connectivity: Connectivity types: level one, level two and level three connectivity, Setting up a connection: hardware requirement, selection of a modem, software requirement, modem configuration, Internet accounts by ISP: Telephone line options, Protocol options, Service options, Telephone line options – Dialup connections through the telephone system, dedicated connections through the telephone system, ISDN

Unit 4:

Internet Network: Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Interoperability, Network administrator, network security, Network Components: Severs, Clients, Communication Media, Types of network, Addressing in Internet, Network topologies.

Unit 5:

Services on Internet (Definition and Functions): WWW, Telnet, FTP, IRC and Search Engine, Electronic Mail - Email Networks and Servers, Email protocols, Structure of an Email, Email Clients, Web based E-mail. Email encryption- Address Book, Signature File. Current Trends on Internet: Languages, Internet Phone, Internet Video, collaborative computing, e-commerce.

Test Book:

1. Greenlaw R and Hepp E "Fundamentals of Internet and www" 2nd Edition, TataMcGrawHill,2007.

Reference:

1. D. Comer, "The Internet Book", Pearson Education, 2009.

BIT 3602 .NET Programming TL 6 (3+3)Hrs / 6 Cr

Objective:

The main aim of the course is to provide in depth knowledge about .NET frame work, VB.Net, ASP.NET and ADO.NET. It also equips the students to develop window applications and dynamic web application.

Unit 1:

Introduction: Introduction to .NET-Evolution -.net platform-advantages of .net-working of .net- .basic architecture of net frame work-common language run time- architecture of CLR-features of CLR -common language specification-unified programming classes- meta data – assembly-MSIL-Just In Time compiler-class loader-verifier- security in .net.

Unit 2:

VB.NET: Visual studio .net IDE-Window based applications-Data types-operators- Event handling -loading and showing forms -adding controls-working with simple controls-adding menus-menus-advanced windows applications-creating MDI application.

Unit 3:

VB.NET Programming concepts: Introduction to console application- Procedures-OOPs in VB.net- class-object-inheritance-polymorphism-inheritance-my base class keyword-my class keyword-abstract base class-exception handling-delegates.

Unit 4:

ADO.NET : Overview of ADO.NET architecture-ADO.NET Component model- managed provider in ADO.net – advantages of ADO.net - data access using ADO.NET - ADO.net data form wizard.

Unit 5:

ASP.NET: Features of ASP.net - ASP.net page life cycle-using common web controls - creating simple web applications - create web applications using data base connectivity - Web services.

Text Books:

1. .Net Programming Black Book, Kogent Solutions Inc, Published by Dreamtech Press, New Edition, 2013.
2. Nikhil Kothari, Vandana datye “Developing Microsoft ASP.NET Server controls and components” Tata Mcgraw Hill publishing company limited, 2002.
3. David sceppa, “Programming Microsoft® ADO.NET 2.0 Core Reference, Microsoft press, 2009

References:

1. Nitini pandey yesh singhal, mridula pairhar “Visual studio.net programming”, Wiley- Dream tech India (p) Ltd, 2002.
2. Steven holzner, “Visual basic .net black book”, coriolis group book, 2009.

BIT 3604 SOFTWARE DEVELOPMENT LAB II 6 Hrs /6 Cr

Objective:

The main objective of this software development lab is to improve the acquired technical skills of the student by giving required lab practices. It supports them to work efficiently in the latest technologies. It improves the student's problem solving ability.

Based on case study of the following lab components need to be done by students

1. Planning a problem
2. Analyzing the problem
3. Requirement analysis
4. Designing prototype.
5. Table Design
6. Dataflow diagram
7. Coding
11. Testing.
12. Implementation.
13. Maintenance.

Suggested case study topics:

Student may take any one of the topics listed below

1. Client/server application
2. Network security
3. Embedded system
4. Image processing
5. Data mining
6. Distributed networks
7. Software engineering
8. Internet of things
9. Mobile applications.
10. Cloud Computing.
11. Web application development

Evaluation pattern

It adopts the evaluation pattern of a lab course of our college which contains 75% marks allotment for the continuous assessment using project reviews and 25% marks allotment for final report submission.

BIT 3606 DATA MINING AND DATA WAREHOUSING 6Hrs/6Cr

Objective:

This course enables the student to understand the basic concepts of data mining and warehousing and various methodologies in it

Unit 1:

Data Mining versus KDD - Data Mining & Goals – Stages of the Data Mining Process - Types of Databases – Data warehouse – Multidimensional data model – DW Architecture - OLAP operations – From Data Warehousing to Data Mining.

Unit 2:

Data Preprocessing - Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization and generating concept hierarchies.

Unit 3:

Data Mining tasks - Architecture of Data mining system - Data mining primitives – Data mining query language. Market Basket Analysis - Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

Unit 4:

Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

Unit 5:

Applications and trends in Data Mining- Social Impacts of Data Mining - Introduction to Advanced Topics: Web Mining, Spatial Mining and Temporal Mining.

Text Book:

1.” Data Mining: Concepts and Techniques” Book by Jiawei Han, editor Micheline Kamber, 2012.

References:

1. Shawkat Ali A B M, Saleh A. Wasimi, “Data Mining: Methods and Techniques , Third Indian Reprint, Cengage Learning, 2010.

2. Soman K. P., Shyam Diwakar, Ajay V. “Insight into Data Mining Theory and Practice” , Fifth Printing, PHI Learning, 2011.

BIT 3508 MOBILE TECHNOLOGIES 5Hrs / 5Cr

Objective:

This course enables the student to learn the basics of wireless voice and data communication technologies along with Android Application Development.

Unit 1:

Introduction – Wireless transmission – Frequencies for radio transmission – MAC – SDMA – FDMA – TDMA – CDMA – GSM.

Unit 2:
Evolution of Mobile Technology, Lte, VoLte, wifi, Lifi,, Bluetooth, NFC, Mobile Operating System. Sensors used in Mobile devices, GPS and GeoFencing.

Unit 3:
Mobility Management: Call Handoff and Roaming (national and international)
Mobile Commerce Services: Base Services Platform, Mobile Commerce Services for Consumers, Mobile Commerce Services for Businesses.
Case Study: ecommerce application.

Unit 4:
Android OS and its architecture, IOS and its architecture, IDE used for app development in android and ios, Application data management, publishing the app to playstore / app store. Native application, Hybrid application, comparison of native and hybrid approach.

Unit 5:
IOT overview, applications, potential & challenges, and architecture, Arduino and Raspberry Pi architecture.
Case study: Control of a smart home.

Text Books:
1. Wireless Communications & Networks, Second Edition,William Stallings by Pearson, 2005.
2. M-Commerce: Technologies, Services, and Business Models by Norman Sadeh, September 2002
3. Android Application Development Black Book, Pradeep Kothari, dreamtech press, 2014
4. Internet of Things: A Hands-On Approach Paperback – 2015 by Arsheep Bahga (Author), Vijay Madisetti (Author)

References:
1. Android Programming for Beginners, Book by John Horton, December 2015
2. Dharma PrakashAgarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.

BIT3200 ENVIRONMENTAL STUDIES 4 Hrs / 2 Crs

Objective:
The objective of this course is to create awareness about the environmental pollution and how to manage and dispose the Solid wastes and E-wastes.

Unit 1:

Introduction to environment and environmental studies: Introduction to environment – components – nature of environment - need of awareness – reasons for environmental problems – anthropocentric and eco centric views. Environmental studies - multidisciplinary nature – scope and aim – sustainable development.

Unit 2:

Ecosystem and Biodiversity: Ecosystem – structure – functions – simplified ecosystem models (food chain and food webs and their types, energy flow) - forest – grassland – pond – ecosystems – ecological succession - ecological pyramids. Biodiversity – definition – types – species – genetic and ecosystem diversities- values of biodiversity – threats to biodiversity – conservation of biodiversity – endemism – biodiversity hotspots – Indian biodiversity

Unit 3:

Natural resources: Natural resources – definition – types – forest resources – uses – deforestation- reasons - effects –water resources – dams – effects of dams - food resources – modern agriculture– ill effects -energy resources- types – hydel –nuclear – solar –wind and biomass energy – world scenario – Indian scenario. Population and environment – reasons for over exploitation of resources – population –demography – population curves – population explosion – effects – consumerism – effects –urbanization – reasons and effects- role of an individual.

Unit 4:

Environmental Pollution: Pollution – definition – types – air pollution – causes and effects – effects of CO2 – CO – NOx –SOx – particulates – control of air pollution – water pollution – causes – effects –remedies – soil pollution

Unit 5:

Solid Waste Management: Solid waste management - House hold, Hospital, Insecticide, pesticide, fungicide, Biomedical, Animal and human excreta, E – waste – ill effects of e-waste - Effects of Solid Waste: Ground water pollution, Increase in infecting agents in soil, Soil quality deterioration, On human health, Disposal of Solid Waste – Solid Waste Management: Open dumping, Landfilling, Incineration, Re – use, reclamation, recycle, Composting

Reference :

1. Environmental Studies - Sanjay Kumar Batra, Kanchan Batra, Harpreet Kaur &Parul Pant – 2nd Edition 2016
2. Environmental Studies: From Crisis to Cure, R. Rajagopalan, 3rd edition 2015

BIT 3210 CLOUD COMPUTING 3Hrs / 2 Cr

Objective:

The aim of this course is to introduce the broad perceptive of cloud architecture and model. To understand the concept of Virtualization and the design of cloud Services. It also helps the students to learn cloud programming model.

Unit 1:

Cloud architecture and model: Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models: -Public, Private and hybrid Cloud – Cloud Services: IaaS, PaaS, SaaS.

Unit 2:

Virtualization: Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data- center Automation.

Unit 3:

Cloud infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development, Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources.

Unit 4:

Programming model: Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support- Amazon AWS - Cloud Software Environments - OpenNebula, OpenStack, Aneka

Unit 5:

Security in the cloud: Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security– Security Monitoring – Security ArchitectureDesign – Data Security – Application Security – Virtual Machine Security – IdentityManagement and Access Control – Autonomic Security.

Text Book:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, FromParallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

References:

1. 1. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation,Management, and Security", CRC Press, 2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A PracticalApproach", TMH, 2009.
3. Kumar Saurabh, " Cloud Computing – insights into New-Era Infrastructure", WileyIndia,2011.

UG Department of Physical Education (SF)

B. Sc Physical Education (SF)

from 2017 – 2018 onwards

Vision of the Department of Physical Education (SF)

To striving towards excellence in physical education, sports, and games

Mission of the Department of English (SF)

Students of Physical Education shall demonstrate

i. professional skills in the field of physical education
ii. competencies required for professional educators of sports and games
iii. sensitivity on contemporary issues in the field of physical education
iv. the ability to employ rational and critical thinking in the related field
v. creativity and self expression in the professional growth
vi. indigeneity and innovation in physical education

UNDERGRADUATE DEPARTMENT OF PHYSICAL EDUCATION (SF)
Programme for B.Sc. Physical Education (SF) from 2017 batch onwards

Sem	Part		Code	Title	Hr/ Wk	Cr.	Marks
I	Part I		TAM/FRS/HIS		3	2	30
	Part II		ENS 1201	Conversational Skills	3	2	30
	Part III Major	Core	BPE 1401	Foundation of Physical Education & Sports	4	4	60
			BPE 1403	Practical I – Track & Field Marking	4	4	60
			BPE 1505	Theory - Track & Field Event - I	5	5	75
		Supportive	BPE 1407	Practical II – Track & Field Events - I	5	4	60
	Part IV	Non-Maj. Elect.	XXXX	-	3	2	30
		Life Skill I	XXXX	-	3	2	30
	Part V	*Extension*		(PED/NSS/SLP)	-	-	-
				Total	**30**	**25**	**375**
II	Part I		TAM/FRS/HIS		3	2	30
	Part II		ENS 1202	Reading & Writing Skills	3	2	30
	Part III Major	Core	BPE 1402	Game of Specialization - I	4	4	60
			BPE 1404	Practical III – First Aid, Human Physiology	4	4	60
			BPE 1506	Human Anatomy & Physiology	5	5	75
		Supportive	BPE 1408	Practical IV – Game of Specialization - I	5	4	60
	Part IV	Non-Maj. Elect.	XXXX	-	3	2	30
		Life Skill II	XXXX	-	3	2	30
	Part V	Extension	XXXX	(PED/NSS/SLP)	2	1	30
				Total	**30+2**	**25+1**	**375+ 30**
III	Part I		TAM/FRS/HIS		3	2	30
	Part II		ENS 2201	Study Skills	3	2	30
	Part III Major	Core	BPE 2501	Health Education, Safety Education, & First Aid	5	5	75
			BPE 2503	Theory – Track & Field - II	5	5	75
			BPE 2505	Theories of Yoga	5	5	75
			BPE 2407	Practical V –Track & Field -II	4	4	60
		Supportive	BPE 2409	Practical VI - Yoga	5	4	60
	Part V	Extension	XXXX	(PED/NSS/SLP)	-	-	-
			Total		**30**	**27**	**405**

Sem.	Part		Code	Title	Hr/ Wk	Cr.	Marks
IV	Part I		TAM/FRS/HIS		3	2	30
	Part II		ENS2202	Career Skills	3	2	30
		Core	BPE 2502	Methods in Physical Education	5	5	75
			BPE 2404	Physical fitness & wellness	4	4	60
			BPE 2506	Game of Specialization -II	5	5	75
			BPE 2508	Practical VII – General Fitness	5	4	60
		Supportive	BPE 2410	Practical VIII – Game of Specialization -II	5	5	75
	Part V	Extension	XXXX	(PED/NSS/SLP)	2	1	30
				Total	**30+2**	**27+1**	**405+ 30**
V	Part III Major	Core	BPE 3501	Test, Measurement & Evaluation in Physical Education	5	5	75
			BPE 3603	Theories of Sports Training	6	6	90
			BPE 3605	Practical IX – Test and Measurement	6	6	90
		Innovative	BPE 3607	Practical - X Sports Training	6	6	90
	Part IV	Life Skill Course	XXXX	-	3	2	30
	Part IV	EVS	BPE 3200	Environmental Studies	4	2	30
				Total	**30**	**27**	**405**
VI	Part III Major	Core	BPE 3502	Psychology and Sociology of Physical Education & Sports	5	5	75
			BPE 3604	Fundamentals of Kinesiology	6	6	90
			BPE 3606	Practical XI – Track & Field III	6	6	90
		Innovative	BPE 3608	Practical XII – Game of Specialization –III	6	6	90
	Part IV	Life Skill Courses	XXXX	-	3	2	30
		HVS	HVS	Human Values	4	2	30
				Total	**30**	**27**	**405**
				Grand Total for semesters I-VI	**180+4**	**158+2**	**2370+ 60**

BPE 1401 FOUNDATION OF PHYSICAL EDUCATION AND SPORTS 4Hr/4Cr

OBJECTIVES

Enable students to

1. understand the meaning, nature, need and scope of physical education and sports.study about the scientific principles from various allied subjects in the field of physical education and sports.
2. describe the national programmes of physical education and sports and youth welfare programmes in the field of physical education and sports; and
3. analyse the historical review of physical education and sports activities of Indian heritage.

THEORY

UNIT I

Meaning and nature of physical education and sports. Aims and objectives of Physical Education and Sports.

1. Physical Development
2. Mental Development
3. Social Development
4. Emotional Development
5. Development of neuro-muscular co-ordination
6. Development of good citizenship
7. Worthy use of Leisure

UNIT II

Scientific basis of physical education and sports, contribution of allied sciences, Anatomy, Physiology, kinesiology, psychology, sociology, Bio-mechanics, and Anthropometry.

UNIT III

National Programmes Of Physical Education And Sports

Sports Authority of India, National coaching schemes, sports talent search scholarship, Rural sports, women sports festival, National awards and honours to outstanding sportsman and coaches,

UNIT IV

Olympic movement and its impact on physical education and sports. The contribution of Olympic movement towards international understanding.

UNIT V

Youth welfare programme N.C.C, N.S.S, youth hostels, youth festivals. Sports Development Authority of Tamilnadu.

History of Physical Education in Ancient Greece

TEXT BOOK

Charles,B.A.,1988, Foundation Of Physical Education, The C.V. Mosby company, St.Louis.

REFERENCE BOOKS

1. John,H.L.,1969,A brief history of Physical Education . The Ronald press company, New York.
2. Kamlesh,M.L.,1988,Physical Education facts and Foundations.Choushan Printing press. New Delhi.
3. Kamlesh,M.L.,1997.Foundations of Physical Education. Metropolitan Book pvt. Ltd. New Delhi.
4. ThiruNarayanan,C., and Harriharasarma. S., 1985, An Analytical history of physical education ,The south India press, Karaikudi.
5. Willgoose,C.,1984,Curriculum physical Education, Prentice-Hall, New Jersey.

BPE 1403 PRACTICAL I TRACK AND FIELD MARKING 4Hr/4Cr

OBJECTIVE

Enables students to

be familiar with the procedure of Track Events marking

Marking:

Track Marking:

Planning and construction of a standard Track Marking of the starting lines – calculation of Staggers – Calculation – Diagonal excess distance – curved start – split start – 4 x100 M relay marking - 4 x 400M relay marking

Jump Events:

Long Jump – Triple Jump

Throw Events:

Shot Put – Javelin – Discus – Hammer Throw

TEXT BOOK

Lamine.D., Athletic Federation of India "Competition Rules Hand Book:, New Delhi,2010.

REFERENCE BOOKS

1. Bosen,K., "Athletics", NIS Publication, Patiala,1996.
2. Sharma.N.P.,"Fundamentals of Track and Field", Khel Sahitya Kendra, New Delhi,2005.

3..Vijayalakshmi. V., "Principles of Athletic Training" Khel Sahitya Kendra, New Delhi,2004.

BPE 1505 THEORY- TRACK AND FIELD EVENTS I 5Hr/5Cr

OBJECTIVES

Enable students to

1. trace the history of sports and games in India
2. learn the strategy and tactics in sports
3. learn various skills in track and field
4. be familiar with rules and regulations, and learn the method of officiating for all track and field events and gymnastics.

THEORY
(a) TRACK AND FIELD EVENTS

UNIT I

Layout and maintenance of track.

Sprint & Middle Distance:-

1. Sprinting forms- Techniques in sprint running-Crouch start-Fixing the block-Techniques at finish-curve running-Specific exercises.

2. Middle distance running:

Arm action-Foot placement- Body position – Techniques in middle distance running-Practice of standing start.

UNIT II

Jumps & Long Distance Running

1.High Jump:

Approach run for different styles - Take off - Bar clearance – Landing - Specific exercises.

2. Long Jump:

Approach run-Take off-Flying phase-Landing-Specific exercises

3. Long Distance Running

Rules and interpretations
Arm action - foot placement - body position - running tactics -specific exercises

UNIT III

Throw Events & Relay Race:

1. . Shotput:

Holding the shot – initial stance – Placement of the shot – Glide – Delivery – Reverse – Specific exercises

2. Relay races

Rules and interpretations

Style of baton exchange - fixing up of runners for different relay races - exchange zone marking-strategy in running relay races -specific drills.

