ANNAMALAI UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E. Information Technology

Regulations & Curriculum – 2016

HAND BOOK

2016

 # DEPARTMENT OF INFORMATION TECHNOLOGY #

ANNAMALAI UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

B.E. (Four Year) Degree Programme (FULL–TIME)

Choice Based Credit System (CBCS)

B.E. INFORMATION TECHNOLOGY

REGULATIONS - 2016

(Students Admitted From the Academic Year 2016-2017)

1. Condition for Admission

Candidates for admission to the first year of the four year B.E. Degree programmes shall be required to have passed the final examination of the plus 2 Higher Secondary Course with Mathematics, Physics and Chemistry as subjects of study and candidates who have passed the Higher Secondary Examination through vocational stream under Engineering, conducted by the Board of Secondary Education, Government of Tamilnadu or an examination of any other authority accepted by the Syndicate of this University as equivalent thereto. They shall satisfy the conditions regarding qualifying marks, age and physical fitness as may be prescribed by the Syndicate of the Annamalai University from time to time.

Candidates who have passed the Diploma course in Engineering of the State Board of Technical Education, TamilNadu (listed in Annexure-1) will be eligible for admission to the second year of the four year degree programme in B.E. under the lateral entry scheme provided they satisfy other conditions.

2. Branches of Study in B.E.

BRANCH I - Civil Engineering
BRANCH II - Civil and Structural Engineering
BRANCH III - Mechanical Engineering
BRANCH IV - Mechanical Engineering (Manufacturing)
BRANCH V - Electrical and Electronics Engineering
BRANCH VI - Electronics and Instrumentation Engineering
BRANCH VII - Chemical Engineering
BRANCH VIII - Computer Science and Engineering
BRANCH IX - Information Technology
BRANCH X - Electronics and Communication Engineering

3. Courses of study and Scheme of Examinations

The courses of study with respective syllabi and the scheme of Examinations are given separately.

4. Choice Based Credit System (CBCS)

The curriculum includes six components namely Humanities/Social Sciences/Management, Basic Sciences, Engineering Sciences, Professional Core, Professional Electives and Open Electives in addition to Seminar & Industrial Training and Project. Each semester curriculum shall normally have a blend of theory and practical courses. The total credits for the entire degree Programme is 176 (135 for lateral entry students).

5. Eligibility for the Degree

A candidate shall be eligible for the degree of Bachelor of Engineering if the candidate has satisfactorily undergone the prescribed courses of study for a period of four academic years and has passed the prescribed examinations in all the four academic years. For the award of the degree, a student has to

5.1 Earn a minimum of 176 credits (135 for lateral entry students).

5.2 Serve in any one of the Co-curricular activities such as

- National Cadet Corps (NCC)
- National Service Scheme (NSS)
- National Sports Organization (NSO) and
- Youth Red Cross (YRC)

for at least one year. The students enrolled in any one of the co-curricular activities (NCC / NSS / NSO / YRC) will undergo training for about 80 hours and attend a camp of about seven days. The training shall include classes on hygiene and health awareness and also training in first-aid. While the training activities will normally be during weekends, the camp will normally be during vacation period.

(or)

Enrol as a student member of a recognized professional society such as

- Student Chapters of Institution of Engineers (India)
- Student Chapters of other Professional bodies like ICI, ISA, IIChE

6. Assignment of Credits for Courses

Each course is normally assigned one credit per hour of lecture / tutorial per week and one credit for two hours or part thereof for laboratory or practical or drawing per week.

7. Duration of the programme

A student is normally expected to complete the B.E. programme in four years but in any case not more than eight years from the time of admission.

8. Registration for courses

A newly admitted student will automatically be registered for all the courses prescribed for the first, second and third semesters without any option.

Every other student shall enroll for the courses intended to be credited in the succeeding semester in the current semester itself by completing the registration form indicating the list of courses. This registration will be done a week before the last working day of the current semester.

A student is required to earn 176 (135 for lateral entry students) credits in order to be eligible for obtaining the degree. However the student is entitled to enjoy an option to earn either more or less than the total number of credits prescribed in the curriculum of a particular semester on the following guidelines:

The **slow learners** may be allowed to withdraw certain courses with the approval by Head of the Department and those courses may be completed by them in the fifth year of study and still they are eligible to be awarded with I Class. A student can withdraw a maximum of 2 courses per semester from IV semester to VII semester and take up those courses in the fifth year of study. However, courses withdrawn during odd semesters (V and VII) must be registered in the odd semester of fifth year and courses withdrawn during even semesters (IV and VI) must be registered in the even semester of fifth year.