UNIT V

1 Walking:

Arm action-Foot placement- Hip movements - Body position - Strategy in walking- Specific exercises.

TEXT BOOK

Pintu Modak.. 1996,Gymnastics a scientific approach, Runthala Publishers,Pilani.

REFERENCE BOOKS

1.Gambetta.VV..1981,Track and field coaching manual, Leisure press ,Illinois.

2.Howard.P..1985,Athletics in Action,British library.

3.Paish.W..1975,Introdution to Athletics,Faber and Faber,London.

4.Tankmilan.C.. 1982 Teaching Gymnastics & skills to men and women, surjet Publications, New Delhi.

5.While, J.J.. 1989 , Gymnastics in action, stanly paul, London.

BPE 1407 PRACTICAL - II TRACK AND FIELD EVENTS – I 5Hr/4Cr

OBJECTIVES

To enable the students to

i. learn the strategy and tactics in sports
ii. learn various skills in track and field and gymnastics.
iii. be familiar with rules and regulations, and learn the method of officiating for all track and field events and gymnastics.

PRACTICAL I

TRACK AND FIELD EVENTS-I

A part of the practical period shall be devoted to warming up and conditioning exercises for the concerned events shall be introduced.

1. Sprints
    a. Correct running style emphasizing on proper body position.
    b. Crouch start- fixing of the starting blocks getting off the block.
    c. Practice of starts with blocks using proper command.
    d. Curve running.
2. Middle distance running
    a. Correct running style emphasizing on proper body position and feet placement.
    b. Practice of standing start.
3. Long Jump
    a. Approach run
    b. Take off
    c. Flying Phase
    d. Landing.
4. Shot-put
    a. Hand hold
    b. Placement of shot
    c. Initial Stance
    d. Glide
    e. Delivery stance
    f. Delivery action
    g. Reverse.

TEXT BOOKS

1. Goel, R.C., 1992. Encyclopaedia of Sports and Games, Trange paper, Delhi.
2. Pintu modak., 1996, Gymnastics a scientific approach.
3. Runthala Publishers & Printers, Near Nehru place 11, Pilani (Raj).

REFERENCE BOOKS

1. A.A.F.I., 1994, Competitive Rules Hand Book, Ashok Printers, Kanpur.
2. Federation International De Gymnastics, 1993, Code of Points, Switzerland.
3. Gambetta, V., 1981, Track and Field Coaching Manual, Leisure Press Champaign, Illidis.
4. Thirunarayan, C., and Hariharan, S., 1970, Track and Field the South Indian Press, Karaikudi.

BPE 1402 GAME OF SPECIALISATION I 4Hr/4Cr
(Football – Hockey - Badminton – Tennis).

OBJECTIVES

Enable students to

1. trace the history and working federations
2. develop the fundamental skills and techniques
3. acquire the physiological training, warming-up and motor qualities
4. become familiar with the rules and regulations and their interpretations.

THEORY

The following games are included in the syllabus of the course.

Football – Hockey - Badminton – Tennis.

The general format for covering the aspect for each of the above game is given below.

UNIT I

Content for topics

1. History of games and working federations.
2. Play field
   a) Layout and maintenance of play field.
   b) Equipment and their specification.

UNIT II

Officiating

a) Rules and their interpretation.
b) Method of officiating.

UNIT III

1. FOOT BALL

Elements of Game Skill

a) Pass and passing techniques, passing techniques, passing drills
b) Trapping-receiving and ball control techniques.
c) Dribbling and running with the ball-dribbling drills.
d) Types of kicks:
   1.Low drive.
   2.Lifted kicks.
   3.Half volleys.
   4.Punt kicks and Volleys.
e) Kicking and shooting practices, heading techniques, heading drills.
f) Goal keeping techniques, goal keeping drills.

2. HOCKEY

Fundamentals of techniques and basic skills:

a) Grip.	b) Hitting.
c) Stopping.	d) Dribbling.
e) Push.	f) Scoop.
g) Hitting on the wrong foot	h) Dodging and tackling
i) Reverse hit	j) Flick.

SET PLAYS:

Corners, penalty corners, Hit-in, Push-in, penalty stroke.

UNIT IV
BADMINTON
Fundamental skills

Holding the racket

i. Forehand grip.
ii. Backhand grip.

Holding the shuttle

. i. Mid grip.
ii. Base grip.
iii. Top grip.

Foot work for various strokes

i. Forehand strokes.
ii. Backhand strokes.
iii. Overhead stroke.
iv. Round and Head stroke.

Basic shots

i. Smash.
ii. Lob, toss or clear.
iii. Netshot.
iv. Drive.

Singles service

i. High Lob service.
ii. Low service.
iii. Medium service.

Doubles service

i. Low or long service.
ii. Drive or shuttling service.
iii. High flick service (High and Low).

UNIT V

TENNIS

Fundamentals of techniques and Basic Skills:

1. Forehand-grip, ready position, foot work, back-swing point of impact, follow through
2. Back hand – as above.
3. Service – grip, stance, back swing, point of impact follow through.
4. Volleys – grip, ready position.
5. Lobs – offensive, defensive.
6. Smash.
7. Drop shot.

Variations in

i) Ground strokes ii) Service

iii) Volleys iv) Lobs

TEXT BOOK

1.Goel.R.G,1975, Encyclopaedia Of Sports And Games,Vikaas publishing house Pvt.,Ltd., Delhi.

REFERENCE BOOKS

1. F.I.F.A.,1986,Referee's charge and players guide to Laws of Association Football, Pan Books Ltd., Caraya place, London.
2. Hayleft, J. and Evelians,1989,The Illustrated Encyclopedia of World Tennis,Exter Books, New York.
3. Jones,C.M.1973,Improving Your Tennis, Faber and Faber Publications, London.
4. Singh,G.1978, Olympic Hockey on Astroturf, Services Publishing House, Delhi.
5. Ashok kalra, A.P., 1993, Badminton, Surjeet Printing Press, Jalandher – 8.
6. Baddy, S., 1982, Badminton In Action, Cox and Woman Ltd., London.
7. Ballok, R., 1988, Teaching Badminton, Surjeet Publication, Delhi.
8. Bob Swope., 2011, ***"Youth Filed Hockey Drills, Strategies, Plays & Games Handbook"***, St. Louis

BPE 1404 PRACTICAL III FIRST AID, HUMAN PHYSIOLOGY 4Hr/4Cr

OBJECTIVES

Enables Students to

i. treat different types of Fractures
ii. apply different types of Bandages
iii. treat Snake bite, Dog bite, Burns and Poison
iv. understand the ptractical knowledge on visual and auditory reaction time
v. measure vital capacity and Blood pressure

FIRST AID:

1. Methods to treat different types of Fractures
ii. Methods to apply different types of Bandages
iii. Methods to treat Snake bite, Dog bite, Burns and Poison

HUMAN PHYSIOLOGY:

1. Methods to find out the visual and auditory reaction time.
2. Methods to find out the co-ordination.
3. Methods to find out the body fat.
4. Measurement of heart rate by means of pulse rate.
5. Measurement of vital capacity and blood pressure.

TEXT BOOKS:

1. Sivaramakrishnan.S., 2006 " Anatomy and Physiology for Physical Education", First Edition, Friends Publication, Chennai.

REFERENCE BOOKS

1. Marieb.N., 2006 " Human Anatomy and Physiology", Benjamin Publication, New Delhi.
2. Sivaramakrishnan.S., 2006 " Anatomy and Physiology for Physical Education", First Edition, Friends Publication, Chennai
3. Budhe,A.A. 2013, "Exercise Physiology", Sports Publications, New Delhi.
4. Rajeev,K.,2011, "Sports Medicine and Exercise Physiology", Sports Publications,New Delhi.
5. Blaisdall,A.2006,"Human Physiolosy",First Edition, sports Publications,New Delhi.

BPE 1506 HUMAN ANATOMY & PHYSIOLOGY 5Hr/5Cr

OBJECTIVE:

To provide knowledge on various parts of the human body and their movements.

UNIT – I:

Bone – Classification of Bone – Long Bone – Short Bone – Flat Bone – Irregular Bone – Seemoid Bone. Joints – Define – Classification of Joints – Fibrous Joints – Cartilagious Joints – Synovial Joints.

UNIT – II:

Respiratory System: Structure and Function of lungs – Mechanism of Respiration. Circulatory System: Structure and functions of Heart – Cardiac output & cycle - Blood – Blood pressure – Blood group – Blood clotting.

UNIT – III:

Muscular System: Voluntary muscle - Involuntary muscle – Cardiac Muscle Digestive System: Structure and Functions of Stomach – Small Intestine – Large Intestine.

UNIT – IV:

Nervous System: Structure and Functions of Brain – Cerebellum – Cerebrum – Medulla oblongata –Spinal cord – Reflex Action. Endocrine Glands – Its types – Functions of Pituitary, Thyroid, Adrenal, Pancreas and gonads.

UNIT – V:

Skeleton System :Axial Skeleton - Skull – Vertebral Column – Sternum - Ribs and Xiphoid - Appendicle Skeleton – Upper Extremities - Lower Extremities. Excretory System: Structure and Function of Skin – Kidney.

BOOKS FOR REFERENCE:

1. Essentials of Human Anatomy & Physiology Laboratory Manual by Elaine Nicpon Marieb (Jan 20, 2008)
2. Human Anatomy & Physiology with MasteringA&P™ (8th Edition) by Elaine N. Marieb and Katja N. Hoehn (Jul 2, 2010)
3. Human Anatomy & Physiology Lab Manual, Fetal Pig Version (10th Edition) by Elaine N. Marieb and Susan J. Mitchell (Feb 8, 2010)
4. Human Anatomy & Physiology Laboratory Manual with MasteringA&P®, Main Version, Update (9th Edition) by Elaine N. Marieb and Susan J. Mitchell (Jul 10, 2011)

BPE 1408 PRACTICAL IV GAME OF SPECIALISATION I 5Hr/4Cr

OBJECTIVES

To enable the students to

i. learn the strategy and tactics in the game concerned
ii. be familiar with rules and regulations and
iii. learn the method of officiating in the game of specialisation

PRACTICAL IV

GAME OF SPECIALISATION

The students can choose any one of the following games- fundamental skills and playing ability.

1. Football
2. Hockey
3. Badminton

The same fundamental skills in the theory may be taught in the practical also.

TEXT BOOK

1. Goel.R.S., 1975,Encyclopaedia of sports and games, Vikas Publication House pvt.,Ltd., New Delhi.

REFERENCE BOOKS

1. F.I.F.A. Referee's charch and players guide to law of Association, 1986, Football pan Books ltd., Caraya Place, London.
2. Gian, S, 1976, Olympic Hockey on Astrotes and services publishing House, Delhi.
3. Hayleft,J.,and Evelians,1989,The Illustrated Encyclopaedia of World Tennis , ExterBooks, New York.

BPE 2501 HEALTH EDUCATION AND SAFETY EDUCATION & FIRST AID

5Hr/5Cr

OBJECTIVES

Enable students to

1. understand the meaning of health and relationships among the various aspects of health;
2. analyse the principles and characteristics of health education;
3. understand the importance of the hygiene and practices related to maintenance and promotions of health;
4. prepare obligatory measures to prevent the contemporary health problems which are related to the community ; and
5. understand the importance of safety education for preventing accidents and its general principles.

THEORY

HEALTH EDUCATION

UNIT I

Health:

1) Meaning of health: Brief description of physical, mental, emotional and social health; Interrelationships among these aspects of health.
2) Importance of health for an individual, family, community and nation.

Health Education:

3) Meaning of health education , its need, scope for college students, aims and objectives of health education.
4) Characteristics of a health education person.

UNIT II

Hygiene

1. Need and importance of personal hygiene. Environmental hygiene and food hygiene, associated practice related to maintenance and promotion of health.
2. Food poisoning, food allergies and their prevention, food adulteration and its harmful effect on health.

Mental Health

1. Meaning of mental health, foundation factors for mental health, mental health problems of college students. Characteristics of a healthy personality, principles of mental health.
2. Adjustment process: adjustive reactions: guidelines for making adjustments – development of interests, attitudes and habits: development and control of emotions, guidelines for controlling emotions.

UNIT III

Community Health

1.Environmental health conditions in rural, metropolitan, urban –marginal and industrial areas.
2. Environmental pollution-water, air, soil and land, radiation, noise, pesticides, occupational hazards, efforts at individual, community and government level to reduce ill efforts of environmental health.
3. Communicable and non communicable diseases Distinction between communicable and non communicable diseases: communicable diseases by mode of spread and their preventions. Non-communicable diseases disputes, heart problems, cancer, renal diseases, respiratory diseases.
4. World health organization (WHO)-organisational structure, activities, co-operation with the other international agencies.
5 .Use of tobacco:(Chewing, Snuffing and Smoking): alcohol and drugs and their harmful effects; premarital sex, sexuality transmitted diseases and their prevention.

UNIT IV

First Aid

First aid – Definition –Aim and Objectives of First Aid - Scope of First Aid - Bandages – Types of Bandages - Wound – Types of Wounds- Fractures – Types of Fractures -Shock- Burns - Poison - Snake bite - Dog bite.

UNIT V

Safety Education

1. Importance of safety education for preventing accidents and its general principles.

2. A. Safety in physical education and sports, principles of safety with respect of buildings and playfields.
   B. Principles of safety with respect to equipments, dress, etc., principles of safety with respect to organization of classes, demonstration and matches.
   C. Accident reporting and maintenance of records.

3.) Safety in roads, camps, picnic and tours.

4.) Safety in water, fire, floods, hurricane, thunder and lightening

5.) Resuritation measures in life saving emergencies like drowning, asphyxia, head injuries etc.

TEXT BOOK

1. Basu, D.S.M., Kamal,R.,1989, Introduction To Health Education, A.P.Publishers, Jalandhar.

REFERENCE BOOKS

1. Anonymous,1990, First Aid,St.John Ambulance Association Head quarters New Delhi.
2. Atwal and Kawsal 1983, A text book of I.C.S.E Health Physical Education and sports,A.P. publishers, Jalandhar.
3. Raur,M.,1987,An introduction to health and physical education T.A.N.D.O.N Publications, Ludhiana.
4. Swaminathan,M.,1986, Principles of Nutrition and Diabetics, The Bangalore printing and publishing co.,Ltd., Bangalore.
5. John Severs, 2012 “Safety and Risk in Primary School Physical Education” London.
6. Cathie Robertson, 2010 “Safety, Nutrition and Health in Early Education”, 4th Ed., USA
7. Melinda J. Flegel, 2010 “Sports First Aid : A Coach’s Guide to the care and prevention of Athletic Injuries” 4th Ed., USA.
8. Lyan R. Marotz, 2008 “Health, Safety and Nutrition for the Young Child” Seventh Edition, USA.
9. Catwalk and Kawsal.1983 “A Text Book on Health, Physical and sports”, A.P. Publishers., Jalandhar.

BPE 2503 THEORY - TRACK AND FIELD EVENTS - II 5Hr/5Cr

OBJECTIVES

To enable the students to

i. trace the history of sports and games in India
ii. learn the strategy and tactics in sports
iii. learn various skills in track and field events.
iv. be familiar with rules and regulations and learn the method of officiating for all track and field events.

THEORY

UNIT I

1. History- Equipments and their specification

2.Triple jump:

Rules and interpretations

Approach run - take off and landing for hop - step and jump - flying phase - landing - tactics in jumping - specific exercises.

3.Discus throw:

Rules and interpretations

Hand hold - initial stance - preliminary swings – turns - delivery stance - delivery action - reverse - tactics in throw - specific exercises.

(15 Hours)

UNIT II

Hurdles

Rules and interpretations

Approach - take off - clearance of the hurdle - lead leg action - trailing leg action - body position - between the hurdles - last hurdle to finishing line - specific drills.

(15 Hours)

UNIT III

Pole vault

Rules and interpretations

Pole grip - carry and run - pole plant - take off - rock back - pull up -push up - bar clearance – landing - specific drills.

(15 Hours)

UNIT IV

1.Javelin throw

Rules and interpretations

Grip - carry - approach run (preparatory and transition period) -impulse stride - delivery stride - delivery action – reverse - specific drills

2.Hammer throw

Rules and interpretations

Grip - initial stance - preliminary swings – entry – turns - delivery stance - delivery action - reverse - specific drills.

(15 Hours)

UNIT V

Officiating:

Various committees and officials to conduct a sports meet. Duties of following officials.

a) Management officials.
b) Jury of appeal
c) Judges for Track events
d) Judges for field events
e) Judges for walking events
f) Time keeper
g) Starter and assistant starter
h) Other officials

(15 Hours)

TEXT BOOK

A.A.F.I..1999.Competitive Rules Hand Book, Asoka Printers, Kanpur.

REFERENCE BOOKS

1. Bosen,K.O..1993.Athelitics, SAINSNIS publication, Patiala, India.
2. Carr Gerry, A.. 1982, fundamentals of track and field, University of Victoria, British – Columbia.
3. Edmundson Joseph, M.C..1958, Athletics for girls and boys, Gbells & sons, London
4. Steban Ralph, E and Sam Bell.,1978,Track and Field, John Wiley & Sons, Inc Canada.

SELF STUDY AREAS

Specific exercises for all track and field events

BPE 2505 THEORIES OF YOGA 5Hr/5Cr

OBJECTIVES:

Enable students to

1. develop the muscles and the body, mainly to the internal organs and glands
2. develops agility, balance, endurance and greater vitality
3. helps to develop sound health and eternal peace of mind

UNIT I

History of Yoga – Meaning and Definition of Yoga – Aims and Objectives of Yoga – Concept of Yoga – Ashtanga Yoga – Patanjali Eight limbs of Yoga – Principles of practicing Asana and Pranayama.

UNIT II

Asanas :

Relative Asanas : Shanthiasana / Savasana, Makarasana

Meditative Asanas : Sukhasana, Padmasana, Vajrasana

Methods and Benefits

UNIT III

Yogic Techniques – Methods and benefits,

Asanas:

Cultural Asanas : Bhujangasana, Salabhasana, Dhanurasana, Pascimottanasana, Vakrasana, Ardha Matsyendrasana, Yogamudra, Sarvangasana, Halasana, Mayurasana, Sirshasana, Chakarasana, Parvatasana, Trikonasana, Ardha kati Chakarasana

UNIT IV

Pranayama: Methods and Benefits, Naddi Suddhi – Nadi Shodhana – Kaphalabhathi, Ujjiayi, Sitali, Sitkari.

UNIT V

Meaning of Kriya – Types of Kriyas: Kaphalabhathi, Trataka, Neti, Dhauthi, Nauli, Basti
Neti: Jala Neti – Sutra Neti – Methods of Practicing Neti and its benefits.
Dhauthi: Vamana Dhauthi, Vastra Dhauthi – Methods of Practicing Dhauthi and its benefits,
Trataka : Practicing Method – Benefits

REFERENCE BOOKS

1. SwamiKuvalayananda, Asanas, Kaivalyadhama, Lonavala,Pune,1991.
2. B.K.S.Iyankar,Light on Yoga Harper Collins Publications,Delhi,2002
3. Mariayyah.P,Asanas, Sports Publishers, Raja Street, Coimbatore-1,1995.
4. Mariyyah.P,Suriyanamaskar Jaya PublishingHouse,Erode,1997
5. Chandrasekaran.K, Sound Health Through Yoga, Prem Kalyan Publications,Sedapatti, Madurai,1999.
6. Jeyaveera Pandian.V.Yoga and Sports, UVN-Publications-Sivakasi,Tamilnadu 2009

BPE 2407 PRACTICAL V TRACK AND FIELD II 4Hr/4Cr

OBJECTIVES

Enable students to

i. learn the strategy and tactics in sports
ii. learn various skills in track and field and gymnastics.
iii. be familiar with rules and regulations, and learn the method of officiating for all track and field events and gymnastics.

TRACK AND FIELD EVENTS-II

A part of the practical period shall be devoted to warming up and conditioning exercises. Both general and specific conditioning exercises for the concerned events shall be introduced.

1.RELAYS

a) Styles of baton exchange
b) Fixing up runners for different relay races

2.TRIPLE JUMP

a) Approach run
b) Take off and landing for hop and jump
c) Flying phase
d) Landing

3. HIGH JUMP

a) Approach run
b) Take off
c) Flying Phase
d) Landing.

4.LONG DISTANCE RUNNING

a) Correct running style emphasizing on proper body position and foot placement.
b) Proper arm and leg action
c) Running tactics

TEXT BOOKS

1. Thirunarayan, C., and Hariharan, S., 1970, Track and Field the South Indian Press, Karaikudi
2. Pintu modak., 1996, Gymnastics a scientific approach.
3. Runthala Publishers & Printers, Near Nehru place 11, Pilani (Raj).

REFERENCE BOOKS

1. Bosen,K.O.,1993.Athletics, SAINSNIS publication, Patiala, India.
2. White, J., 1989, Gymnastics in Action Stanly Paul, London.
3. Gambetta, V., 1981, Track and Field Coaching Manual, Leisure Press Champaign, Illidis.

BPE 2409 PRACTICAL VI YOGA 5Hr/4Cr

PRACTICAL VI

YOGA

Practical work should include the following *asanas* and yogic practices:

1.*ASANAS*

a. *Swastickasana*
b. *Padmasana*
c. *Vajrasana*
d. Samasana
e. *Bhujangasana*
f. *Dhanurasana*
g. Matsyasana
h. *Shalabasana*
i. *Halasana*
j. Patchimotanasana
k. *Yogamudra*
l. *Vakrasana*
m. *Ardha-matsyendrasan*
n. *Vipareetakarani*
o. *Sarvangasana*
p. *Shirsasana*
q. *Mayurasana*
r. *Vrikshasana*
s. *Tadasana*
t. *Makarasana*
u. *Shavasana*

2. *Bandha* and *Kriyas*

Jalaneti, Uddyan and *Nauli, Kapala Bhati*

3. *Pranayam*

Puraka, *Kumbhaka* and *Rechaka* of each of the following

a) Suryabedhan
b) Ujjayi
c) Bhastrika
d) Nadishodhana
e) Sheetali
f) *Shitkari*

TEXT BOOK

1. Goel.R.G,1975, Encyclopaedia Of Sports And Games,Vikaas publishing house Pvt.,Ltd., Delhi.
2. Iyenkar,B.K.S., 1989, Light On *Yoga*, George Allen and Unwin Ltd., London.
3. 5. Chandrasekaran.K, Sound Health Through Yoga, Prem Kalyan Publications,Sedapatti, Madurai,1999.
4. 6. Jeyaveera Pandian.V.Yoga and Sports, UVN-Publications-Sivakasi,Tamilnadu 2009

BPE 2502 METHODS IN PHYSICAL EDUCATION 5Hr/5Cr

OBJECTIVES

Enable students to

1. understand the techniques of Presentation
2. understand class Management
3. understand how to draw fixtures
4. helps to know the methods of deciding winners in League matches

UNIT I

Meaning – Factors influencing Methods – Presentation Techniques.
Class Management – Principles of Class Management
Teaching Aids.

UNIT II

Explain various physical activities in the field of Physical education – Calisthenics – Marching – Minor games – Indigenous activities – Rhythmic activities – Gymnastics – Defensive arts and Swimming

UNIT III

Meaning of Tournaments – Merits and Demerits of Knock-out and League Tournaments – Drawing Fixtures for Knock-out and League Tournaments – Methods of deciding winner in the League tournament and Tie breaking league tournaments

UNIT IV

Intramural Competition : Objectives – Methods of Organizing and Conducting – Units of competition – Intramural Committee
External Competition : Benefits – Drawbacks – Methods of organizing and Conducting

UNIT V

Sports Meet – Standard and Non-Standard – Methods of organizing and conducting sports Meet
Plays Day – Methods of organization and conduct

REFERENCE BOOKS

1. Colin A. Hardy, Mick Mawer, Learning and Teaching in Physical Education, Falmer Press, Great Britain, 1999.
2. James Michael Lee Principles and Methods of Secondary Education,McGraw-Hill,1963
3. Susan Capel Learning to Teach Physical Education in the Secondary School:A Companion to School Experience, RoutledgeFalmer,2004.

BPE 2404 PHYSICAL FITNESS, AND WELLNESS, 4Hr/4Cr

OBJECTIVES:

Enable students to

1. Understand the essentials of lifelong wellness
2. Overcome fitness barriers and involve in physical movement pursuits
3. Learn and excel in Track and Field sports events

UNIT I

Awareness of Physical fitness and Wellness:
Definition – Meaning – Concept of Fitness and Wellness – Need and importance of Fitness and Wellness

UNIT II

Age of Automation – Technological developments – Healthy aging – Wellness – Sports as a hobby and de-stressing agent

UNIT III

Types of Fitness and Wellness:
Chronological fitness – Physiological fitness - Functional fitness – Mental fitness

UNIT: IV

Social fitness – Sports and socialization – Performance related fitness

UNIT: V

Tools to assess fitness – Spiritual fitness and wellness

BOOKS FOR REFERENCE:

1. Hoeger Werner W.K. and Hoeger Sharon A. **Fitness and Wellness**, Englewood:Morton publishing Company, 1990.
2. Hazedine, **Fitness for Sports**, Ramsburg: The Crowood Ress Ltd., 1985.
3. James and Leona Hart. **100% Fitness**, New Delhi: Goodwill Publishing House, 1983.
4. **Wellness-Concepts and applications** – David J. Anspaugh, Michael H. Hamrick and Frank D. Rosato II edition Masby publishing house – Chicago.1991.
5. **International Encyclopedia of sports and games**- Ashok Kumar, Mittal Publications, New Delhi 110059 Vol. I to IV.
6. **Books of rules of games and sports**: Y.M.C.A. Publication House, Jaisingh Road, New Delhi 110007.

BPE 2506 GAME OF SPECIALIZATION – II 5Hr/5Cr
(Basket Ball, Kabaddi, Volley Ball. Handball and Kho – Kho)

OBJECTIVES

To enable the students to

i. trace the history and working federations,
ii. develop the fundamental skills and techniques,
iii. acquire the physiological training, warming – up and motor qualities,
iv. become familiar with the rules and regulations and their interpretations

THEORY

The following games are included in the syllabus of the course.

Basket Ball, Kabaddi, Volley Ball. Handball and Kho – Kho

The general format for covering the aspect for each of the above game is given below.

UNIT I

Content for topics

1. History of games and working of federations.
2. Play field
    a. Layout and maintenance of play field
    b. Equipment and their specification.

UNIT II

1. Officiating
    a. Rules and their interpretation.
    b. Method of officiating.
    c. Duties of various officials.
    d. System of play.

UNIT III

BASKETBALL

Players stance and ball handling, passing and receiving techniques:

PASSING

a) Two hand chest pass.
b) Two hand bounce pass.
c) One hand baseball pass.
d) Side arm pass.
e) Overhead pass.
f) Hook pass.

RECEIVING

a) Two hand receiving.
b) One hand receiving
    i. Receiving in stationary.
    ii Receiving while running.
    iii Receiving while jumping.

DRIBBLING

a) How to start dribble.
b) How to stop dribble.
c) High dribble.
d) Low dribble.
e) Reverse dribble.

SHOOTING

a) Lay-up shot and its variations.
b) One hand set shot.
c) One hand jump shot.
d) Hook shot.
e) Free throw

REBOUNDING

a) Offensive rebound
b) Defensive rebound
c) Rock out
d) Rebound

INDIVIDUAL DEFENCE

a) Guarding the man with the ball
b) Guarding the man without the ball

UNIT IV

KABADDI

OFFENSIVE SKILLS

a) Touching with the hand. b) Leg thrust.
c) Front kick. d) Side Kick.
e) Mule kick. f) Aero kick.
g) Roll kick. h) Jump &Counter.
i) Drive and Counter.

DEFENSIVE SKILLS

a) Wrist catch. b) Ankle catch.
c) Knee catch. d) Thigh catch.
e) Trunk catch. f) Washer man catch.
g) Chain formation.

1. Normal grip.
2. Crocodile grip.

VOLLEY BALL

Fundamentals of techniques and basic skills:

i. Players stance-receiving the ball and passing to team mates.
ii. Foot work.
iii. Service: under-arm, side- arm, overhead and floating
iv. Pass - the volley and dig.
v. Spike - straight arm, round arm.
vi. Block - Individual and group block.
vii. Dives and rolls.

UNIT V

HANDBALL

Basic skills

i. Holding the ball.
ii. Receiving – stationary, walking, running.
iii. Dribbling and stopping.
iv. Progression with ball.
v. Passing.
vi. Throws – Throw in – Throw out – Free throw.
vii. Shooting – Penalty throw, single hand shooting, both hand shooting.
viii. Goal keeping.

KHO – KHO

Fundamentals skills.

a. Chasing and touching
   i. Chaser's stance - foot work
   ii. Sitting
   iii. Proper way of giving kho
   iv. Proper way of getting up.
   v. Turning around the pole.
   vi. Touching at the post
   vii. Judgement kho
   viii. Diving
   ix. Tapping
   x. Trapping

b. Chasing Tactics
   i. Chaser's footwork
   ii. Dodging and pointing movements
   iii. Taking runner to the pole

c. Running Tactics
   i. Selection of batches for running
   ii. Single chain
   iii. Double chain
   iv. Ring formation

TEXT BOOK

Goel, R.C., 1992, Encyclopaedia of sports and games, Trang paper backs, Delhi.

REFERENCE BOOKS:

1. Lokesh Thane, 1996, Handball Skills and Tactics, Sports Publications, Hindustan Offset Press, Delhi.
2. Yogesh Yadav, Kho – kho, Maharashtra Kho – kho Association, 1969.
3. Ashok.K,1983, Kabaddi, A.P. Publishers, Sartaj Printing Press, Jalanthar.
4. Core,R.H.,1988, Teaching Volleyball, Surjeet Publications, Delhi.
5. Fox,A.R.1960,Basketball,Pretince Hall, Engle Wood Cliffs, New Jersey

BPE 2508 PRACTICAL VII GENERAL FITNESS 5Hr/4Cr

OBJECTIVE

Sound mind leads a sound body.

PRACTICALS

GENERAL CONDITIONING

i. Warming up Exercises
ii. Warm down Exercises
iii. Stretching Exercises

STRENGTHENING TRAINING

Weight training exercises

UPPER BODY**:**

i. Abdominal conditioning
ii. Lower and Upper Abdominal
iii. Shoulder Fitness
iv. Back Strengthening Exercises

LOWER BODY:

i. Thigh Muscle Strengthening
ii. Calf Muscle Strengthening
iii. Ankle Strengthening
iv. Knee Strengthening

REFERENCE BOOKS

1. K.O.Bosen. 1997, "Teaching in Athletics" NSNIS,Patiala.
2. L. Matreyer. 1992. "Fundamentals of Sports Training".
3. Hardayal Sing.1992,:Sports Training"-NSNIS,Patiala

BPE 2410 PRACTICAL VIII GAME OF SPECIALIZATION 5Hr/5Cr

GAME OF SPECILISATION

Advanced skills and playing ability.

BASKET BALL, KABADDI, AND VOLLEY BALL

TEXT BOOK

1. Goel.R.G, 1975, Encyclopaedia Of Sports And Games,Vikaas publishing house Pvt.,Ltd., Delhi.

REFERENCE BOOKS

1. Ashok.K, 1983, Kabaddi, A.P Publishers, Sartaj Printing Press, Jalanthar.
2. Core, R.H., 1988, Teaching Volleyball, Surjeet Publications, Delhi.
3. Fox, A.R.1960, Basketball, Pretince Hall, Engle Wood Cliffs, New Jersey.

BPE 3501 TEST, MEASUREMENTS AND EVALUATION IN PHYSICAL EDUCATION 5Hr/5Cr

OBJECTIVES

To teach the testing procedure to find the performance of the sports persons

UNIT I

Meaning of Test, Measurement and Evaluation – Need and Importance of test, Measurement and Evaluation,Classification of Test – Standardized and Teacher Made Test – Objective and Subjective Tests – contribution of Knowledge Test and Skill Test

UNIT II

Criteria of Good test – Validity – Reliability – Objectivity – Norms – Administration Feasibility – Educational Application

UNIT III

Physical Fitness Components – Test for Speed, Strength, Endurance, Agility and Flexibility.

UNIT IV

1. New York State Physical Fitness Test
2. Barrow Motor Ability Test
3. Kraus Weber Test
4. Cooper 12 Minutes Run / Walk Test
5. JCR test
6. Harward Step Test

UNIT V

SKILL TESTS

1. AAPHERD Basketball Test
2. Mc Donald Soccer Test
3. Russel Lange Volleyball Test
4. Harban Singh Hockey Skill Test
5. French Short Service Test (Badminton)

REFERENCE BOOKS

1. Clarke, II Application of Measurement in Health and Physical Education, Prentice Hall, Inc 1976
2. Mathew K Donald, Measurement in Physical Education London WS Saunders Company 1973.
3. Bosco. James. S. measurement and Evaluation in Physical Education and Sports, New Jersey, Prentic Hall Inc. 1988
4. Matheuss k Donald, Measurement in Physical Education. London: W.S. sounders Company 1973.
5. Safrit, Margaat, J., Measurement in Physical Education and Exercise Science, St. Louis Times Mirror Mosby College Publications, 1986.

BPE 3603 THEORIES OF SPORT TRAINING 6Hr/6Cr

OBJECTIVES

Enable students to

1. understand the importance of warm up and warm down exercises
2. understand the importance of Training load
3. understand the basic types of Training

UNIT I
Meaning and Definition – Aims – Tasks and characteristics of sports training – Principles of sports training – importance of warm-up and warm-down

UNIT II
Important features of Training Load – Intensity Density and Volume – Types of Training Load – Training and Adaption – Over Load – Causes Symptoms and Remedies

UNIT III
Means and methods of developing : Strength – Endurance – Speed – Flexibility

UNIT IV
Basic types of Training – Weight training – Circuit training – Plyometric training – Fartlek training – Interval training – Continuous training

UNIT V
Training Plan – Types of Cycles – Periodisation – Definitions of Techniques and Tactics

REFERENCE BOOKS
1. Singh, Hardhayal, Sports training General theory and methods,NIS Patiala,1984.

2. Williams,J.LL Athletic Training and Physical Fitness. Allyn and Bacon Inc.Sydney.1977.

3. Singh,Hardhayal, Science of sports Training, 1987.

4. Dick Frank.,Sports Training Principles,Times Mirror Mosby publishing,1982.

5. Mathew,L.P.Fundamental sports Training, Publication Prentice Hall In.,1993.

BPE 3605 PRACTICAL IX TEST AND MEASUREMENT 6Hr/6Cr

OBJECTIVES
Enable students to
i. have knowledge of sports skill test
ii. learn about administration of various test and procedures

List of Practicals:

Test and Measurement
1. Anthropometric tests
2. Sports skill tests:
    i. French Badminton test
    ii. Knox Basketball test
    iii. Sutcliffe Criket skill test
    iv. Schmithals Frence Field Hockey test
    v. AAHPER Football test
    vi. AAHPER Volleyball test
    vii. Cornish Handball test
    viii.Broer-Miller forehand and backhand drive test

TEXT BOOK:

1. Verma, H., 2013,"Test and Measurement in Physical Education",Sports Publications, New Delhi.

REFERENCE BOOKS:

1. Krishnan, J., 2005, "Evaluation of Physical Education and Sports." First Edition, Sports Publication, New Delhi.
2. Srivastava.A.K., 2013, " Evaluation in Test and Measurement" Sports Publications, New Delhi.

BPE 3607 PRACTICAL X SPORTS TRAINING 6Hr/6Cr

OBJECTIVE

To know various methods of physical training to enhance sports performance

METHODS OF SPORTS TRAINING

1. Training of Motor Qualities
2. Strength Training
3. Endurance Training
4. Training Plans
5. Interval Training
6. Circuit Training
7. Plyometric Training
8. Weight Traning

REFERENCE BOOKS

1. K.O.Bosen teaching in Athletics,NSNIS,Patiala
2. Stephen Ralph,E&Som Bell, 1978,Track and Field,John Witley&Sons,INC,Canada
3. Scientific Principles of Coaching-J.Bunn
4. Fundamentals of Sports Training – L.Matreyer
5. Sports Training – Hardayal Sing

BPE 3200 ENVIRONMENTAL STUDIES 4Hr/2Cr

OBJECTIVES

Enable students to

understand How the variations in the Environment helps him to adapt and perform

UNIT I

Introduction – Variation in Temperature – Exercise in the Heat

UNIT II

Dehydration - Acclimatization

UNIT III

Exercise in the Cold - Humidity

UNIT IV

Altitude – Altitude Acclimatization – Physiological Changes that take place during Acclimatization to Altitude

UNIT V

Physical performance at Altitude – Main effects of High Altitude on Physical Performance – Physiological function at Altitude

TEXT BOOK

Ajmer Singh, Jaggdish Bains, Jagtar Singh Gill, Rachhpal Singh Brar, 'Essentials of Physical Education' Fifth Revised Edition, Kalyani Publishers, New Delhi,2016.

REFERENCE BOOKS

1**.** Mathews,Donald K.and Fox Edward I…'The Physiological Basis of Physical Education and Athletics'. Third Edition Saunders College Publishing,Holt. Saunders Japan. 1985.
2**.** Marley,William, "Health and Physical Fitness".CBS College Publishing, United States of America. 1982.
3. Shephard.R.J**.** 'The Fit Athlete'. Oxford University Press.1978.
4. Shaver, Larry G**.** "Essential of Exercise Physiology"Surjeet Publications. Delhi, First Indian Print.1982.
5**.** Wilmore, Jack H**.** "Athlrtic Training and Physical Fitness" 1977. Allyns and Bacon. Inc. 470. Atlantic Avenue, Boston. Masachusetts.1977'.

BPE 3502 PSYCHOLOGY AND SOCIOLOGY OF PHYSICAL EDUCATION & SPORTS 5Hr/5Cr

OBJECTIVES

Enable students to

i. understand the meaning ,scope and nature of psychology and sociology of physical education and sports.
ii. analyse the factors which affect the learning process, role of perception in physical education and sports.
iii. analyse the role of motivation in physical education and sports and
iv. interpret the sports and social problem, behaviour of sportsmen and spectators and leadership through physical education and sports.