The **advance learners** may be allowed to take up the open elective subjects of eighth semester in sixth and seventh semesters one in each to enable them to pursue industrial training/project work in the entire eighth semester period provided they should register those courses in the fifth semester itself. Such students should meet the teachers offering those elective courses themselves for clarifications. No specific slots will be allotted in the time table for such courses.

9. Seminar / Industrial Training

The student has to present a seminar on the chosen topic. However, the student can select a topic duly approved by the Seminar Coordinator and the Head of the Department concerned. The student who has presented the seminar has to submit a report and appear for viva-voce examination at the end of the semester.

10. Project Work

The student typically registers for project at the end of seventh semester and completes it at the end of the eighth semester along with the courses prescribed for study in the eighth semester. However a student who has registered and successfully completed the courses of eighth semester by acquiring additional credits in the earlier semesters can attempt to spend his/her period of study in an industry and complete his/her project work, submit the project report and appear for viva-voce examination at the end of eighth semester.

11. Industrial Training (Value added courses)

One credit courses shall be offered by a Department with the prior approval from the Dean, Faculty of Engineering and Technology. For one credit course, a relevant potential

topic may be selected by a committee consisting of Head of the department concerned and the Board of Studies member from the Department and a senior faculty member from the department concerned. An expert from industry familiar with the topic chosen may be accordingly invited to handle classes for the students. The details of the syllabus, time table and the name of the industrial expert may be sent by the above committee to the Dean for approval. The credits earned through the one credit courses shall be over and above the total credit requirement prescribed in the curriculum for the award of the degree. Students can take a maximum of two one credit courses (one each in VI and VII semesters). They shall be allowed to take one credit courses offered in other Departments with the permission of Head of the Department offering the course. A separate mark sheet shall be issued for one credit courses.

12. Electives

The elective courses fall under two categories: Professional Electives and Open Electives. The Professional Elective courses are offered in the concerned branch of specialization and a student can choose the Professional Elective courses with the approval of the Head of the Department concerned. Apart from the various Professional elective courses, a student can choose the open electives from any specialization offered in any Department in the Faculty of Engineering & Technology during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course.

Further, the student can also credit not more than two courses offered through the SWAYAM Portal of UGC with the approval of the Head of the Department concerned. These courses will be considered as equivalent of open electives.

13. Assessment

The break-up of continuous assessment and examination marks for theory courses is as follows:

First assessment (Mid-Semester Test-I)	: 10 marks
Second assessment (Mid-Semester Test-II)	: 10 marks
Third Assessment	: 5 marks
End Semester Examination	: 75 marks

The break-up of continuous assessment and examination marks for Practical courses is as follows:

First assessment (Test-I)	: 15 marks
Second assessment (Test-II)	: 15 marks
Maintenance of record book	: 10 marks
End Semester Examination	: 60 marks

The continuous assessment marks for the seminar/industrial training will be 40 and to be assessed by a seminar committee consisting of the Seminar Coordinator and a minimum of two members nominated by the Head of the Department. The continuous assessment marks will be awarded at the end of seminar session. 60 marks are allotted for the seminar/industrial training and viva voce examination conducted based on the seminar/industrial training report at the end of the semester.

The continuous assessment marks for the project work will be 40 and to be assessed by a review committee consisting of the project guide and a minimum of two members nominated by the Head of the Department. One of the committee members will be nominated as the Chairman by the Head of the Department. The Head of the Department may be a member or the Chairman. At least two reviews should be conducted during the semester by the review committee. The student shall make presentation on the progress made before the committee. 60 marks are allotted for the project work and viva voce examination at the end of the semester.

14. Substitute Assessment

A student who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the final examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the third meeting of the respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the Dean/Head of the Department within a week from the date of the missed assessment.

15. Student Counsellors (Mentors)

To help the students in planning their course of study and for general advice on the academic programme, the Dean/Head of the Department will attach a certain number of students to a member of the faculty who shall function as student counsellor for those students throughout their period of study. Such student counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Dean/Head of the Department.

16. Class Committee

For all the branches of study during the first two semesters, a common class committee will be constituted by the Dean of the faculty. From among the various teachers teaching the same common course to different classes during each semester of the first year, the Dean shall appoint one of them as course coordinator. The composition of the class committee during first and second semesters will be as follows:

- Course coordinators of all courses.

- All Heads of the Sections, among whom one may be nominated as Chairman by the Dean.
- The Dean may opt to be a member or the Chairman.

For each of the higher semesters, separate class committees will be constituted by the respective Head of the Departments. The composition of the class committees from third to eighth semester will be as follows:

- Teachers of the individual courses.
- A seminar coordinator (for seventh semester only) shall be appointed by the Head of the Department
- A project coordinator (for eighth semester only) shall be appointed by the Head of the Department from among the project supervisors.
- One Professor or Associate Professor, preferably not teaching the concerned class, appointed as Chairman by the Head of the Department.
- The Head of the Department may opt to be a member or the Chairman.