THEORY

PSYCHOLOGY

UNIT I

Meaning, Scope and nature of psychology and psychology of physical education and sports, Motor learning, Stages, theories and law of learning process, role of perception in physical and sports.

UNIT II

Personality-nature of personality, various traits of personality and its relation to performance in physical education and sports.Personality development.

UNIT III

Emotion and their role in physical education and sports.
Motivation - Meaning and its role in physical education and sports.
Main tasks in psychological preparation, psychological aspects of short term and long term training.

SOCIOLOGY

UNIT IV

Meaning, nature and scope of sociology and sociology of physical education and sports. Physical Education and Sports as a special phenomena and product of culture and its relationship with other elements of culture- sports for better international understanding co-operation.

UNIT V

Sports as regulating institution of society. Sports and social problems. Behaviour of sportsmen and spectators, leadership through physical education and sports.

TEXT BOOKS

1. Kamalesh,M.L.1988, Psychology in physical education and sports, Renu Printers, Delhi.
2. Kumar.R.1991, Principles of sociology, Agarwal Ltd, Agra.

REFERENCE BOOKS

1. Bucher, C.A.1987, Foundations of physical education,St.Louis, C.V.Mosby company, Missouri,America.
2. Gita, M., 1997, Sports Psychology, Shaju and Shaju Brothers Publication, Karaikudi.
3. Mukhi.K.R.1985,Rural sociology,R.B Publications,Delhi.
4. Swinn.R.M.1989,Psychology in sports,Methods and Applications, Surjeet Publications, Delhi.

BPE 3604 FUNDAMENTALS OF KINESIOLOGY 6Hr/6Cr

OBJECTIVES

Enable students to

1. understand the meaning, aim and objectives and importance of kinesiology and bio mechanics for Physical Education and Sports
2. acquire the fundamental concepts of kinesiology for Physical Education and Sports
3. acquire knowledge of various types of motions and application of motion in games and sports and
4. interpret the principles of Biomechanics with suitable examples

UNIT I

KINESIOLOGY

Introduction: meaning, history, aim and objectives of kinesiology for physical education and sports.

UNIT II

1. Joints: meaning. Classification of joints: Shape – Movement.
2. Fundamental movements of joints: Flexion – Extension – Adduction – Abduction – Elevation – Depression – Circumduction – Rotation – Inversion – Eversion – Dorsi flexion – Plantar flexion – Pronation - Supination

UNIT III

Fundamental concepts: centre of gravity, area and planes of motion, fundamental starting positions, and classification of muscles.

UNIT IV

Location and action of muscles at various joints

a) Upper extremity – Pectoralis major, Pectoralis minor, deltoid, biceps brachii, triceps, teres major, latissimus dorsi and trapezius muscles
b) Lower extremity – Rectus femoris, sartorius, biceps femoris, semimembranus, semitendinosus, gluteus maximus, vastus group and gasatrocnemius muscles

UNIT V

Muscular analysis of Fundamental movements walking, running, and throwing Structure of motor action: Structure of cyclic and acyclic motor action and movement condition.

TEXT BOOK

Cooper and classgow., 1976, Kinesiology C.V., Mosby Company Saint Louis.

REFERENCE BOOKS

1. Bunn.J.W., 1969, Scientific Principles Of Coaching, Prentice Hall, New Jersey.
2. Hay, J.G., 1978, The Biomechanics Of Sports Techniques, Prentice Hall, New Jersey.
3. Katharine, F.W,1966, Kinesiology,W.B.Saundas,London.

BPE 3606 PRACTICAL XI TRACK AND FIELD III 6Hr/6Cr

OBJECTIVES

Enable students to

iv. learn the strategy and tactics in sports
v. learn various skills in track and field
vi. be familiar with rules and regulations, and learn the method of officiating for all track and field events and gymnastics.

TRACK AND FIELD EVENTS-III

A part of the practical period shall be devoted to warming up and conditioning exercises. Both general and specific conditioning exercises for the concerned events shall be introduced.

1. 1. HURDLES
   Approach run
   Take off or attack phase.
   Clearance of the hurdle or interphase:
   Lead leg action
   Trailing leg action

Body position
Landing or escape
Inbetween the hurdles.
Techniques at finish.

2. POLE VAULT
   Pole grip
   Carry and run
   Pole plant
   Take off
   Rock back
   Pull up
   Push up
   Bar clearance
   Landing

3. JAVELIN THROW
   Grip
   Carry
   Approach run
   Last five strides rhythm including impulse stride
   Delivery stance
   Delivery
   Reverse

4. HAMMER THROW
   Grip
   Initial stance
   Preliminary swings
   Entry (or) Transition from swings to turn
   Turns
   Delivery Stance
   Delivery action
   Reverse

TEXT BOOKS

1. Thirunarayan, C., and Hariharan, S., 1970, Track and Field the South Indian Press, Karaikudi
2. Pintu modak., 1996, Gymnastics a scientific approach.
3. Runthala Publishers & Printers, Near Nehru place 11, Pilani (Raj).

BPE 3608 PRACTICAL VIII GAME OF SPECIALIZATION 6Hr/6Cr

GAME OF SPECILISATION

Advanced skills and playing ability.

HAND BALL , KHO-KHO, AND TENNIS

TEXT BOOK

1. Goel.R.G,1975, Encyclopaedia Of Sports And Games,Vikaas publishing house Pvt.,Ltd., Delhi.

REFERENCE BOOKS

1. Hayleft, J. and Evelians,1989,The Illustrated Encyclopedia of World Tennis,Exter Books, New York.
2. Jones,C.M.1973,Improving Your Tennis, Faber and Faber Publications, London.
3. Vincent, T., 1973,Why You Lose At Tennis?, Barnes & Noble Books, London.
4. Lokesh Thane, 1996, Handball Skills and Tactics, Sports Publications, Hindustan Offset Press, Delhi.
5. Yogesh Yadav, Kho – kho, Maharashtra Kho – kho Association, 1969.

UNDERGRADUATE DEPARTMENT OF PSYCHOLOGY (SF)

PROGRAMME FOR B.Sc. PSYCHOLOGY (SF)

FROM 2017 BATCH ONWARDS

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	**Part I**	**Lang**	Tamil/Hindi/French	3	2	30
	Part II	ENS 1201	Conversational Skills	3	2	30
	Part III Major	**PSY 1501**	General Psychology - I	5	5	75
		PSY 1403	Developmental Psychology - I	4	4	60
		PSY 1405	Biological Psychology	4	4	60
		PSY 1407	Introduction to Sociology	5	4	60
	Part IV	**NME XXXX**	Non-Major Electives	3	2	30
		LS XXXX	Life Skill	3	2	30
			TOTAL	**30**	**25**	**375**
II	**Part I**	**Lang**	Tamil/Hindi/French	3	2	30
	Part II	ENS 1202	Reading & Writing Skills	3	2	30
	Part III Major	**PSY 1502**	General Psychology - II	5	5	75
		PSY 1404	Developmental Psychology - II	4	4	60
		PSY 1406	Statistics for Psychology	4	4	60
		PSY 1408	Educational Psychology	5	4	60
	Part IV	**NME XXXX**	Non-Major Electives	3	2	30
		LS XXXX	Life Skill	3	2	30
	Part V	**Extension**	NSS /PED/SLP	2	1+1	
			TOTAL	**30+2**	**25**	**375**
III	**Part I**	**Lang**	Tamil/Hindi/French	3	2	30
	Part II	ENS 2201	Study Skills	3	2	30
	Part III Major	**PSY 2501**	Social Psychology - I	5	5	75
		PSY 2503	Experimental Psychology - I	5	5	75
		PSY 2405	Rehabilitation Psychology	4	4	60
		PSY 2507	Abnormal Psychology - I	5	5	75
		PSY 2409	Geriatric Psychology	5	4	60
			TOTAL	**30**	**27**	**405**

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
IV	Part I	Lang	Tamil/Hindi/French	3	2	30
	Part II	ENS 2202	Career Skills	3	2	30
	Part III Major	PSY 2502	Social Psychology - II	5	5	75
		PSY 2404	Research Methods in Psychology	4	4	60
		PSY 2506	Abnormal Psychology - II	5	5	75
		PSY 2508	Experimental Psychology - II	5	5	75
		PSY 2410	Industrial Psychology	5	4	60
	Part V	Extension	NSS / PED/SLP	2	1	
			TOTAL	30 + 2	27+1	405
V	Part III Major	PSY 3601	Cognitive Psychology	6	6	90
		PSY 3603	Health Psychology	6	6	90
		PSY 3605	Principles of Counselling	6	6	90
		PSY 3507	Disaster Management	5	5	75
	Part IV	LS XXXX	Life Skill	3	2	30
		PSY 3200	Environmental Studies	4	2	30
			TOTAL	30	27	405
VI	Part III Major	PSY 3602	Positive Psychology	6	6	90
		PSY 3604	Organizational Behaviour	6	6	90
		PSY 3606	Research Project	6	6	90
		PSY 3509	Sports Psychology	5	5	75
	Part IV	LS XXXX	Life Skill	3	2	30
		HVS		4	2	30
			TOTAL	30	27	405
GRAND TOTAL FOR SEMESTER (1 TO 6)				180+4	158+2	2370

SUPPORTIVE COURSES

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	III	PSY 1407	Introduction to Sociology	5	4	60
II	III	PSY 1408	Educational Psychology	5	4	60
III	III	PSY 2409	Geriatric Psychology	5	4	60
IV	III	PSY 2410	Industrial Psychology	5	4	60

NON-MAJOR ELECTIVE COURSES

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	**IV**	**PSY 1201**	Psychology in Daily Life	3	2	30
II	**IV**	**PSY 1202**	Guidance & Counselling	3	2	30

LIFE – SKILL COURSES

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	**IV**	**PSY 1203**	Life Skill Education	3	2	30
II	**IV**	**PSY 1204**	IT Skills for Psychologists	3	2	30
V	**IV**	**PSY 3201**	Cyber Psychology	3	2	30
VI	**IV**	**PSY 3202**	Consumer Psychology	3	2	30

PSY 1501 GENERAL PSYCHOLOGY I 5 Hrs / 5Cr

OBJECTIVES:

- To help the students to understand the Basic concepts of Psychology.
- To facilitate their understanding application of the basic components of Psychology.

UNIT I:

A definition of Psychology-practical problems, Methods of Psychology, Work of Psychologists, Schools of psychology.

UNIT II:

Attention & Perception- Conscious clarity, determinants of Attention, Distraction, Training attention, Physiological basis of attention, Sensory deprivation, attention and overt behaviour; Perceptual constancies, Instabilities, perception of fundamental physical dimensions, illusions, Organizational factors of perception, sensory interaction; Perception in learning.

UNIT III:

Learning: Principles of learning - Classical conditioning, Operant Conditioning, Principles of reinforcement, Cognitive Learning, Individualized learning, Learner & learning.

UNIT IV:

Memory - Kinds Of memory, Processes of memory, Stages of memory, Levels-Of-Processing model, Forgetting, Biology of memory.

UNIT V:

Thinking and language- Thinking process, Concepts, Problem-solving, Decision Making, Creative thinking, Language, communication.

REFERENCE

1. Morgan, Clifford.T., King, Richard.A., Weisz,John.R., Schopler, John (1993): Introduction to Psychology, TataMcGraw Hill.
2. Marx, Melvin H. (1976) Introduction to psychology - Problems, Procedures & Principles, MacMillan Publishing Co.
3. Hilgard, E.R., Atkinson, R.L., Atkinson, R.C., (1979): Introduction to Psychology, Harcourt Brace Jovanovich. Inc.
4. Baron, R. A., & Misra, G. (2014). Psychology, 5th ed. New Delhi: Pearson Education
5. NCERT (2002). *Introduction to Psychology- Part-I.* New Delhi: NCERT

PSY 1403 DEVELOPMENTAL PSYCHOLOGY I 4 Hrs/ 4Cr

OBJECTIVES:

- To help the students to understand the basic concepts of Developmental Psychology.
- To facilitate their understanding application of the components of Development Psychology.

UNIT I:
Conception through birth: Fertilization, Prenatal development, Environmental Influences on prenatal development; stages of child Birth, types of childbirth: prenatal hazards & complications of low birth weight.

UNIT II:
Infancy & Toddlerhood (0-3 years) - Physical & Cognitive Development - Body Systems of neonate, infant reflexes, infant Sensory capacities, Milestones of motor development, Environmental influences on motor development; Piaget's Sensorimotor Stage.

UNIT III:
Infancy & Toddlerhood - Language and Personality Development - Theories of language development, Stages of language development from 0-3 years; Emotional development - Temperamental differences, Development of Attachment - Individual differences and long term correlates of attachment.

UNIT IV:
Early childhood (3-6 years) - Motor Skills, Piaget's Preoperational stage, Development of language; gender differences, fears and aggression; prosocial behaviour, Child rearing practices and parenting styles

UNIT V:
Middle Childhood (6-12 years) - Piaget's Stage of Concrete operations, Development of self concept, Components of self concept, Theoretical perspectives on self concept - Freud's latency period, Erickson's Industry vs Inferiority, Social learning theory, Information processing approach; The child in the peer group, functions and influences of the peer group, Friendship & popularity Visits to nursery schools / hospitals to get an idea about preschoolers and infants should be arranged.

REFERENCES:
1. Hurlock, E: Developmental Psychology (1980), Tata McGraw Hill Publishing Co.
2. Papalia, Diane E, Olds, Sally Wendoks (2003): Human Development, Tata McGraw Hill Publishing Co
3. Brown, Carol (2008), Developmental Psychology, Sage publications

PSY 1405 BIOLOGICAL PSYCHOLOGY 4 Hrs/4Cr

OBJECTIVES:
- To lend a hand to the students to understand the Basic concepts of Biological Psychology.
- To make easy their understanding & application of the components of Biological Psychology.

UNIT I
The Nature of Biological Psychology- Meaning and Definition of Physiological Psychology - Historical views on human behavior - The Modern Era of Brain Imaging -Physiological Psychology and Neuroscience

UNIT II:
Neuro anatomy - The neuron: Structure of the neuron, types of Neurons; The Peripheral Nervous system: Structure and function The Skeletal Nervous system-structure and function; The Autonomic Nervous System-Structure & function The Central Nervous System: Spinal cord - structure and function The Brain - hindbrain, midbrain & forebrain.

UNIT III:
Neural Impulse: Neural impulse Cycle: membrane potential, resting potential, action potential; conduction across the length of a neuron and conduction across the synapse; Neurtransmitters and the nervous system - acetylcholine, dopamine, norepinephrine & GABA.

UNIT IV:
Hormones and Behaviour-Main endocrine glands, their hormone products and principal effects of the hormones

UNIT V:
The Biology Of Emotions, Learning & Memory Emotional behaviour - Visceral factors in emotional behaviour, Autonomic nervous system & emotions; Brain mechanisms Learning & Memory: Various types of memory, brain damage & Impairments of implicit memory; brain damage & experiments Of explicit memory; The story of H.M: a man with hippocampal Damage; role of hippocampus, amygdala and frontal cortex.

REFERENCE

1.Kalat, James. W.,(2003) Physiological Psychology, Brooks/Cole Publishers
2. Morgan (l965): Physiological Psychology, International student edition, McGraw Hill Series
3. Rosenweig, Breedlov, Leiman(2002): Biological Psychology, 3rd edition, Sinaven Associates, Inc

PSY 1407 INTRODUCTION TO SOCIOLOGY 5 Hrs/4Cr

OBJECTIVES

- To help the students understand the concepts of society.
- To facilitate their understanding about the components of society.
- To help them understand the relevance of the knowledge of society for Psychological practice.

UNIT I
Sociology: Definition, Meaning, Characteristics and Concept. Society, Community, Social group, Associations, and Institution: Definition, Meaning, Characteristics, Types.

UNIT-II
Social Processes - Meaning, Types -Co-operation, Competition, Conflict, Accommodation, and Assimilation. Concept and meaning of culture, civilization, customs, folkways and mores.

UNIT-III
Social Institutions – Meaning, Primary & Secondary Institution, and Functions. Socialization – Definition and functions. Agencies of Socialization.

UNIT-IV
Social stratification - concept, and forms. Concept of Caste, Class, and Race. Caste System in India.

UNIT-V
Social Control-, Definition, Concept, agents of Social Control. Social Change – Definition, concept, process, factors for Social Change.

REFERENCES:
1. Shankar Rao (2011) Principles of sociology, Tata Macraw Hill, New Delhi.
2. Mangal(PD), 2011 Sociology of Social Stratification, Centrum press, New Delhi
3. Ashok Walekar, 2012, Encyclopedia of Sociology and Social Work –I, ABD Publishers
4. Ashok Walekar, 2012, Encyclopedia of Sociology and Social Work –II, ABD Publishers.
5. Haralambos & Holborn (2013) Sociology: Themes and Perspectives 8th Edition. Collins UK.

PSY 1201 PSYCHOLOGY IN DAILY LIFE 3 Hrs/2Cr

OBJECTIVES
- To help students to understand the concept of behavior.
- To enable them to understand the factors influencing human behavior.
- To help them to understand the importance of studying human behavior.

UNIT –I
Psychology - Meaning, Definition, Scope. Branches of Psychology. Importance of Psychology in Daily Practice.

UNIT -II
Developmental Psychology: Conception, Pregnancy – Child growth & development. Importance of prenatal development. Developmental tasks in each stage: Infancy to old age.

UNIT -III
Personality – Definition, Types of personality, Introduction to Theories of Personality, Learning and remembering: Meaning of learning - Types of learning, Learning Theories: Conditioning theory, operant conditioning theory.

UNIT –IV
Memory –Meaning, Types, Factors influencing of memory. Behavior: Meaning, Types of behavior, factors influencing behavior. Behavior modification: Definition and techniques.

UNIT –V
Intelligence: Meaning and definition of intelligence. Motivation - Meaning, Types of motives.- Introduction to psychological testing, Frustration - sources of frustration, Defense mechanisms – Meaning and types. Application of Psychology in various fields (Family, Educational settings, Industry).

REFERENCES

1. Morgan, Clifford (1986), Introduction of Psychology, New Delhi, Tata McGrawHill
2. Barron, Robert, A (2000), Psychology 5th Edition, Allyn & Bacon
3. Hurlock, Elizabeth, (2002), Development Psychology, New York, McGraw Hill.
4. Hilgard& Atkinson, (1998), Introduction to Psychology, New York, HCB & Word.

PSY 1203 LIFE SKILL EDUCATION 3 Hrs/2Cr

OBJECTIVES:

- To help the students to understand self.
- To help them to equip thinking skill, problem solving skill, coping skill
- To strengthen their Life skills.

UNIT I:

Life skills: importance, category of skills. Self awareness: concept of self, self awareness-Johari window, concept of ideal and real self, inferiority complex.

UNIT II

Relationship management: importance, expectations, conflicts, nurturing relationship. Communication: objectives, passive, aggressive and assertive communication.

UNIT III

Empathy: concept of empathy, importance, development of empathy.
Thinking skills: creative and critical thinking, strategies to develop these skills.

UNIT IV

Coping skills: understanding emotions and stress, strategies to manage emotions and stress effectively. Stress Management techniques.

UNIT V

Problem solving: concept of problem, problem analysis, problem solving techniques. Decision
making: problems in making decisions, decision making techniques.

References:

- Centre for Field Assistance and Applied Research (2001), **Life Skills Manual,** Washington, Peace Corps.
- WHO Report (1997), Life Skill Education Guidelines
- MS Chellamuthu Trust, Life Skill Education Manual.

PSY 1502 GENERAL PSYCHOLOGY II 5 Hrs/5Cr

OBJECTIVES:

- To help the students to understand the Little Advanced concepts of Psychology.
- To facilitate their understanding application of the components of Psychology.

UNIT I.

Intelligence - Theories - Factor, Cognitive: measurement of Intelligence; Determinants; Testing for special aptitudes.

UNIT II.

Motivation - Motives as inferences, explanations and predictors, Theories of motivation, Biological motivation, social motives, Motives to know and to be effective, Frustration and Conflicts of motives.

UNIT III.

Emotions - Components of Emotion, Characteristics & Functions of Emotion, Expression and Control of Emotions, Emotions & lie detectors, Facial feedback hypothesis, Theories of emotions, Measurement of Emotion, Culture and Emotion.

UNIT IV.

Personality - Determinants of Personality (brief review), Theories Of personality - Psychodynamic, Trait, Type, Learning, Behavioural & Self: Measurement of personality

UNIT V.

Consciousness - Fundamental processes, active and passive roles of consciousness; Sleep & dreams; Hypnosis.

REFERENCE:

1. Hilgard, Ernest R., Atkinson, Rita L., Atkinson, Richard, C.(1979) : Introduction to Psychology, Harcourt Brace Jovanovich. Inc
2. Rathus, Spencer A.(1996) : Essentials of Psychology, Wadsworth Publishing Co Inc
3. Marx, Melvin H.(1976) : Introduction to Psychology-Problems, procedures & Principles (for chapter V only)
4. Baron, R.A.(2013). Psychology. India: Dorling Kindersley.
5. Smith, E.E., Hoeksema, S.N., Freddrickson, B.,• & Loftus, G.R. (2006). Introduction to Psychology. India : Thomson learning Inc.

PSY 1404 DEVELOPMENTAL PSYCHOLOGY II 4 Hrs/Cr

OBJECTIVES:

- To help the students to understand the little advanced concepts of Development Psychology.
- To make possible of their understanding in application of the components of Development Psychology.

UNIT I:

Adolescence (13-19 years): Physical Changes - adolescent growth spurt, Maturation in adolescence, psychological impact of physical Health concerns of adolescents; Intellectual development - Piaget's formal operational stage, home influences on achievement in schools, effect of cognitive growth on adolescent lives - social cognition.

UNIT II:
Influences on Vocational planning; Theoretical Perspectives on adolescence; Identity Formation- gender identity and sex role identity; Relationship with parents - roots of conflicts, how adolescents are affected by parents' life situation; relationship with peers - friendship.

UNIT III:
Young adulthood (20-39 years): Intellectual development; Vocational adjustment in young adulthood - stability of vocational choice; Work and gender influences; Health & fitness in young adulthood.
Young adulthood : Marriage and areas of marital adjustment; Parenthood; Factors influencing adjustment to parenthood; Alternate ways to parenthood; Divorce.

UNIT IV:
Middle Age (40-64 years): Physical changes and health in middle age; Adjustment to physical changes; Work in middle ages; Marital satisfaction in midlife; Relationship with maturing Children; Relationship with aging parents

UNIT V:
Late Adulthood (65 - death) - Physical and Cognitive Development -Aging, Physical Development, Cognitive Development. Psycho-Social Development-Social Development, Personal Development. Old Age - Social and family adjustments. - Violence and health problems, spirituality in later life.

REFERENCE

1. Paplaia, Diane B., Olds, Sally, Wendkos(1992): Human Development, Tata McGraw Hill Publishing Co
2. Shaffer, David R(1996): Developmental Psychology, IV Edition, Brooks/Cole Publishing Company
3. Travers, D. (1999). *Human Development. Across the life span*. 4th ed. London: McGraw Hill.
4. Hurlock, E. (1980): Developmental Psychology, Tata McGraw Hill
5. Conger, John.J. and Galambos, Nancy. L. (1997): Adolescence and Youth, 5th edition, Longman, New York.

PSY 1406 **STATISTICS FOR PSYCHOLOGY** **4 Hrs/4Cr**

OBJECTIVE:
To learn the basics of statistics and how to apply the methods and techniques in statistics for data analysis.

UNIT I: Introduction - Meaning of statistics, Need and Importance of Statistics in psychology. Types of statistics – descriptive, inferential; Scales of measurement - Nominal, Ordinal, Interval & Ratio; Organization of data -Coding, Sorting, Editing, Data Entry, Data Verification, Tabulation.

UNIT II: Graphical Representation of data - One Dimensional, Two and Three Dimensional diagrams. Graphical representation of data - Frequency polygon, histogram, cumulative frequency graph and O give; computing percentiles.

UNIT III: Measures of Central Tendency - Mean, Median & Mode. Advantages and Limitations of different types of Central Tendencies. When to use the mean, median & mode.

UNIT IV : Measures of Variability - Range, Quartile deviation, Average Deviation & Standard deviation; coefficient of variation. Concept of Normal Distribution. Properties and applications of Normal Curve.

Unit V: Correlation - Meaning & Types; correlation & causation; coefficient of correlation and its interpretation. Karl Pearson's coefficient of Correlation. Edward Spearman's Rank Correlation. Introduction to Hypothesis Testing. (Usefulness of basic Parametric and Non Parametric Tests- (***only theory no problems***)

REFERENCE

1. Garrett, Henry E.(1981): *Statistics in Psychology & Education*, Vakils, Feffer & Simons Ltd.
2. Gupta, S.P. (2015): *Statistical Methods*, New Delhi, Sultan & Chand.
3. Kothari, C.R. (2004). *Research Methodology: Methods and Techniques*. New Delhi, New Age International Pvt. Ltd.

PSY 1408 EDUCATIONAL PSYCHOLOGY 5 Hrs/Cr

OBJECTIVES

- To provide an understanding about the psychological elements in learning process and different¬ views about learning.
- To familiarize students with various aspects related to the instructional process.
- To develop an overview of the importance of development in education
- To equip the students with the theoretical and practical know-how of how to work as a educational psychologist.

Unit-I: Exploring Educational Psychology.

Exploring Educational Psychology: Historical Background- Teaching: Art and Science- Effective Teaching: Professional knowledge and Skills-Goal Setting and Instructional planning Skills-Classroom Management Skills-Motivational Skills-Technological Skills.
Research in Educational Psychology: The Scientific Research Approach – Research Methods.

Unit II: Cognitive Development: Piaget's theory and Vygotsky's Theory .

Cognitive Development: Piaget's theory: Cognitive Processes-Piagetian Stages-Evaluating Piaget's Theory: Contributions and Criticisms. Vygotsky's Theory-Assumptions- Zone of Proximal Development-Scaffolding- Language and Thought.

Unit III: Language Developments and Intelligence .

Language Development: Language-Morphology-Syntax- Semantics-How Language Develops-Biological and Environmental Influence. Memory: Encoding-Storage-Retrieval and Forgetting. Intelligence: Intelligence Tests- Theories of Multiple Intelligence-Information- Processing Approach

Unit IV: Learning and Motivation .

Learning: Behavioral Approach to Learning-Classical Conditioning- Operant Conditioning. Increasing Desirable Behaviors- Decreasing Undesirable Behavior. Bandura's Social Cognitive Theory- Observational Learning. Teaching Techniques: Description-Demonstration- Lecture Method- Discussion Method- Dramatization-Explanation- Aptitude Treatment Interaction –Mastery Learning –Teaching through Multimedia.

Unit V: Special Education.

Children with Disabilities- Learning Disabilities- ADHD- Mental Retardation- Physical Disorders- Sensory Disorders- Speech and Language Disorders- Autism Spectrum Disorders-Emotional and Behavioural Disorders of Children who are gifted- Characteristics and educating gifted children.

REFERENCE

1. Santrock, J. W. (2006), *Educational Psychology*, 2nd Edition, New Delhi, Tata McGraw Hill.
2. Corno, Lyn & Anderman, Eric M (2012), *Handbook of Educational Psychology (2nd edition)* Routledge
3. Misra, Girishwar & Woolfolk, Anita (2012), *Fundamentals of Educational Psychology*, Pearson India

PSY 1202 COUNSELLING AND GUIDANCE 3 Hrs/2Cr

OBJECTIVES:

- To enable the students to understand the concept of Counselling in different perspectives.
- To help them understand the importance of counseling in the process of recovery.
- To strengthen their skills that would enable them to perform their role effectively.

UNIT I:

What is Counselling? Conceptual clarification of related terms - Guidance & Counselling , Advice & Counselling, Education & Counselling characteristics & attitudes; Need for Counseling.

UNIT II:

Direction & Counselling; Instruction & Counselling The effective counselor - Counselling approaches and practices - Directive, non directive, Existential, Eclectic.

UNIT III:
Group Counselling & Guidance - Aims, Appeal, Types of groups.

UNIT IV
Counselling Interview - Nature and significant features, setting And types of counseling interviews, Organization & Development And guidelines.

UNIT V:
Tools & Techniques used in counseling and guidance - Testing & non testing devices, Tools and techniques for environmental information; Tools used in assisting individuals towards self discovery Some guidelines.

REFERENCE

- John Antony, D OFM Cap.(2015)Counselling Made Easy, Dindugal, Guru Publications.
- Pasricha, Prem (1976) : Guidance and Counselling In Indian education
- Rao, Narayan (1984): Counselling Psychology
- Dave, Indu (1992): Basic Essentials of Counselling

PSY 1204 IT SKILLS FOR PSYCHOLOGISTS 3 Hrs/2Cr

OBJECITIVES
- To understand the basics of computer.
- To acquire knowledge of MS word, Excel, Power Point and SPSS
- To learn the usages of computer in social work profession.

UNIT I
Introduction to computers – Generations of computers – Classification of computers – application of computers. Computer Architecture – personal computer – Hardware / Software – operating systems – computer languages.

UNIT II
Starting Windows – desktop – mouse – window maximizing, minimizing, restoring & closing a window. Using the start menu – control panel – windows explorer – copying, moving files – finding files or folders.

UNIT III
Starting word – creating a document – saving, printing, resaving and closing a document. Editing a document – move and copy text – Formatting Text and paragraph – finding and replacing text and checking spelling – mail merge.

UNIT IV
Worksheet - Excel – getting started with Excel. Entering numbers – entering formula –editing cells and using commands and functions – moving and copying. Inserting and deleting rows and columns – creating charts – Data base in a Worksheet.

UNIT V

Power point – slides – inserting new slides – clip arts – power point views – running a slide show – printing a presentations – format options – editing features. Internet – web browsers – email – search engines – chatting. Introduction to data analysis – analysis of data through computer software – introduction to SPSS – variable list – variable code - value code – cross tabulation – simple statistical analysis.

REFERENCES

1. Ritu Choudhary (2011) Operating systems. Centrum Press, New Delhi.
2. Vasanthi Ramanathan (2007) Computer application in Business, Meenakshi pathipagam.
3. The Institute of Charted Accountants in India (2015) Information Technology Training Programme Module 1, New Delhi
4. Taxali R.K (2005) PC Software for Windows, New Delhi, McGraw Company.
5. Jeff Walden ,More File Formats for Popular PC Software, New Delhi,Wiley.

DEPARTMENT OF FOOD SCIENCE
Choice Based Credit System
Program for B.Sc. – Food Science and Nutrition (2017 onwards)

Sem	Part	Course no	Course title	Hrs	Credits	Marks
I	I	XXX 0000	Tamil/French/Hindi	3	2	30
I	II	ENS 1201	Conversational Skills	3	2	30
I	III-C	FSN 1511	Food Science	5	5	75
I	III-C	FSN 1413	Lab in Food Science	4	4	60
I	III-C	FSN 1415	Nutrition Science	4	4	60
I	III-S	FSN 1401	Human Physiology	5	4	60
I	IV-E	XXX 0000	Non Major Elective –I	3	2	30
I	IV-LS	XXX 0000	Life Skill –I	3	2	30
I	V	XXX 0000	Extension Activity (NSS/SLP/PED)			
			Total	**30**	**25**	**375**
II	I	XXX 0000	Tamil/French/Hindi	3	2	30
II	II	ENS 1202	Reading & Writing Skills	3	2	30
II	III-C	FSN 1512	Nutritional Biochemistry	5	5	75
II	III-C	FSN 1414	Lab in Nutritional Biochemistry	4	4	60
II	III-C	FSN 1416	Food Microbiology	4	4	60
II	III-S	FSN 1402	Human Nutrition	5	4	60
II	IV-E	XXX 0000	Non Major Elective –II	3	2	30
II	IV-LS	XXX 0000	Life Skill – II	3	2	30
II	V	XXX 0000	Extension Activity (NSS/SLP/PED)		1	
			Total	**30**	**25+1**	**375/390**
III	I	XXX 0000	Tamil/French/Hindi	3	2	30
III	II	ENS 2201	Study Skills	3	2	30
III	III-C	FSN 2517	Food Chemistry	5	5	75
III	III-C	FSN 2519	Food Processing – I	5	5	75
III	III-C	FSN 2411	Lab in Food Processing	4	4	60
III	III-C	FSN 2513	Food Service Management	5	5	75
III	III-S	FSN 2403	Child development	5	4	60
III	V	XXX 0000	Extension Activity – NSS/SLP/PED			
			Total	**30**	**27**	**405**

Sem	Part	Course no	Course title	Hrs	Credits	Marks
IV	I	XXX 0000	Tamil/French/Hindi	3	2	30
IV	II	ENS 2202	Career Skills	3	2	30
IV	III-C	FSN 2510	Therapeutic Nutrition-I	5	5	75
IV	III-C	FSN 2412	Lab in Therapeutic Nutrition-I	4	4	60
IV	III-C	FSN 2514	Food Processing - II	5	5	75
IV	III-C	FSN 2516	Food packaging	5	5	75
IV	III-S	FSN 2404	Functional foods and Nutraceuticals	5	4	60
IV	V	XXX 0000	Extension Activity -NSS/SLP/PED	-	1	15
			Total	**30**	**27+1**	**405/420**
V	III-C	FSN 3615	Therapeutic Nutrition – II	6	6	90
V	III-C	FSN 3517	Lab in Therapeutic Nutrition– II	5	5	75
V	III-C	FSN 3619	Food Biotechnology	6	6	90
V	III-C	FSN 3621	Food safety and Quality control	6	6	90
V	IV-LS	XXX 0000	Life Skill –III	3	2	30
V	ES	FSN 3200	Environmental Studies	4	2	30
			Total	**30**	**27**	**405**
VI	III-C	FSN 3618	Baking and confectionary	6	6	90
VI	III-C	FSN 3520	Lab in Baking and confectionary	5	5	75
VI	III-C	FSN 3622	Health and Fitness	6	6	90
VI	III-C	FSN 3624	Public Health and Nutrition	6	6	90
VI	IV-LS	XXX 0000	Life Skill – IV	3	2	30
VI	V-VE	XXX 0000	Value education	4	2	30
Total				**30**	**27**	**405**
GRAND TOTAL				**180**	**158+2**	**2370/2400**

C - Core Courses **NME - Non - Major Elective** **LS - Life Skill**

S – Supportive Courses **VE- Value Education** **ES- Environmental Studies**

Courses offered by the Department of Food sciences to Non-Major Students

Part III Supportive

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1404	Human Physiology	**5**	**4**	**60**
II	FSN 1402	Human Nutrition	**5**	**4**	**60**
III	FSN 2403	Child Development	**5**	**4**	**60**
IV	FSN 2404	Food Service Management	**5**	**4**	**60**
Total			**20**	**12**	**240**

Part IV Life skill course

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1201	Home Food Catering	**3**	**2**	**30**
II	FSN 1202	Ethnic Foods	**3**	**2**	**30**
V	FSN 3203	Obesity Management	**3**	**2**	**30**
VI	FSN 3204	Food additives	**3**	**2**	**30**
Total			**12**	**8**	**120**

Part IV Non-Major Electives

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1211	Basic Nutrition	**3**	**2**	**30**
II	FSN 1212	Diet and Disease	**3**	**2**	**30**
Total			**6**	**4**	**60**

FSN 1511 **Food Science** **(5hrs/wk) (5cr)**

This is a foundational course for students to obtain knowledge on different food groups and their nutritive value, this course helps to understand the scientific principles underlying in food preparation and it also develops skills and techniques in food preparation with conservation of nutrients and palatability using cooking methods generally employed.

OBJECTIVES:

1. To help them study the different methods of cooking and their advantages and disadvantages.
2. Togain experience in the preparation of foods with attention to the preservation of their nutritive value - oriented to Indian cooking.
3. To help them understand the scientific principles governing the acceptability of food preparations.
4. To understand biochemical reactions taking place in the body and their relationship to nutrition.
5. To familiarize the students to various equipment packaging & manufacturing useful in the industry.

1. **Introduction to foods:** Food - Definition, Functions, classification of foods, Food groups - Basic Four, Basic Five and Basic Seven, Food pyramid. Cooking - Definition**,** objectives, preliminary preparation of food, Methods of cooking - Moist heat and Dry heat methods, advantages and disadvantages. Micro-wave cooking, Solar cooking - advantages and disadvantages.
2. **Cereals and pulses:** Cereals - wheat and rice - structure, composition and Nutritive value - milling - by products of wheat and rice, parboiling - methods, advantages, Effect of cooking on the nutritive value of cereals,Gelatinisation, Dextrinization, gluten formation. Millets - Ragi, Bajra, Italian millet, Varagu, Samai-Composition, Nutritive value. Pulses - Composition and Nutritive value, Germination, Effect of cooking on pulses, factors affecting cooking quality of pulses, role of pulses in cookery.
3. **Vegetables, Fruits and Milk:** Classification, Composition and Nutritive value, Conservation of nutrients during cooking, role of vegetables in cookery, pigments in fruits and vegetables and effect of cooking on pigments. Milk - composition and Nutritive value, physical properties of milk, Different types of milk and milk products, role of milk and milk products in cookery.
4. **Flesh foods:** Meat - Classes of meat, composition and Nutritive value, methods of cooking and its effects Post mortem changes, ageing of meat, tenderising meat. Fish - Classification, composition and Nutritive value, selection criteria, Methods of cooking and its effects. Poultry - Classification, composition and nutritive value, Principles and methods of cooking poultry. Eggs - Structure composition and nutritive value, role of egg in cookery, evaluation of egg quality, effect of cooking and factors affecting coagulation.
5. **Fats & Oils, Sugars, Spices, Nuts & Oilseeds:** Composition & nutritive value,Types of fats and oils, Hydrogenation, role of fat in cookery, effect of heating, factors affecting absorption of fats, smoking point Rancidity-Types, Prevention. Sugar: Nutritive value, properties**,**Types of sugars, stages in sugar cookery, sugar and related products. Spices: Functions, role of spices in cookery, Types, Nutritive value ,Uses and abuses. Nuts & Oilseeds: Types, Composition&Nutritive value, role of nuts and oil seeds in cookery.