The class committee shall meet three times during the semester. The first meeting will be held within two weeks from the date of class commencement in which the type of assessment like test, assignment etc. for the third assessment and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.

The third meeting will be held after all the assessments but before the University semester examinations are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 25 marks for theory/40 marks for seminar/ industrial training, practical and project work will be finalized for every student and tabulated and submitted to the Head of the Department (to the Dean in the case of I & II Semester) for approval and transmission to the Controller of Examinations.

17. Attendance Requirements

The students with 75% attendance and above are permitted to appear for the University examinations. However, the Vice Chancellor may give a rebate / concession not exceeding 10% in attendance for exceptional cases only on Medical Grounds.

18. Temporary Break of Study

A student is permitted to go on break of study for a maximum period of one year either as two breaks of one semester each or a single break of one year.

The student applies for break of study, the student shall apply to the Dean in advance, in any case, not later than the last date of the first assessment period. The application duly filled by the student shall be submitted through the Head of the Department. In the case

of short term employment/ training/ internship, the application for break of study shall be approved and forwarded by the Head of the department concerned to the Dean.

However, the student must complete the entire programme within the maximum period of eight years.

19. Procedure for withdrawing from the Examinations

A student can withdraw from all the examinations of the semester only once during the entire programme on valid grounds accepted by the University. Such withdrawal from the examinations of a semester will be permitted only if the candidate applies for withdrawal at least 24 hours before the commencement of the last examination. The letter grade 'W' appears in the mark sheet for such candidates.

20. Passing and Declaration of Examination Results

All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. Thereafter, the Controller of examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), and prepare the mark sheets.

90 to 100 marks	:	Grade 'S'
80 to 89 marks	:	Grade 'A'
70 to 79 marks	:	Grade 'B'
60 to 69 marks	:	Grade 'C'
55 to 59 marks	:	Grade 'D'
50 to 54 marks	:	Grade 'E'
Less than 50 marks	:	Grade 'RA'
Withdrawn from the examination	:	Grade 'W'

A student who obtains less than 30/24 marks out of 75/60 in the theory/ practical examinations respectively or is absent for the examination will be awarded grade RA.

A student who earns a grade of S,A,B,C,D or E for a course is declared to have successfully completed that course. Such a course cannot be repeated by the student.

A student who is detained for lack of attendance must re-register for and repeat the courses in the respective semester.

A student who obtains letter grade RA / W in the mark sheet must reappear for the examination of the courses.

The following grade points are associated with each letter grade for calculating the grade point average and cumulative grade point average.

S - 10; A - 9; B - 8; C - 7; D - 6; E - 5; RA - 0

Courses with grade RA / W are not considered for calculation of grade point average or cumulative grade point average.

A student can apply for re-totaling of one or more of his examination answer papers within a week from the date of issue of mark sheet to the student on payment of the prescribed fee per paper. The application must be made to the Controller of Examinations with the recommendation of the Head of the Department.

After the results are declared, mark sheets will be issued to the students. The mark sheet will contain the list of courses registered during the semester, the grades scored and the grade point average for the semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the semester, divided by the sum of the number of credits for all courses taken in that semester.

CGPA is similarly calculated considering all the courses taken from the time of admission.

21. Awarding degree

After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.

- For **First Class with Distinction**, the student must earn a minimum of 176 credits within four years (135 credits within three years for lateral entry students) for from the time of admission , pass all the courses in the first attempt and obtain a CGPA of 8.25 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).
- For **First Class**, the student must earn a minimum of 176 credits within five years (135 credits within four years for lateral entry students) from the time of admission and obtain a CGPA of 6.75 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students)..
- For **Second Class**, the student must earn a minimum of 176 credits within eight years (135 credits within seven years for lateral entry students) from the time of admission.

22. Ranking of Candidates

The candidates who are eligible to get the B.E. degree in the First Class with Distinction will be ranked together on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The Candidates passing with First Class will be ranked next after those with distinction on the basis of CGPA for all the subjects of study from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

The ranking of candidates will be done separately for each branch of study.

23. Transitory Regulations

The University shall have powers to revise or change or amend the regulations, the scheme of examinations, the courses of study and the syllabi from time to time.

Wherever there had been change of syllabi, examinations based on the existing syllabi will be conducted for three consecutive times after implementation of the new syllabi in order to enable the students to clear the arrears. Beyond that the students will have to take up their examinations in equivalent courses, as per the new syllabi, on the recommendations of the Head of the Department concerned.

ANNEXURE – I

Diploma Programmes Eligible for the B.E (Lateral Entry) Programmes offered in FEAT (from 2017-2018)

Sl.No.	Branches of Study	Eligible Diploma Programme (FT / PT / SW)
1.	**Civil Engineering**	i. Civil Engineering ii. Civil Engineering(Architecture) iii. Environmental Engineering and Pollution Control(Full Time) iv. Architectural Assistantship v. Civil Engineering (Rural Tech.) vi. Civil and Rural Engineering
2.	**Civil and Structural Engineering**	
3.	**Mechanical Engineering**	i. Mechanical Engineering ii. Mechanical and Rural Engineering iii. Mechanical Design and Drafting iv. Production Engineering v. Production Technology vi. Automobile Engineering vii. Automobile Technology viii. Metallurgy ix. Mechatronics Engineering x. Machine Tool Maintenance and Repairs xi. Tool and Die making xii. Tool Engineering xiii. Tool Design xiv. Foundry Technology xv. Refrigeration and Air Conditioning xvi. Agricultural Engineering xvii. Agricultural Technology xviii. Marine Engineering xix. Mechanical Engineering(Production) xx. Mechanical Engineering(Tool &Die) xxi. Mechanical Engineering (Foundry) xxii. Mechanical Engineering(R & A.C.) xxiii. Electronics(Robotics) xxiv. Mining Engineering xxv. Agricultural Engineering and Farm xxvi. Equipment Technology
4.	**Mechanical Engineering (Manufacturing Engineering)**	

Sl.No.	Branches of Study	Eligible Diploma Programme (FT / PT / SW)
5.	**Electrical and Electronics Engineering**	i. Electrical and Electronics Engineering ii. Electronics and Communication Engg. iii. Electronics and Instrumentation Engg iv. Electronics Engineering(Instrumentation) v. Instrument Technology vi. Instrumentation and Control Engineering vii. Electrical Engineering (Instruments and Control) viii. Electrical Engineering ix. Instrumentation Technology x. Electronics (Robotics) xi. Mechatronics Engineering
6.	**Electronics and Instrumentation Engineering**	
7.	**Chemical Engineering**	i. Petrochemical Engineering ii. Chemical Engineering iii. Environmental Engineering and Pollution Control iv. Leather Technology (Footwear) v. Leather Technology vi. Plastic Technology vii. Polymer Technology viii. Sugar Technology ix. Textile Technology x. Chemical Technology xi. Ceramic Technology xii. Petro Chemical Technology xiii. Pulp & Paper Technology xiv. Petroleum Engineering
8.	**Computer Science and Engineering**	i. Electronics and Communication Engineering ii. Computer Technology iii. Computer Science and Engineering iv. Information Technology v. Computer Engineering vi. Computer Networking vii. Electronics(Robotics)
9.	**Information Technology**	
10.	**Electronics and Communication Engineering**	

Sl.No.	Branches of Study	Eligible Diploma Programme (FT / PT / SW)
		viii. Mechatronics Engineering

FT - Full Time; PT - Part Time; SW- Sandwich.

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

To produce globally competent, quality technocrats, to inculcate values of leadership and research qualities and to play a vital role in the socio – economic progress of the nation.

MISSION

M1 : To partner with the University community to understand the information technology needs of faculty, staff and students.

M2 : To develop dynamic IT professionals with globally competitive learning experience by providing high class education.

M3 : To involve graduates in understanding need based Research activities and disseminate the knowledge to develop entrepreneur skills.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1 : To offer students with **core competence** in mathematical, scientific and basic engineering rudiments necessary to prepare, analyze and solve hardware/software engineering problems and/or also to pursue advanced study or research.

PEO2 : To educate students with good **scope** of knowledge in core areas of IT and related engineering so as to comprehend engineering tradE-offs, analyze, design, and synthesize data and technical concepts to create novel products and solutions for the real life problems.

PEO3 : To instil in students to maintain high **proficiency** and ethical standards, effective oral and written communication skills, to work as part of teams on multidisciplinary projects and diverse professional environments, and relate engineering issues to the society, global economy and to emerging technologies.

PEO4 : To deliver our graduates with **learning environment** awareness of the life-long learning needed for a successful professional career and to introduce them to written ethical codes and guidelines, perform excellence, leadership and demonstrate good citizenship.

PROGRAMME OUTCOMES (POs)

After the successful completion of the B.E. Information Technology degree programme, the students will be able to:

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,
and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the
information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in
independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the time of graduation, the students will be able to :

PSO 1: Apply the fundamental concepts of Information Technology to design, develop and test various real time applications in the areas of Computer Networking, Wireless Communication, and Information System and Security.

PSO 2: Solve complex engineering problems using the latest Information Technology tools and skills to arrive at cost effective and appropriate solutions.