Text Books:

1. Srilakshmi B (2005) Dietetics. New Age International Publishers, New Delhi.
2. Swaminathan M (1979) Food Science and Experimental foods. Ganesh and Co, Madras.
3. Mudambi SR and Rao SM (1986) Food Sciene. Wiley Eastern Ltd. New Delhi.

References:

1. Bennion M and Hughes D (1975) Introductory foods Macmillan Publishing Co. Inc. New york.
2. Brich CG, Spencer M and Cancerron AG (1977) Food Science. Pergamon Press, New York.
3. Gopalan C, Ramasastri PN and Balasubramanian SC (1977) Nutritive value of Indian Foods. National Institute of Nutrition, Hyderabad.
4. Growworld RH (1972) The experimental study of foods. Houghton Miffflin Co, Boston.

FSN 1413 Lab in Food Science (4hrs/wk) (4cr)

This course is aimed to create awareness on the effect of various cooking methods on different food groups and it also helps to understand the various methods of sensory analysis.

OBJECTIVES:

1. To understand the basic principles of sensory analysis.
2. To know the methods and principles involved in cooking.
3. To learn the selection, purchase and storage of foods.
4. To know about various adulterants and the methods of detecting them.
5. To learn the prevailing food, hygiene and sanitation of foods.

1. Technique in measurement of different food stuffs - use of standard measuring cups and spoons.
2. Different recipes from cereals, pulses, vegetables, fruits, fleshy foods, egg, milk and milk products.
3. Cereals - Examination of different starch granules,Gelatinisation, Dextrinisation.
4. Beverages - preparation of stimulating, nourishing and refreshing beverages.
5. Pulses - Effect of hard and soft water, alkali, cooking time of grams and dhals.
6. Vegetables - Effect of acids, alkali, steaming and pressure cooking on the different pigments and acceptability of vegetables.
7. Fruits - Study of different methods of preventing enzymatic browning of cut fruits, pectin content of fruits.
8. Sugars - Stages of sugar cookery.

Text Book:

1. Jamesen SK (1998) Food Science Laboratory Manual. Purdue University.

FSN 1415 Nutrition Science (4hrs/wk) (4cr)

This course enables the students to gain basic knowledge of the different nutrients and their role in maintaining health of the community and it also develop skills in qualitative analysis and quantitative estimation of nutrients.

OBJECTIVES:

1. To understanding the meaning of Nutrition
2. To understanding the role of Nutrition in human life
3. To increasing the ability to overcome Deficiency
4. To understand the vital link between nutrition and health
5. To gain knowledge on functions, metabolism and effects of deficiency of nutrients

1. **Concept of nutrition:** Definitions - Nutrition, Health, Malnutrition, Nutritional status, Balanced diet, Under nutrition & over nutrition,Nutrients - classification of nutrients relation of food and health. RDA - Definition, factors, methods used for deriving RDA, Reference man and woman - Definition. Energy - Definition, units of measurement, determination of energy value of foods, physiological fuel value. Total energy requirement - Factorial method, experimental determination, Thermic effect of food - factors. BMR - Definition, measurement, factors.
2. **Carbohydrates**: Definition,classification, digestion, absorption and metabolism. Functions, deficiency, requirement and sources. Dietary fiber - Definition, classification, physiological effects, role of fiber in human nutrition,sources.
3. **Proteins and Lipids:** Definition,classification of proteins and amino acids, functions of proteins, sources, and requirements, deficiency, Digestion absorption and metabolism, quality of proteins. Lipids - Definition, classification, functions, sources, requirements, deficiency,digestion, absorption and metabolism of fats.
4. **Minerals:** Definition, classification ,functions, Sources, deficiency of calcium, Sodium, phosphorus, Iron, Zinc, Iodine, fluorine, magnesium,potassium
5. **Vitamins**: Definition,classification,functions, Sources, deficiency of vitamins A,D,E,K, C,B1,B2,Niacin, folic acid, pyridoxine, B12.

Text Books:

1. Mudambi SR, Rajagopal MV (1997) Fundametals of Foods and Nutrition. Third Edition. New Age International (P) Ltd, Publishers, Third edition.
2. Srilakshmi B (2004) Nutrition Science, New Age International (P) Ltd, Publishers.
3. Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications, Madras.

References :

1. Kango M (2005) Normal nutrition, curing diseases through diet. Third Edition CBS Publications.
2. Paul S (2003) Text book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
3. Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition. C.V. Melskey Co..

FSN 1401 Human Physiology (5hrs/wk)(4cr)

This course helps the students to understand the structure and basic physiology of various organs of the body. The students will obtain better understanding of the principles of Foods and Nutrition through the study of physiology.

OBJECTIVES:

1. To understand the basic structure and functions of human body.
2. To create awareness about common diseases/ disorders affecting each system.
3. To advance their understanding of some of the relevant issues and topics of humanphysiology.
4. To understand the integrated function of all systems and the grounding of nutritional science in Physiology.
5. To understand alterations of structure and function in various organs and systems in disease conditions.

1. **Digestive System:** Structure and functions of digestive system,process of digestion, absorption and assimilation of food, role of enzymes and bile salts in digestion, saliva - composition, function. Bile - composition,function, movements of gastrointestinal tract.

2. **Cardiovascular and Respiratory system:** Blood - Composition, clotting, blood groups, Blood transfusion and its importance. Heart - Structure and functions, Cardiac Muscle, cardiac impulse, Cardiac cycle, Cardiac output, Heart rate and its Regulation, Arterial Blood Pressure - regulation. Respiratory organs - structure, functions, mechanism of respiration, lung volumes, types of breathing and modified forms of breathing.
3. **Nervous System, Sense organs and Musculoskeletal system:** Nervous system - structure, functions of brain, spinal cord, neuron, autonomic nervous systems, reflex action, physiology of sleep. Sense organs - structure and function of eye, ear, skin, nose and tongue. Musculoskeletal system - structure and function of muscles, bone, cartilage and connective tissue - types of muscles.
4. **Excretory system:** Structure and function of kidney, nephron - Mechanism of urine formation, composition, Micturition.
5. **Reproductive system:** Structure and function of male and female reproductive organs, Menstrual cycle, Process of reproduction, lactation, conception and contraception. Endocrine System - Structure and functions of thyroid, parathyroid, adrenal and pituitary glands.

Text Books:

1. Chatterjee CC (1988) Text Book of Medical Physiology. W B Saunder's Co. London.
2. Elaine N and Marieb RN (1992) Anatomy and Physiology. TheBenjamin/Cummings Publishing company Inc, New York.
3. Elaine N and Marieb RN (1997) Human Anatomy and Physiology. AddisonWesley Longman, Inc., UK.

References:

1. Guyton (1991) Human physiology and Mechanism of diseases. W.B Saunders and Co. London.
2. Ganong (1995) Review of Medical physiology. Prentice Hall international, London.
3. Guyton AC and Hall JE (1996)Text book of Medical Physiology. Prism Books (Pvt) Ltd., Bangalore.
4. Guyton A C and Hall J E (2001) Pocket Companion to Text Book of MedicalPhysiology. Tenth Edition, W.B Saunders company, Philadelphia.

FSN 1512 Nutritional Biochemistry (5hrs/wk) (5cr)

This course will foster understanding on the basis of nutrition and the effects of varied nutrition, it further provides knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional biochemistry.

OBJECTIVES:

1. To augment the biochemistry knowledge acquired at the undergraduate level.
2. To understand the mechanisms adopted by the human body for regulation of metabolic pathways.
3. To get an insight into interrelationships between various metabolic pathways.
4. To understand the principles and use of Instruments used for biochemical analysis.
5. To become proficient for specialization in nutrition.

1. **Introduction to Biochemistry:** Definition, objectives, scope and inter relationship between biochemistry and other biological science.
2. **Enzymes:** Definition - types - classification - specificity - Isozymes - Coenzymes -Enzyme kinetics - Factors affecting enzyme action - Enzyme inhibition.
3. **Intermediary metabolism:** Carbohydrate metabolism, Glycolysis, TCA cycle and energy generation, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.

4. **Lipids and proteins:** Oxidation and biosynthesis of fatty acids (saturated and mono-unsaturated) : Synthesis and utilization of ketone bodies, Ketosis, fatty livers. Proteins - General reaction of amino acid metabolism, urea cycle. Lipoproteins : Types, compostion, role and significance in disease
5. **Introduction to Nucleic acids:** Structure, replication, transcription, genetic code elementary knowledge of biosynthesis of purine and pyrimidine.

Text Books:

1. Murray R K, Grannen DK, Mayes PA and Rodwell VW (2012) Harper's Illustrated Biochemistry. Twenty Ninth Edition, Lange Medical Book, Mc Graw Hill Edition.
2. Lehninger AC, Nelson DL and Cox MM (2001) Principles of Biochemistry. 4th Edition, W.H. Freeman Company, USA.

References:

1. Voet D and Voet JG (2004) Biochemistry. 3rd Edition. John Wiley & Sons Inc. USA.
2. Berg JM, Tymoczko JL, Stryer L (2011) Biochemistry. International Edition, Seventh Edition, W.H. Freeman & Co.

FSN 1414 Lab in Nutritional Biochemistry (4hrs/wk) (4cr)

This course emphasizes the clinical significance and understanding of the basic concepts and enables the students to get practical experience in lab and clinical nutrition.

OBJECTIVES:

1. To understand the use of colorimetry in biochemical estimations.
2. To detect the purity of samples by using biochemical techniques.
3. To understand various methods of quantitative estimations of biomolecules.
4. To learn the basic analytical techniques.
5. To get practical experience in the Laboratory and develop the skills to undertake research work.

1. Identification of carbohydrates (Qualitative,quantitativetests)
2. Identification of proteins (Qualitative Tests)
3. Estimation of glucose in urine by Benedict's methods
4. Urine analysis - normal & abnormal constituents of urine.
5. Blood glucose estimation.

Text books:

1. Miller DD (2014) Food chemistry: a laboratory manual. First Edition, John Wiley & Sons.
2. Plummer DT (1996) An introduction to Practical Biochemistry. Tata McGraw Hill, New Delhi.

References

1. Conn EE and Stump PK (1981) Outlines of Biochemistry . Wiley Eastern (P) Ltd., New Delhi.
2. Linder MC (1991)Nutritional Biochemistry and Metabolism: with clinical applications. Second Edition, Appleton and Lange.

FSN 1416 Food Microbiology (4hrs/wk) (4cr)

The goal of teaching this course to students is to gain knowledge about the role of micro-organisms in health and disease, understand the role of micro-organisms in spoilage of various foods and its role in relation to food and food preservation.

OBJECTIVES:

1. To understand the nature of microorganisms involved in food spoilage, food infections and intoxications and also those used in food biotechnology (food fermentation and various food processing industries)
2. To gain knowledge of principles of various techniques used in the prevention and control of the microorganisms in foods.
3. To gain an insight of the types and role of micro-organisms affecting man and the environment.
4. To understand criteria for microbiological safety in various foods operations to avoid public health hazards due to food contamination.
5. To gain knowledge of micro-organisms in relation to food and food preservation.

1. **History and scope of food microbiology:** Contributions of Louis Pasteur - Fermentation - Pasteurization - Role of microbiologist in food industries - Scope of food microbiology .
2. **Food as a substrate for microorganism:** Hydrogen ion concentration, Moisture requirement, Nutrient content - inhibitory substances of biological structure, combined effects of factors affecting growth. Role of micro organism in food microbiology.
3. **Contamination and spoilage of foods:** Principles of food spoilage -microbiological, physical and biological factors - contamination, preservation and spoilage of cereal and cereal products, baked products, Fruits and vegetables and their products, Fleshy food, Milk and Milk products.
4. **Food infections and food borne diseases:** Microbial food poisoning -Staphylococci, Salmonella, clostridium botulinum. Measures to prevent microbial food poisoning. Food infections - Food borne diseases - Dysentery diarrhoea, Typhoid, Cholera.
5. **Fermented food products:** Fermentation - aerobic respiration, anaerobic respiration, products of fermentation - Bread, Malt Beverages, Wine, Distill liquor, Vinegar, Fermented Vegetables and dairy products.

Text Books:

1. Frazier WC and Westhoff DC (2013) Food Microbiology. Fifth Edition, McGraw Hill Eduction (India) Pvt. Ltd., New Delhi.
2. Adams MR and Moss MO (1991) Food Microbiology. The Royal society and chemistry, Cambridge.

References :

1. Banwart GJ (1989) Basic Food Microbiology. Second Edition, Chapman and Hall, New York.
2. Pelczar MJ, Chan ECS and Kreigh NR (2000) Microbiology. Eighth Edition, Tata McGraw Hill, New Delhi.
3. Willey UM, Sherwood LM and Woolverton CJ (2011) Precott's Microbiology. Eighth Edition, Mc Graw-Hill International.

FSN 1402 Human Nutrition (5hrs/wk) (4cr)

This course helps the students to have basic understanding on the nutritional needs from birth to adolescence and old age; it provides necessary theoretical background for the field of child guidance. Acquaint them about the needs of guidance and counseling at various stages of development.

OBJECTIVES:

1. Understand the role of nutrition in different stages of life cycle.
2. Gain experience in Planning menu for different stages.
3. Gain knowledge about the method of assessment of nutritional status of a community.
4. Students develop an understanding of self in relation to family and society.
5. They understand their roles and responsibilities as productive individuals, asmembers of family, community and society.

1. **Nutrition in pregnancy:** Food and nutrient requirements, physiological changes during pregnancy, developmental stages of the embryo, physiological cost of pregnancy and complications in pregnancy. Nutrition in lactation - Food and nutrient requirements, physiology of lactation, composition of breast milk, influence of mother's diet on the quality and quantity of milk production and breastfeeding practices.
2. **Nutrition during infancy:** Food and nutrient requirements, weaning, types of weaning foods and supplementary foods, changes in growth pattern - height and weight. Nutrition during preschool age - Food and nutrient requirements, eating habits and behavior, growth, factors inhibiting growth and increment in height and weight.
3. **Nutrition during school-going age:** Food and nutrient requirements, factors affecting eating habits, school lunch and mid-day meal program.
4. **Nutrition in adolescence and adult:** Food and nutrient requirements, changes in growth pattern, puberty, menarche, changes in food habits, nutritional disorders, psychological and peer group pressure on eating habits. Nutrition in adulthood- Food and nutrient requirements, changes in consumption pattern: physical, mental and social changes influencing meal pattern.
5. **Nutrition in oldage:** Food and nutrient requirements, physical, physiological, biological and psychological changes influencing meal pattern.

Text Books:

1. Swaninathan M (1985)Advanced Text Book on Food and Nutrition. Vol.II. BAPPOO, No.88, Mysore Road, Bangalore.
2. Srilakshmi B.(2004) Nutrition Science, New Age International (P) Ltd, Publishers.
3. Robinson CH, Lawber MR, Chenoweth WL and Garwick AE (1986) Normal and Therapeutic Nutrition. Seventh Edition, Mc Millan Publishing company, New York.

References:

1. Whiteny EN and Cataldo CB (1983) Understanding normal and clinical Nutrition. West Publishing Company, New York.
2. Krause MV and Mohan LK (1984) Food, Nutrition and Diet Therapy. W.B. Saunders company, Philadelphia.
3. Passmore R and East Wood MA (1987) Human Nutrition and Dietetics. English Language Book Society/Chruchill, Livingstone.

FSN 1201 Home Food Catering (3hrs/wk) (2cr)
(Life Skill Course)

This course will provide the students to face the challenges of the food industry and provide theoretical knowledge along with practical skill for proper motivation to build a career in the Hotel industry.

OBJECTIVES:

1. To Gain knowledge about various types of food services.
2. Gain knowledge about the Principles and functions of Management.
3. To understand about personnel Management, financial management and legal aspects of catering.
4. To pealise the importance of sanitation and hygiene in food service institutions.

1. **Food production:** Menu planning - Importance - Factors affecting menu planning, different kinds of food service units - Food Purchase and Storage. Quantity Food production-Standardization of recipes, quantity food preparation techniques, recipe adjustments and portion control. Hygiene and Sanitation.
2. **Kitchen organization and layout**: General layout of kitchen in various organizations - receiving and preparation area - storage area- cooking areas - service and washing areas - obtaining supplies.
3. **Resources management:**Money-Manpower-Time-Facilities and equipment-Utilities.
4. **Sanitation and safety:** Sanitation of plant, kitchen, hygiene, personal hygiene, garbage disposal, pest control - Health and safety at work, causes and types of accidents, accordance and applications
5. **Planning of a food service unit:** Preliminary Planning-Survey of types of units, identifying clientele, menu operations and delivery. Planning the set up-Identifying resources, developing Project plan, determining investments.

Text Books:

1. Bessie WB and Levelle W (1988) Food Service in Institutions. Sixth Edition. Macmillian Publishing Company New York.
2. Mohini S (2005) Institution Food Management. New Age International Publishers. New Delhi.

References:

1. Thangam PE (2008) Modern Cookery for Teaching and Trade. Part I & II Orient Longman, Chennai.
2. Taneja S and Gupta SL (2001) Enterpreneurship Development. Galgotia Publishing.

FSN 1202 Ethnic Foods (3hrs/wk) (2cr)
(Life Skill Course)

This course deals with the nutritional, social, cultural, economic and health effects of traditional foods.

OBJECTIVES:

1. To understand the historical perspective of nutrient requirements.
2. To learn to critically evaluate the methodology and derivation of requirements for specific macronutrients.
3. To appreciate importance of nutrition immunity interactions and their implications.
4. To learn various measures for enhancing nutritional quality of diets.
5. To stay updated with emerging concepts in nutrition.

1. **Traditional food style**: History – Concept and Principles of Traditional Foods – Benefits and nutritional content of Traditional Foods.
2. **Traditionally fermented foods:** Unsweetened yogurt, kefir, dahi, lassi, shrikhand, miso, kimchi, kombucha, tempeh, pickles and sauerkraut – processing methods, nutritional benefits and therapeutic uses

3. **Healthy aspects of traditionally foods:** National health benefits - impacts of consuming traditional foods.
4. **Traditional methods of cooking and preservation:** Introduction - cooking techniques - conventional cooking - dry cooking - wet cooking - thermal processing – effect of time and temperature - equipments.
5. **Traditionally fermented fruits and vegetables:** Cucumber, onion, olives, carrot, caper berries, pickled garlic - safety and regulations.

Text book:

Kristbergsson K and Oliveira J (2016) Traditional foods: general and consumer aspects. Springer, New York.

References:

1. Pathak YV, Handbook of nutraceuticals Volume 2, CRC Press 2011.
2. Prakash V and Belloso OM (2015) Regulating safety of traditional and ethnic foods. Academic Press, Elsevier, USA.