PSO 3: Apply the knowledge of management principles and soft skills to carry out Information Technology projects with social and environmental awareness to have a successful career and as an entrepreneur.

Mapping Programme Educational Objectives (PEOs) with Programme Outcomes (POs)				
	PEO1	PEO2	PEO3	PEO4
PO1	✓	✓	✓	
PO2	✓	✓		✓
PO3	✓	✓		✓
PO4		✓	✓	✓
PO5	✓	✓	✓	
PO6			✓	✓
PO7		✓		✓
PO8			✓	✓
PO9	✓	✓	✓	✓
PO10			✓	✓
PO11	✓	✓	✓	✓
PO12	✓	✓	✓	✓

COURSES AND CREDITS - SUMMARY

Semester	No. of Courses		HS	BS	ES	PC	PE	OE	S&IT	Proj.	Total Credits
	T+P	Total									
I	4+2	**6**	3*	9	5	-	-	-	-	-	17
			1**	3	2						
II	4+4	**8**	4	13	7	-	-	-	-	-	24
			1	5	2						
III	6+2	**8**	3	4	8	8	-	-	-	-	23
			1	1	3	3					
IV	6+2	**8**	-	4	3	16	-	-	-	-	23
				1	1	6					
V	6+3	**9**	-	-	-	17	8	-	-	-	25
						6	3				
VI	6+3	**9**	-	-	-	10	11	3	-	-	24
						4	4	1			
VII	5+3	**8**	3	-	-	5	8	3	1	-	20
			1			2	3	1	1		
VIII	2+1	**3**	-	-	-	-	-	6	-	14	20
								2	-	1	
Total Courses	39+20	**59**	**4**	**10**	**8**	**21**	**10**	**4**	**1**	**1**	**-**
Total Credits		**-**	**13**	**30**	**23**	**56**	**27**	**12**	**1**	**14**	**176**

* - No of Credits ** - No of Courses

DETAILS OF COURSE CODE

Code (First Two digits)	Details	Code (3rd and 4th Digits)	Details
00	Common course for the faculty	HS	Humanities Theory
01	Civil Engg. Course	HP	Humanities Practical
02	Civil and Structural Engg. Course	BS	Basic Science Theory
03	Mechanical Engg. Course	BP	Basic Science Practical
04	Mechanical Engg. (Manufacturing). Course	ES	Engineering Science Theory
05	Electrical and Electronics Engg. Course	SP	Engineering Science Practical
06	Electronics and Instrumentation Engg. Course	PC	Professional Core Theory
07	Chemical Engg. Course	CP	Professional Core Practical
08	Computer Science and Engg. Course	PE	Professional Elective Theory
09	Information Technology Course	EP	Professional Elective Practical
10	Electronics and Communication Engg. Course	ST	Seminar / Industrial Training
XX	Code of the programme concerned (01 to 10)	OE	Open Elective Theory
		PV	Project and Viva-voce

5th digit represents the semester and 6th and 7th digits represent the serial number of courses.

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FACULTY OF ENGINEERING AND TECHNOLOGY

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Choice Based Credit System (CBCS)

COURSES OF STUDY AND SCHEME OF EXAMINATIONS (REGULATION 2016)

FIRST SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**Exam**	**CA**	**Total**	**Credits**
1.	HS-I	00HS101	Technical English	4	-	-	75	25	100	3
2.	BS-I	00BS102	Engineering Mathematics-I	4	-	-	75	25	100	3
3.	BS-II	00BS103	Applied Physics-I	4	-	-	75	25	100	3
4.	BS-III	00BS104	Applied Chemistry-I	4	-	-	75	25	100	3
5.	ES-I Lab	00SP105	Computer Programming Lab	-	1	3	60	40	100	3
6.	ES-II Lab	00SP106	Engineering Workshop	-	-	3	60	40	100	2
			Total	**16**	**1**	**6**	**420**	**180**	**600**	**17**

L - Lecture; **T** - Tutorial; **P** - Practical; **D** - Drawing

Exam - End Semester Examination; **CA** - Continuous Assessment

SECOND SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**D**	**Exam**	**CA**	**Total**	**Credits**
1.	BS-IV	00BS201	Engineering Mathematics-II	4	-	-	-	75	25	100	3
2.	BS-V	00BS202	Applied Physics-II	4	-	-	-	75	25	100	3
3.	BS-VI	00BS203	Applied Chemistry-II	4	-	-	-	75	25	100	3
4.	ES-I	00ES204	Basic Engineering*	4		-	-	75	25	100	3
5.	HS-II	00HP205	Communication Skills and Language Lab	-	2	3	-	60	40	100	4
6.	BS-I Lab	00BP206	Applied Physics Lab	-	-	3	-	60	40	100	2
7.	BS-II Lab	00BP207	Applied Chemistry Lab	-	-	3	-	60	40	100	2
8.	ES-III Lab	00SP208	Engineering Graphics	-	2	-	3	60	40	100	4
			Total	**16**	**4**	**9**	**3**	**540**	**260**	**800**	**24**

*** Basic Civil Engg. Course** for Mech., Manuf., EEE, EIE, ECE, CSE and IT

Basic Electrical Engg. Course for Civil, Civil and Structural, Mech., Manuf., and Chem. Engg.

Basic Mechanical Engg. Course for Civil, Civil and Structural, EEE, EIE, ECE, CSE, IT and Chem. Engg.

THIRD SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**Exam**	**CA**	**Total**	**Credits**
1.	HS-III	00HS301	Environmental Studies	4	-	-	75	25	100	3
2.	BS-VII	00BS302	Engineering Mathematics-III	4	1	-	75	25	100	4
3.	ES-II	00ES303	Engineering Mechanics	4	-	-	75	25	100	3
4.	ES-III	09ES304	Basic Electronics Engineering	4	-	-	75	25	100	3
5.	PC-I	09PC305	Microprocessors	4	-	-	75	25	100	3
6.	PC-II	09PC306	Data Structures and Algorithms	4	-	-	75	25	100	3
7.	ES-IV Lab	09SP307	Basic Electronics Engg Lab	-	-	3	60	40	100	2
8.	PC-I Lab	09CP308	Microprocessor Lab	-	-	3	60	40	100	2
			Total	**24**	**1**	**6**	**570**	**230**	**800**	**23**

FOURTH SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**Exam**	**CA**	**Total**	**Credits**
1.	BS-VIII	09BS401	Discrete Mathematics	**4**	**1**	**-**	**75**	**25**	**100**	**4**
2.	ES-IV	09ES402	Materials Science	4	-	-	75	25	100	3
3.	PC-III	09PC403	Object Oriented Programming and C++	4	-	-	75	25	100	3
4.	PC-IV	09PC404	Computer Architecture	4	-	-	75	25	100	3
5.	PC-V	09PC405	Analog and Digital Communication	4	-	-	75	25	100	3
6.	PC-VI	09PC406	Database Management System	4	-	-	75	25	100	3
7.	PC-II Lab	09CP407	Object Oriented Programming and Data Structures Lab	-	-	3	60	40	100	2
8.	PC-III Lab	09CP408	Database Management System Lab	-	-	3	60	40	100	2
			Total	**24**	**1**	**6**	**570**	**230**	**800**	**23**

FIFTH SEMESTER										
1.	PC-VII	09PC501	Theory of Computation	4	1	-	75	25	100	4
2.	PC-VIII	09PC502	Computer Networks	4	-	-	75	25	100	3
3.	PC-IX	09PC503	Computer Graphics and Multimedia	4	-	-	75	25	100	3
4.	PC-X	09PC504	Operating System	4	-	-	75	25	100	3
5.	PE-I	09PE505	Professional Elective-I	4	-	-	75	25	100	3
6.	PE-II	09PE506	Professional Elective-II	4	-	-	75	25	100	3
7.	PC-IV Lab	09CP507	Computer Graphics and Multimedia Lab	-	-	3	60	40	100	2
8.	PC-V Lab	09CP508	Operating System Lab	-	-	3	60	40	100	2
9.	PE-I Lab	09EP509	Professional Elective-I Lab	-	-	3	60	40	100	2
			Total	**24**	**1**	**9**	**630**	**270**	**900**	**25**

SIXTH SEMESTER										
1.	PC-XI	09PC601	Data Warehousing and Data Mining	4	-	-	75	25	100	3
2.	PC-XII	09PC602	Digital Signal Processing	4	-	-	75	25	100	3
3.	PE-III	09PE603	Professional Elective-III	4	-	-	75	25	100	3
4.	PE-IV	09PE604	Professional Elective-IV	4	-	-	75	25	100	3
5.	PE-V	09PE605	Professional Elective-V	4	-	-	75	25	100	3
6.	OE-I	XXOE606 *	Open Elective-I	4	-	-	75	25	100	3
7.	PC-VI Lab	09CP607	Data Warehousing and Data Mining Lab	-	-	3	60	40	100	2
8.	PC-VII Lab	09CP608	Digital Signal Processing and Information Coding Techniques Lab	-	-	3	60	40	100	2
9.	PE-II Lab	09EP609	Professional Elective-II Lab	-	-	3	60	40	100	2
			Total	**24**	**-**	**9**	**630**	**270**	**900**	**24**

* First two digits indicate the code of the Department / branch offering the elective course.