FSN 1211 **Basic Nutrition** **(3hrs/wk) (2cr)**
(Non-Major Elective)

This course provides an overview of the major macronutrients relevant to human health. They gain knowledge on dietary sources, intake levels, physiological role, and requirement of major nutrients on human body. They also attain knowledge about major nutrition-related deficiency conditions.

OBJECTIVES :

1. Under stand the relationship between nutrition and human well being
2. Know and understand the functions, importance of all nutrients for different age group and special group.
3. Understand critical periods in growth and development and impact of malnutrition on it.
4. Understand the demographic transition and its implications on the quality of life.
5. Learn to critically evaluate the methodology and derivation of requirements for specific micronutrients.

Introduction to nutrition: Definition of nutrition- food, health, nutritional status, malnutrition, over nutrition, under nutrition, functions of food, balanced diet, food pyramid, ICMR Basic five food groups.

Macro nutrients : carbohydrates-composition, classification, functions, food soures. Dietary fibre-Functions, food sources,Deficiency. Lipids and fats- definition, composition,classification, functions, Deficiency, sources-Proteins, Definition , composition, classification, functions, deficiency, sources.

Micronutrients: vitamins-,definition, classification, functions of vitamins
Nomenclature, functions, deficiency& sources of vitaminsA,D,E,K
Nomenclature, functions, deficiency& sources of vitamins B1,B2,B3,folic acid, B6, B12
Minerals:definition, functions and classification
Nomenclature, functions, deficiency&sources of calcium, Iron, Zinc, phosphorus, iodine,fluorine, sodium

Unit-V: Water:
Distribution of water & electrolytes, functions, requirements, sources, water balance, water depletion, water excess.

Text Books:

1. Mudambi SR and Rajagopal MV (1997) Fundametals of Foods and Nutrition. New Age International (P) Ltd, Publishers.
2. Srilakshmi B (2004) Nutrition Science. New Age International (P) Ltd, Publishers.
3. Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications, Madras.

References :

1. Kango M (2005) Normal Nutrition, Curing diseases through diet. First Edition CBS Publications.
2. Paul S (2003)Text Book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
3. Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition C.V. Melskey Co.

FSN 1212 Diet and Disease (3hrs/wk) (2cr)
(Non-Major Elective)

This course imparts knowledge in the field of clinical nutrition to make appropriate dietary modifications for various disease conditions based on the pathophysiology. They develop capacity and aptitude in taking up dietetics as a profession by understanding the consequences of nutritional problems in the society to create awareness on community nutrition based programmes.

OBJECTIVES:

1. To Understand causative factors and metabolic changes in various disease/disorders
2. To Gain knowledge of the principles of diet therapy and dietary counseling
3. To Understand the rationale of prevention of various diseases/disorders
4. To Plan and prepare suitable therapeutic diets based on patient needs for various diseases/disorders
5. To Prepare special therapeutic / health foods.

1. **Therapeutic diets:** Introduction- routine hospital diet - clear fluid, full - liquid and soft diets, pre and post operative diet. Regular normal diet.Special feeding methods -tube feeding - types of food - food requirements- parental feeding.TPN formula for children, adolescents.
2. **Diet in obesity and underweight:** Introduction-aetiology-types, complication. Regional distribution of adipose tissues - tretement-diet therapy.Principles of dietetic management.Limitation of underweight - aetiology dietary modifications.
3. **Diet in fever:** Types - causes - metabolic changes -dietary modifications. Typhoid-malaria, tuberculosis - symptoms-causes, principles of diet- dietary managements.
4. **Diet in diabetes mellitus:** introduction-symptoms-diagnosis- types-nutritional care-meal distribution-changes - exchange list-control of diabetes-complications.
5. **Diet in cardiovascular disease:** Introduction - risk factors - nutritional plan-meal planning-heart and blood vessel diseases.

Text Books:

1. Garrrow JS, James W PT and Ralph A (2000) Human Nutrition and Dietetics. Tenth Edition, Churchill Livingston, London.
2. Bamji MS andReddy V (1998) Text Book of Human Nutrition ford. IBH Publishing Co. Ltd New Delhi.

References:

1. Antia P and Abhraham P (1998) Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Guthrie HA and Picciano M F (1995) Human Nutrition. Mosby, St. Louis Missionery.
3. Sharon M (1994) Complete Nutrition. Avery publishing group, New York.
4. Robinson CH and Lawler MR (1990) Normal and Therapectic Nutrition,Seventeenth Edition, Mac Milan Publishers.

M.Sc. Food Science

PFS 4505 Food Science (5+1=6h/5cr)

This course deals with the basics of food science, various food products such as cereal, legumes, fats and oil seeds, fruits, vegetable and dairy products, poultry, meat and marine foods and confectionery products.

I. **Introduction to Food Science:** Food science - aims and scope - branches. Water - properties, biological importance, activity and role in food processing & preservation. Dietary sources - Constituents of foods - Quality factors in food - Quality standards - Government regulation of food supply and labeling - Federal food, drug and cosmetic act - Additional food laws - Legal categories of food substances - food additives and color additives - International food standard and Codex Alimentarius.

II. **Cereals, Millets, Fats and Oil Seeds:** Rice- Composition, primary and secondary processing-raw and boiled rice. Millets: Types, composition, processing. Legume: Types, composition, milling, germination, cooking & processed products. Oilseeds: Use of oilseeds and oilseed meals, sunflower and gingelly oil- composition - processing.

III. **Fruits and vegetables:** Fruits and vegetables: Composition, pectins, plant acids, types of pigments, effect of cooking on colour and texture of vegetables. Dairy and Dairy products-Milk and milk products: Composition, functionality in food system, processing of different products like ghee, butter, milk powders, khoa, paneer, cheese, milk products and ice creams.

IV. **Poultry, Meat and Marine Foods:** Eggs - Quality grading, structure, composition, functional properties and products. Flesh foods - Types, composition, structure of muscle, and conversion of muscle to meat - physicochemical changes, cooking and processing. Marine foods - Types, composition, cooking and processing.

V. **Confectionery:** Sugar and Jaggery: Principles of sugar crystallization, stages of cookery and role in Indian traditional sweet preparations, manufacturing of candies and sweets.

References

1. Potter NN and Hotchkiss JH eds.(1995) Food science. CBS publishers and distributors Pvt. Ltd., New Delhi.
2. Vaclavik VA and Christian EW (2008) Essentials of food science. 3rd Edition, Springer-Verlag.
3. Srilakshmi B (2015) Food Science. 3rd Edition, New Age International (P) Ltd., New Delhi.

M.Sc. Immunology & Microbiology

(2017 onwards)

Course Code	Course Title	Hours	Credits	Marks
	Semester I			
MIM 4621	Principles of Microbiology	6	6	120
MIM 4523	Biological Chemistry	5	5	100
MIM 4325	Lab. in Biological Chemistry	3	3	60
MIM 4527	Molecular Biology and Microbial Genetics	5	5	100
MIM 4329	Lab. in Molecular Biology & Microbial Genetics	3	3	60
MIM 4531	Immunology	5	5	100
MIM 4333	Lab. in Immunology	3	3	60
	Total	**30**	**30**	**600**
	Semester II			
MIM 4622	Medical Microbiology	6	6	120
MIM 4324	Lab. in Medical Microbiology	3	3	60
MIM 4526	Immunology of Infectious Diseases	5	5	100
MIM 4328	Lab in Immunology of Infectious Diseases	3	3	60
MIM 4530	Food and Industrial Microbiology	5	5	100
MIM 4332	Lab. in Food and Industrial Microbiology	3	3	60
MIM 4534	Molecular Immunology & Immunogenetics	5	5	100
	Total	**30**	**30**	**600**
	Semester III			
MIM 5631	Environmental and Agricultural Microbiology	6	6	120
MIM 5333	Lab. in Environmental and Agricultural Microbiology	3	3	60
MIM 5535	Veterinary Microbiology and Veterinary Immunology	5	5	100
MIM 5337	Lab in Veterinary Microbiology and Vaccinology	3	3	60
MIM 5539	Vaccinology	5	5	100
MIM 5441	Biostatistics and Bioinformatics	4	4	80
MIM5443	Research Project	4	4	80
	Total	**30**	**30**	**600**
	Semester IV			
MIM 5532	Microbial Gene Technology	5	5	100
MIM 5334	Lab. in Microbial Gene Technology	3	3	60
MIM 5536	Immunotechniques and Technology	5	5	100
MIM 5338	Lab. in Immunotechniques and Technology	3	3	60
MIM 5540	Animal Cell Culture	5	5	100
MIM 5342	Lab. in Animal Cell Culture	3	3	60
MIM 5644	Research Project	6	6	120
	Total	**30**	**30**	**600**

MIM 4621 Principles of Microbiology 6Hrs/Wk – 6Cr

Framed as an initiative course in Microbiology, it provides students a better understanding about the fundamental basis on which the subject is built upon. The course includes contributions of eminent scientists in the various fields of microbiology, classifications, microscopic techniques, growth, culturing and control of microorganisms. The laboratory component includes sterilization techniques, isolation, staining and growth properties of bacterial population.

- To understand the basis of Microbiology, classification and the structure and functions of organelles
- To educate about the bacterial growth and their control measures
- To undertake cultivation, isolation and identification of microorganisms from various samples

I. **Basics of Microbiology**: Historical background – discovery of microorganisms, contributions of scientists, Germ theory of diseases; the role of microorganisms in diseases, special fields of microbiology – the future scope.

II. **Microbial Evolution and Taxonomy**: Classification – Binomial and numerical, phylogenetic tree, Haeckel's three kingdom, Whittaker's five kingdom; classification of bacteria, Bergey's classification; molecular taxonomy- polyphasic taxonomy and species concept. Classification of viruses – Baltimore system; classification of fungi –Recent system.

III. **Microscopy and structure of bacteria:** Simple, compound, light, phase contrast microscope, TEM and SEM. Characteristics of bacteria – principles of staining - Size, shape and arrangement; overview of structure – cell wall, cell membrane, flagella, capsule, slime layer, S – layer, ribosomes and gas vesicles.

IV. **Nutrition and bacterial growth**: Cell division – phases of growth, factors affecting growth; nutritional requirements; nutritional classification – phototroph and auxotroph; Transport across membrane – physiology of sporulation, survival at extreme conditions.

V. **Control of microorganisms**: Sterilization – physical and chemical control methods; antibiotics – classification, mode of action, determination of their efficacy; antifungal and antiviral drugs.

Laboratory component includes the following

1. Methods of sterilization and Preparation of culture media
2. Isolation and identification of bacteria from various samples
3. Isolation and identification of fungi from different samples
4. Staining methods:
    a. Simple staining
    b. Differential staining
5. Biochemical and cultural characteristics
6. Motility by Hanging drop method

7. Lacto phenol cotton blue staining for fungi
8. Determination of bacterial growth curve
9. Effect of temperature on bacterial growth
10. Effect of pH on bacterial growth
11. Determination of antimicrobial susceptibility tests
    a. Minimum inhibitory concentration
    b. Kirby Bauer method
    c. Agar well diffusion method

Text Books

1. Jacquelyn G Black. (2013). Microbiology. 8th edn. John Wiley and Sons, Singapore Inc.
2. Cappucino R. (2001). Microbiology - A Laboratory Manual. 6th edn. Benjamin/Cumming Pub. Co. California.

References:

1. Prescott M, John P. Harley and Ronald A. Klein. (2000). Microbiology. 3rd edn. WMC Brown Pub, Iowa, USA.
2. Gunasekaran P. (1995). Lab. Manual in Microbiology. New Age International Pvt. Ltd. Madras.

MIM 4523 Biological Chemistry 5 Hrs/Wk – 5 Cr

Course on biological chemistry includes physical and chemical concepts in biology, composition, structure and functions of carbohydrates, proteins, lipids and vitamins. Other topics are enzyme and enzyme kinetics, carbohydrate and vitamin metabolism, and metabolism of amino acids and lipids. It also includes biosynthesis and degradation of purines and pyrimidines.

- To learn the physical and chemical concepts in biology
- To understand the chemistry and metabolism of biomolecules
- To gain knowledge on enzyme kinetics and bioenergetics

I. **Physical and chemical concepts in biology**: Structure of atoms, molecules and chemical bonds; Biomolecule interaction– vander Waals, electrostatic, hydrogen bonding, hydrophobic interaction and covalent bond; Principles of biophysical chemistry- pH, buffer, reaction kinetics, thermodynamics,colligative properties.

II. **Biomolecules:** Composition, structure, classification and function of carbohydrates, lipids, proteins and vitamins; Conformation of proteins- Ramachandran plot, secondary structure, domains, motif and folds.

III. **Enzymes and bioenergetics**: Enzymes and Enzyme kinetics, regulation of enzymatic activity, mechanism of enzyme catalysis, Michaelis Menten equation, isozymes; Bioenergetics, oxidative phosphorylation, coupled reaction, group transfer, biological energy transducer.

IV. **Carbohydrate and vitamin metabolism**: Types of metabolism; Carbohydrate metabolism-glycolysis, TCA cycle, Gluconeogenesis, glycogen metabolism, Glycogenolysis, HMP shunt, uronic acid pathway; Vitamin metabolism.

V. **Amino acid, nucleic acid and lipid metabolism**: Amino acid metabolism; Nucleotides-Biosynthesis and degradation of purine &pyrimidine; Fatty acid oxidation, Ketone bodies, biosynthesis of fatty acid, metabolism of Phospholipids, Glycolipids, Cholesterol,HDL.

Text Book

Nelson, D. L., and Cox, M. M. (2017). Lehninger Principles of Biochemistry. 7th edn.W. H. Freeman.

References:

1. Stryer L. (1995). Biochemistry. 4th edn.WH Freeman and Co, New York.
2. Voet D and Voet G. (1995). Biochemistry. 2nd edn. John Wiley and sons, New York.
3. R.K. Murray, D.K. Grammer. (2007). Harper's Biochemistry. 25th edn. McGraw Hill, Lange Medical Books.

MIM 4325 Lab in Biological Chemistry 3Hrs/Wk – 3Cr

This course is a supportive one to the theory course Biological chemistry offered in the same semester. Lab. work includes acidic and alkali metry ,colorimetric estimation of biomolecules, centrifugation,chromatographic separation of amino acids, electrophoresis and enzyme kinetics.

- To learn the principle of basic instruments
- To undertake qualitative analysis and quantitative estimation of biomolecules.
- To analyse the separation of biomolecule and to study enzyme kinetics

1. Acidic and Alkali metry
2. Preparation of biological buffer
3. Colorimetry
4. Estimation of Glucose -Anthrone method
5. Estimation of Protein - Lowry's method
6. Estimation of DNA by Diphenylamine reaction
7. Estimation of RNA by Orcinol reagent
8. Centrifugation technique - Types
9. Electrophoresis – (a) Agarose Gel (b) SDS PAGE
10. Chromatography–(a) Paper (b) Thin Layer
11. Enzyme assay - alkaline phosphatase activity
12. Enzyme kinetics using alkaline phosphatase enzyme

References:

1. Jayaraman J. (1996). Laboratory Manual in Biochemistry. 5th edn. New Age International Pub, New Delhi.
2. Plummer D.T. (1997). An Introduction to Practical Biochemistry. Tata McGraw Hill Pub Co, New Delhi.
3. Palanivelu P. (2009). Analytical Biochemistry & Separation Techniques - Lab Manual. 4th edn. Twenty first Century Publications.

MIM 4527 Molecular Biology andMicrobial Genetics5Hrs/Wk – 5Cr

This course will develop an understanding of the key concepts of the molecular biology of the cell, integrating principles of cell structure and function with the underlying molecular mechanism(s). Discussions will focus on aspects of gene regulation, genomics, cell cycle control, protein synthesis, intracellular protein trafficking and protein degradation in eukaryotic cells. Mechanisms behind stability and change in microbial genomes; Mechanisms behind the information flow from DNA to proteins and the multiple levels at which gene expression can be regulated; Genetic aspects of extrachromosomal elements such as plasmidsandbacteriophages – are also detailed.

- To develop basic knowledge and skills in molecular biology and microbial genetics
- To gain an understanding of chemical and molecular processes that occur in and between cells
- To learn the most significant molecular and cell-based methods used today to expand our understanding of biology

I. **Cellular and Genome Organization:** Features of cell; Diversity of genomes - Cell division and cycle in prokaryotes and higher organisms; Nucleic acid: Composition, structure, types and functions– DNA and RNA; Organization and structure of chromosome.

II. **Flow of Genetic information:** Central Dogma of the Cell; DNA Replication – types, mechanisms and enzymatic apparatus for DNA replication; Ribosome – structure – production;Genetic Code – Features, hypothesis and evolution; Transcription of gene- molecular basis of initiation, elongation and termination, prokaryotic and eukaryotic differences; RNA processing; Molecular events of Protein synthesis –post-translational modifications and protein degradation.

III. **Regulation of Gene Expression:** Concept of operon – Inducible, Repressible – Lac, Trp operon models; Gene regulation in eukaryotes: Britten-Davidson Model; mRNA Regulation – RNAi – Riboswitch – CRISPR– Ribozymes.

IV. **Changing the DNA Blueprint:** Mutagenesis – Mutations, Causes, Types, Detection, DNA Repair; Extrachromosomal DNA – Properties, types, amplification, gene transfer; Mobile DNA – terminology, types, detection, mechanism; Retroposons; Mu DNA.

V. **Essentials of Microbial Genetics:**Transformation- discovery, mechanism and significance; Conjugation- F factor- R factor, chromosome transfer by plasmids and integrative conjugative elements; Transduction- discovery, mechanism, specialized transduction, generalized transduction and significance.

Textbooks:

1. Freifelder, D. (1990). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
2. Maloy, S. R., Cronan, J. E., and Freifelder, D. (1994). Microbial Genetics. Jones and Bartlett Publishers

References:

1. Clark, D. P., and Pazdernik, N. J. (2013). Molecular Biology. Elsevier.
2. Krebs, J. E., Lewin, B., Goldstein, E. S., and Kilpatrick, S. T. (2014). Lewin's Genes XI. Jones & Bartlett Publishers.

MIM 4329 Lab. in Molecular Biology and Microbial Genetics 3 Hrs/Wk – 3 Cr

The laboratory component includes isolation of nucleic acids from prokaryotes and eukaryotes, replica plate technique for isolation of mutants, preparation of competent *E.coli*cells, transformation, conjugation, coliphage, isolation and purification of plasmid DNA.

- To provide hands-on experience on many molecular biological tools used in the context of a real research project
- To learn fundamental aspects of experimental designused to discern molecular mechanisms
- Todistinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions

1. Isolation of genomic DNA from bacteria.
2. Isolation of Genomic DNA from Human blood.
3. Isolation and purification of plasmid.
4. Isolation of RNA from mammalian tissue and yeast.
5. Mutation by UV
6. Detection of antibiotic resistant mutant by Gradient plate technique.
7. Isolation of auxotrophs and revertant of auxotrophs – Replica plating method.
8. Detection of β-galactosidase enzyme.
9. Conjugation in *E.coli*.
10. Isolation of coliphage.

References:

1. Microbial Genetic Lab. Manual. (1999). Institute of Microbial Technology, Chandigarh.
2. Scheppler JA, Cassin PE and RM Gambier. (2000). Biotechnology Explorations-Applying the Fundamentals. ASM press, Washington DC.

MIM 4531 Immunology 5Hrs/Wk – 5Cr

This course introduces the fundamental concepts of Immunology, with an emphasis on immune system and diseases. Topics covered are the basic elements of immune system including lymphoid tissues/ organs and cells with immune functions; principles of natural immunity and acquired immunity; cellular and molecular basis of B cell and T cell development and activation, cytokines, immune tolerance. This course also highlights the clinical aspects of immunology including autoimmunity; transplantation immunology; Hypersentivity reactions; Immune deficiency disorders; tumour immunology and Immunoprophylaxis.

- To understand the elements of immunity organs and cells of the immune system
- To learn the regulations and tolerance of immune response
- To analyse the disorders of immune response and clinical aspects of Immunology

I. Overview and Components of Immune System: Cells, tissues and organs of immune system; Innate and adaptive immunity;Antigens – types and properties; Immunoglobulins - structure, isotypes and biological properties; Antigen and antibody interaction – Kinetics of immune response – Complement system.

II. B, T lymphocytes & MHC molecules: Biology & activation of T & B lymphocytes; Cytokines – properties –functional categories – receptors– role in therapy; MHC molecules – variability – structure - antigen processing & presentation.

III. Immune tolerance, Autoimmunity and Transplantation Immunology: Immune tolerance – types – mechanism – immunologically privileged sites; Autoimmunity – factors – organ-specific & systemic diseases – mechanism – therapeutic strategies; Transplantation –types of grafts – allograft rejection & its mechanism – immunosuppression – Graft-vs host disease – foetus as allograft.

IV. Hypersensitivityreactions: Gell and Coombs Classification; Immediate Type I Hypersensitivity – components – factors – consequences; Antibody mediated (Type II)hypersensitivity reactions –transfusion and hemolytic disease; Immune complex-mediated (Type III) Hypersensitivity –systemic and localizeddiseases;Delayed type (Type IV) Hypersensitivity – Mechanism and examples of DTH.

V. **Immune deficiency disorders and Tumor Immunology:** Primary Immunodeficiency; Secondary immunodeficiency and AIDS; Immunoprophylaxis; Malignant transformation of cells – Tumour antigens – Effector response to tumour cells – cancer immunodiagnosis and immunotherapy.

Text Book(s):

Owen .J. A., Punt .J and Stranford S.A. (2009). Kuby Immunology. 7th edn. W. H. Freeman and Company, New York.

References:

1. Coico R. and Sunshine. G. (2015). Immunology – A Short Course. 7th edn. Wiley Blackwell, UK.
2. Abbas A.K. and Lichtman A.H. (2011). Basic Immunology – Functions and Disorders of Immune System. 3rd edn. Saunders Elsevier Inc.
3. Murphy K. and Weaver C. (2017). Janeway's Immunobiology. 9th edn. Garland Science, New York and London.

MIM 4333 Lab. in Immunology 3Hrs/Wk - 3 Cr

This laboratory course includes preparation of antigens, various bleeding techniques, serological reactions, identification and counting of different types of cells. Surveys of lymphoid organs are also done. Students are taught to immunize animals and assay antibody response by complement mediated hemolysis. Isolation of macrophage and *in vitro* phagocytosis are done.

- To involve in the basic experiments in Immunology such as preparation of antigen, serum separation and isolation of immunoglobulins.
- To analyse the cellular immune response
- To undertake experiments involving lymphoid organs, complement and macrophages

1. Preparation of Antigens – Soluble, insoluble and adjuvant antigens.
2. Routes of administration and repetitive bleeding.
3. Separation of serum and plasma from whole blood
4. Isolation and purification of Immunoglobulins – Ammonium Sulphate precipitation
5. Antigen – antibody interactions – Precipitation reactions
6. Antigen – antibody interactions – Haemagglutination assay
7. Differential staining of white blood cells.
8. Isolation of lymphocytes – Density gradient centrifugation
9. Viable Cell count – Trypan blue dye exclusion test.
10. Enumeration of RBC and WBC
11. Survey of lymphoid organs of fish.
12. Complement mediated hemolysis
13. Serum bactericidal activity
14. Isolation of macrophage from peritoneal cavity of fish.
15. *In vitro* phagocytosis.

References:

1. Myers R.L. (1989). Immunology: A Laboratory Manual. Wm. C. Brown, Dubuque, Iowa.
2. Frank C. Hay and Olwyn M. R. Westwood. (2003). Practical Immunology. 4th edn. Blackwell Science UK.
3. Garvey J.S, Cremer N.E and D.H Sussdof. (1993). Methods in Immunology – A Laboratory Text for Instruction and Research. 3rd edn. The Benjamin/Cummings Publisher, London.

MIM 4622 Medical Microbiology 6Hrs/Wk – 6Cr

This course is to provide the students with detailed insight in epidemiology, pathogenesis, prevention and treatment of important infectious diseases, and contemporary issues and novel developments in the field of Medical Microbiology. As the (re-)emergence of infectious diseases and antimicrobial resistance development, the course will also address the global health aspects of infectious diseases.

- To demonstrate a basic understanding of the pathogenesis of some important fungal infections of humans, and be able to identify the causative agents
- To demonstrate an understanding of infections (microbial causes, pathogenesis, transmission of infection, diagnosis, prevention and treatment)
- To able to recognize the nature of infecting organisms, the pathogenesis of infectious diseases,diagnostics and treatment

I. Introduction to Medical Microbiology: History; Epidemiology – Infection: stages and types, Host-microbe interactions, microbial pathogenesis; Human microbiome in health and disease: Nosocomial infections, Antimicrobial resistance; Bioterrorism; collection and processing of clinical specimens.

II. Medical Bacteriology: Epidemiology, pathogenesis, clinical manifestation, diagnosis, treatment and prevention of *Staphylococcus*; *Streptococcus*; *Neisseria*; *Corynebacterium*; *Bacillus*; *Enterobacteriaceae, Vibrio, Mycobacterium*; *Spirochetes*; *Mycoplasma; Rickettssia*; *Chlamydia*.

III. Medical Mycology: Epidemiology, pathogenesis, clinical manifestation, diagnosis, treatment and prevention of superficial and cutaneous mycoses; subcutaneous mycoses; systemic mycoses caused by dimorphic fungi; opportunistic mycoses; fungal and fungal-like infections of unusual or uncertain etiology; mycotoxins and mycotoxicoses.

IV. **MedicalVirology:** Epidemiology, Pathogenesis, Clinical Manifestation, Diagnosis, Treatment and Prevention of Adenoviruses, Human Herpesviruses, Poxviruses,Picornaviruses, Paramyxoviruses**,** Orthomyxoviruses, Rhabdoviruses, Reoviruses, Retroviruses, Hepatitis Viruses, Unconventional Slow Viruses: Prions, Recent evolutions – Zika, Dengue, Chikungunya, MERS, SARS, Ebola

V. **Medical Parasitology:** Epidemiology, pathogenesis, clinical manifestation, diagnosis, treatment and prevention of Protozoans; Amoeba; Flagellates; Ciliates; Helminths; Nematoda; Trematoda and Cestoda

Text Book:

Tille, P. (2015). Bailey & Scott's Diagnostic Microbiology. 14th edn. Elsevier Health Sciences.

References:

1. Murray, P. R., Rosenthal, K. S., and Pfaller, M. A. (2015). Medical Microbiology,8th edn. Elsevier Health Sciences.
2. Paniker, A. A. (2005). Ananthanarayan and Paniker's Textbook of Microbiology (reprint edn.). Orient Blackswan.

MIM 4324 Lab. in Medical Microbiology 3 Hrs/Wk – 3Cr

This lab. course is designed to give the students clinical experience in the area of bacteriology, mycology and parasitology. Test procedures routinely applied are covered with an emphasis on the isolation, identification, and antimicrobial susceptibility testing of pathogenic microorganisms.

- To understand the scientific and administrative direction of a clinical microbiology laboratory
- To learn the provisions of the investigation, diagnosis, and treatment of patients suffering from infectious diseases.
- To understand the epidemiology of public health and communicable disease and prevention

1. Collection of specimen, transportation & storage
2. Nosocomial infections (HAI)
3. Culturing of specimens
    a. Examination of normal sterile body fluids
    b. Culturing of upper and lower respiratory tract microbes
    c. Examination of urine

4. Examination of dermatophytes
    a. Staining and microscopic detection of dermatophytes
    b. Culturing of specimen for fungi
5. Antimicrobial susceptibility of bacteria & fungi from clinical specimens
6. Examination of specimens for parasites
7. Examination of stool (occult blood) for parasites
8. Laboratory Visit

Text Book:
World Health Organization. (2003). Manual of Basic Techniques for a Health Laboratory.

References:

1. John A. Washington, Laboratory procedures in Clinical Microbiology, 2nd edn, Springer-Verlag New York Heidelberg Berlin Tokyo.
2. Forbes, B. A., Sahm, D. F., & Weissfeld, A. S. (2007). Bailey & Scott's Diagnostic Microbiology (12th ed.). Elsevier Mosby.

MIM 4526 Immunology of Infectious Diseases 5Hrs/Wk -5Cr

This course deals with basic immune responses which would arouse due to bacterial(extracellular and intracellular), viral, parasitic, fungal and spirochete infections in human beings. Emphasis is given on the in-depth study of innate and adaptive immune responses and also the evasion strategies of specific infectious agents.

- To precisely acquire knowledge about the extreme sensitivity of immune response against invading pathogens
- To enlighten the minds of young learners with surprising molecular aspects of immune signaling, innate and adaptive immune response and evasion strategies of various pathogens

I. Immune responses to extracellular bacteria: Extracellular bacteria - host defenses and immune responses at epithelial surfaces, clearance and non-specific host defenses, innate and acquired immune defenses at mucosal surfaces, pattern recognition molecules, dendritic cells, lymphocytes, PMNs, macrophages, AMPs, Immunoglobulins; immune responses during local, systemic invasion; sepsis – enhancement of immune responses to extracellular bacteria; vaccines and immune modulation.

II. Immune responses to intracellular bacteria: Features of intracellular bacteria - diseases caused, intracellular niches - innate and adaptive immune responses; role of NK cells, macrophage activation and effector mechanisms, TLRs, NODs, Th1 activation, antigen processing and T-cell activation; bacterial killing by ROI and RNI; genetics of host resistance to intracellular bacteria; microbial evasion.

III. **Immune responses to viruses:** Viral entry and infection; Innate and adaptive immunity against viruses; sensors of viral infection; principles of antiviral immunity, major antiviral innate defense mechanisms; antiviral T- and B-cell immunity – HIV – Zika – Flu; immune evasion, immunologic memory; immunity to chronic viral infections; immune pathology and autoimmunity.

IV. **Immune responses to parasites:** Principal mechanisms of innate and acquired immunity – basic host defenses, evasion strategies; *Plasmodium spp., Leishmania spp., Trypanosomacruzi, Toxoplasma gondii, Entamoeba histolytica, Trichomonas vaginalis.* Helminths - Spectrum of host-parasite interactions, prototypical host responses to helminths, protective immunity against helminthes, pathology associated with immune responses; mechanisms of evasion and immune regulation; regulation of allergy and autoimmunity in helminth infection; vaccines against helminth parasites.

V. **Immune responses to fungi and spirochetes:**Multifaceted interaction of fungi with mammalian hosts; fungal recognition and immune activation; innate immune receptors, dendritic cells, acquired antibody and cell-mediated immunity - th1/th2/th17 cells; Spirochetes – Characteristics, major diseases caused, immune responses to *Borrelia burgdorferi*; innate immunity – phagocytic cell recruitment, complement, adaptive immune responses- mechanisms of immune evasion.

Text Books:

1. Robert R. R., Thomas A. F., William T. S., Harry W. S., Anthony J. F., and Cornelia M. W.,(2008). Clinical immunology – Principles and Practices. 3rd edn. Mosby Elsevier Publisher.
2. Kaufmann S. H. E, Rouse B. T and D. L. Sacks. (2011). Immune Response to Infection. 1st Edition. ASM Press, Washington D.C.

Reference:

John B. Z., Essential Clinical Immunology (2009), Cambridge University Press, New York.

MIM 4328 Lab. in Immunology of Infectious Diseases 3Hrs/Wk – 3Cr

This course is the laboratory part for the theory course Immunology of infectious diseases. Laboratory components includes isolation of samples from hospitals, study of microflora of human and immunodiagnostic assays for various infectious diseases.

- To ensure the opportunity for students to have hands on experience to carry out various immune reaction assay and experiments
    1. Laboratory handling of mice
    2. Isolation of pathogenic bacteria from hospital environment
    3. Preparation of bacterial toxin from gram-negative bacteria
    4. Study of normal microbial flora of human body
    5. Analysis of serum bactericidal activity
    6. NBT assay
    7. RPR test for syphilis

8. Identification of host response by DOT - ELISA
9. WIDAL test – Detection of typhoid fever
10. Isolation of fungus causing dandruff on human scalp.

References:

1. Kaufman S. H . E and Dieter Kabelitz.(2010). Methods in Microbiology - Volume 37. Immunology of Infection. 3rd edn. Academic Press, U.K.
2. Garvey J.S., Cremer N.E. and D.H Sussdorf. (1983). Methods in Immunology - A laboratory text for instruction and research. 3rdedn. The Benjamin/Cummings Pub Co, London.
3. Thompson R.A., (1997).Techniques in Clinical Immunology. 2ndedn. Blackwell Sci., Pub, Oxford.

MIM 4530 Food and Industrial Microbiology 5 Hrs/Wk – 5Cr

This course deals with the basicsof food, their composition and factors responsible for spoilage. Emphasis will be given to preservative methods, their merits, contamination, and spoilage of various foods. It also provides knowledge about foodborne diseases. Equal importance is given to the basic concepts of fermentation, isolation, improvement of microbial strains, designing of media, fermentor and their types. This course also highlights the recovery of products and production of fermented foods and other products.

- To understand the contamination, preservation and spoilage of various foods.
- To learn the basic of fermentation technology
- To gain knowledge about how foods are made through fermentation

I. **Food and its preservation:** Classification of foods; composition of food – intrinsic and extrinsic factors for spoilage; Principle methods of preservation – asepsis, removal, anaerobic conditions, uses of high temperature and low temperature, drying, radiation, food additives, antimicrobials, inorganic and organic preservatives.

II. **Contamination, preservation and spoilage of foods:** Contamination, preservation and spoilage of vegetables, fruits, meat and meat products, fish and other sea foods, egg, poultry, cereals and its products, milk and milk products; food borne diseases - Bacterial, fungal and viral

III. **Fermentation technology:** Isolation, preservation and strain improvement of industrially important microorganisms; formulation of media; fermentor design – control of temperature, pH and foam, computer applications in fermentor; Types of fermentor - Batch, continuous and air lift fermentor.

IV. **Downstream process:** Recovery of fermented products – separation, centrifugation, filtration and flocculation; Extraction; Purification – concentration, precipitation, ultrafiltration and reverse osmosis; Drying and crystallization.

V. **Fermented foods and other products:** SCP; beverages; pickles – Sauerkraut; cheese, yogurt; bakery products; antibiotics; enzymes; organic acids; amino acids and vitamins; probiotics.

Text Books:

1. Doyle MP, Beuchat LR and TJ Montville et al (1997) Fundamentals and Frontiers, ASM Press, Washington DC.
2. Patel A. H. (2012) Industrial Microbiology, 2nd edn. Macmillan India Limited.

References:

1. Frazier WC and DCWesthoff (1997) Food Microbiology 4th edn. Tata McGraw Hill, New Delhi.
2. Adams, K (2000) Food Microbiology 2nd edn. Panima, New Delhi.
3. Peter F. Stanbury, Allan Whitaker, Stephen J. Hall (2003) Principles of Fermentation Technology, 2nd edn.Butterworth-Heinemann Elsevier Ltd, Oxford, United Kingdom.

MIM 4332 Lab. in Food and Industrial Microbiology 3 Hrs/Wk – 3Cr

This course offers practicals in microbial analyses of different types of food such as milk, bakery products, cool and soft drinks, pickles, eggs and examination of spoiled foods. Similarly it offers immobilization technique, fermentation of wine and production of industrially important enzymes. The students will be required to visit training centres regarding food and industrial microbiology.

- To involve in the basic experiments in microbialanalysis of various foods
- To isolate and identify microorganisms form spoiled foods
- To produce wine and industrially important enzymes

1. Qualitative and Quantitative analysis of milk
2. Microbial analysis of raw and processed foods
3. Microbial analysis of canned foods
4. Isolation and identification of microbes from spoiled foods
5. Immobilization of enzymes and microbial cells
6. Wine fermentation
7. Production of Industrially important enzymes
8. Industrial visit

Reference:

Cappucino R (2001) Microbiology - A Laboratory Manual, 6th edn. Benjamin/Cumming Pub Co, California.

MIM 4534 Molecular Immunology and Immunogenetics 5Hrs/Wk – 5Cr

This course is designed to introduce the molecular approach of Immunology, which includes genetic animal strains; genomic organization and gene rearrangement of Immunoglobulins and T – cell receptors; genetic map of MHC; genomic organization and clinical significance of HLA. Special emphasize is given to transfusion genetics of major and minor blood groups in man, genetic basis of tumor antigens and complement components.

- To survey the strains of animals used in immunological laboratories
- To gain knowledge in genetics of MHC, TcR and transfusion genetics
- To learn Immunogenetics of cancer and complement components

I. **Genetics of laboratory strains and Immunoglobulins**: Properties, types and genetic characterization of inbred, outbred and genetically modified strains; Immunoglobulin gene structure – somatic and germ-line cell theory – multigene organization – mechanism of gene rearrangement – generation of antibody diversity – allotypes and idotypes.

II. **Genetics of T- cell surface receptors:** Genetic basis, multigene organization and mechanism of TCR gene rearrangement – TCR diversity; Cell surface alloantigens of T cells – genetics and phenotypic expression; CD marker – TcR cloning and T cell hybridoma.

III. **Genetics of MHC**: Gene mapping – structure of MHC molecules – HLA system – genomic organization – HLA haplotypes – Expression of HLA genes – Clinical HLA testing – Significance of HLA system in transplantation, transfusion therapy and disease association.

IV. **Transfusion genetics and Immunology:** Genetic basis of Major blood groups in man – ABO, Rh, Lewis system – chemistry, genotypes and phenotype, Significance of ABO in transplantation, transfusion and forensic studies; Genetic basis, chemistry and clinical importance of minor blood group systems.

V. **Immunogenetics of cancer and complement components:** Genetic basis and expression of oncofetal, oncoviral, cancer-testis, overexpressed, lineage restricted and mutated tumour antigens; Immune polymorphism against tumour antigens. Genetic basis of complement components.

Text Book:

Owen AJ, Punt J and SA Stranford. (2009). Kuby Immunology. 7th edn, W.H. Freeman and Company, New York.

References:

1. Zaleski MB, Dubiski S, Niles EG and RK Cunningham. (1983). Immunogenetics, Pitman, Toronto.
2. Ratchiffe JHM. (2016). Encyclopedia of Immunobiology. Elsevier Publications, Oxford.