SEVENTH SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**S**	**Exam**	**CA**	**Total**	**Credits**
1.	HS-IV	00HS701	Engineering Ethics	4	-	-	-	75	25	100	3
2.	PC-XIII	09PC702	Information System and Network Security	4	-	-	-	75	25	100	3
3.	PE-VI	09PE703	Professional Elective-VI	4	-	-	-	75	25	100	3
4.	PE-VII	09PE704	Professional Elective-VII	4	-	-	-	75	25	100	3
5.	OE-II	XXOE705	Open Elective-II	4	-	-	-	75	25	100	3
6.	PC-VIII Lab	09CP706	Information System and Network Security Lab	-		3	-	60	40	100	2
7.	PE-III Lab	09EP707	Professional Elective-III Lab	-	-	3	-	60	40	100	2
8.	S & IT	09ST708	Seminar / Industrial Training	-	-	-	1	60	40	100	1
			Total	**20**	**-**	**6**	**1**	**555**	**245**	**800**	**20**

EIGTH SEMESTER										
Sl. No.	**Category**	**Course Code**	**Course**	**L**	**T**	**P**	**Exam**	**CA**	**Total**	**credits**
1.	OE-III	XXOE801	Open Elective-III	4	-	-	75	25	100	3
2.	OE-IV	XXOE802	Open Elective-IV	4	-	-	75	25	100	3
3.	Proj.	09PV803	Project Work and Viva-voce	-	-	15	60	40	100	14
			Total	**8**		**15**	**210**	**90**	**300**	**20**

PE-PROFESSIONAL ELECTIVES

1. Java and Web Design
2. Perl Programming
3. Python Programming
4. Information Coding Techniques
5. Signals and Systems
6. Linear Integrated Circuits
7. Software Engineering
8. Distributed Objects
9. Service Oriented Architecture
10. Digital Image Processing
11. Business Intelligence and Its Applications
12. Free and Open Source Software
13. Object Oriented Analysis and Design
14. System Software and Compiler Design
15. Software Testing and Quality Assurance
16. Mobile Communication
17. Optical Communication
18. Adhoc and Sensor Networks
19. GIS and Remote Sensing
20. Grid and Cloud Computing
21. Natural Language Processing

PE-PROFESSIONAL ELECTIVES LAB

1. Java and Web Design Lab
2. Perl Programming Lab
3. Python programming Lab
4. Object Oriented Analysis and Design Lab
5. Compiler Design and Networking Lab
6. Software Testing Lab
7. GIS and Remote Sensing Lab
8. Grid and Cloud Computing Lab
9. Natural Language Processing Lab

OE-OPEN ELECTIVES

1. Enterprise Resource Planning
2. E-Commerce
3. Bioinformatics
4. Supply Chain Management
5. Cyber Forensics
6. System Modeling and Simulation
7. Data Analytics
8. Social Network Analysis
9. Soft Computing Techniques
10. Knowledge Management
11. Project Management
12. Product Design
13. Organizational Behaviour and Management
14. Biology for Engineers
15. Disaster Management
16. Entrepreneurship
17. Human Rights
18. National Service Scheme

SYLLABUS
FIRST SEMSTER

00HS101	TECHNICAL ENGLISH	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- English technical communication focuses on developing the proficiency of Engineering students in communicative skills, ensuring them to face the demand of their profession with high command in English.
- At the end of the course, the learners will be able to use English for all purposes of technical communication and come out in “flying colours”.

Unit–I : Listening Strategies

This UNIT makes the students to get exposed to the listening exercises and get registered in their minds the nuances of listening and its importance.

1. Listening process.
2. Types of listening.
3. Barriers to listening.
4. Characteristics of good listeners.
5. Team listening and note making.

Unit–II : Critical Reading and Creative Writing Skills

This UNIT introduces communication model like courtesy, body language, role play and good presentation in an effective manner, where the students are given an opportunity to observe, analyze, interpret, imagine and implement their ideas too.

Poem : Road not taken – Robert Frost.

Ulysses – Alfred Lord Tennyson.

Prose : Of Studies – Francis Bacon.

Science-Destroyer or creator – J. Bronowski.

Play : Pygmalion – Bernardshaw.

Unit–III : Speaking Skill

Students shall be motivated to speak in English on familiar or unfamiliar topics. It is a platform to train the students to achieve competency in oral expression.

1. Interview Techniques.
2. Group discussion.
3. Making presentation and Discussing on the presentation.

4. Sample interviews.
5. Dialogue writing.

Unit–IV : Professional Writing

Students shall be trained to create their own proficiency in writing like-calling for quotation, asking clarification, placing orders and so on.

1. Poster making.
2. Letter writing (formal and E-mail).
3. Analytical writing.
4. Format of memos.
5. Report Writing.

Unit–V : Theoretical Writing

The nuances of English grammar may be taught to the students so as to present flawless English both in their oral and written communication.

1. Vocabulary – Homonyms, Homophones, Acronyms & Abbreviations, Idioms & Phrases.
2. Single word substitution.
3. Concord.
4. Tag Questions.
5. Active voice and passive voice.

Text Book

1. Rizvi, Ashraf. 2006. *"Effective Technical Communication"*. New Delhi. Tata McGraw Hill Publication Company Ltd.

REFERENCE BOOKS

1. Raman, Meenakshi and Sangeetha Sharma. 2004. *"Technical Communication: Principles and Practice"*. New Delhi: OUP.
2. Bailey, Stephen. "*Academic Writing: A Practical Guide for Students*". New York: Rutledge. 2011.
3. Gerson, Sharon J and Steven M. Gerson. 2007. "*Technical Writing: Process and Product*". Delhi: Pearson Prentice Hallan, 1980.

COURSE OUTCOMES:

1. Acquire an understanding of the techniques of listening.
2. Understanding the importance of comprehension skills.
3. Ensure the students to achieve competency in oral expression.
4. Understand the characteristics of formal writing and become familiar with the structure and layout of professional writing.

5. Able to present flawless English both in oral & written communication.

Mapping of Course Outcomes with Programme Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	2	2	-	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-

00BS102	ENGINEERING MATHEMATICS – I	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

To acquaint the student with the concepts in

- matrices,
- differential calculus,
- multiple integrals,
- vector calculus, which are most important in connection with practical engineering problems.

Unit–I : Matrices

Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties – Cayley–Hamilton theorem – Orthogonal transformation of a real symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

Unit–II : Differential Calculus

Curvature in Cartesian and parametric co-ordinates – Centre and radius of curvature-Circle of curvature-Evolutes – Envelopes.

Unit–III : Differential Calculus: Functions of Several Variables

Jacobians – Taylor's and Maclaurin's series expansions of functions of two variables – Maxima and Minima of functions of two variables – Constrained Maxima and Minima by Lagrange Method.

Unit–IV : Multiple Integrals

Double integration – Cartesian and polar co-ordinates – change of order of integration – area as a double integral – triple integration – Volume as a triple integral.

Unit–V : Laplace Transform

Definition, Transform of elementary functions, Properties, Derivatives and integrals of transforms, Transforms of derivatives, Convolution theorem, Transforms of periodic functions, Inverse Laplace transform, Application to solution of linear ordinary differential equations of second order with constant coefficients.

(In all UNITs, proof of theorems are not included).

TEXT BOOKS

1. Venkataraman, M.K., Engineering Mathematics, Volumes I (2008) and II (2009), The National Publishing Company, Chennai.
2. Veerarajan T, Engineering Mathematics, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

REFERENCE BOOKS

1. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 40th Edition, 2007.
2. Erwin Kreysig, Advenced Engineering Mathematics, John Wiley & Sons, 8th Edition, 2002.

Course Outcomes:

At the end of this course, students will able to

1. Solve eigen values and eigen vectors of a real matrix and Orthogonal transformation of a matrix.
2. Analyze the curvesby finding its curvature and evolutes.
3. Understand the extreme values for functions of two variables.
4. Evaluate double and triple integrals.
5. Apply Laplace transform in solving differential equations.

Mapping of Course Outcomes with Programme Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	-	-	-	-	2	-	-
CO2	3	3	2	2	-	-	-	-	-	3	-	-
CO3	3	3	2	-	-	-	-	-	2	2	-	-
CO4	3	3	2	-	-	-	-	-	3	2	-	-
CO5	3	3	2	-	-	-	-	-	-	3	-	-

00BS103	APPLIED PHYSICS – I	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

At the end of the course the students would be exposed to fundamental knowledge in various engineering subjects and applications

- Determine the different modulus of elasticity and viscosity of the less and highly viscous liquids.
- Design of acoustically good buildings.
- Interferometric techniques in metrology, communication and civil engineering.
- Application of quantum physics to optical and electrical phenomena.
- Application of ultrasonics and acoustics.
- Structure identification of engineering materials.
- Applications of Radio isotopes and power reactor systems.

Unit–I : Properties of Matter

Introduction to elasticity – Hook's law – Different modulii of elasticity – Bending of beams – Determination of Young's modulus by Uniform and Nonuniform bending – I – shapegirder – Torsional pendulum – Theory – Experiment and its applications. Introduction to Viscosity – streamline and turbulent flow – Poiseuille's equation– capillary flow method – Stoke's law – terminal velocity – determination of viscosity by Stoke's method.

Unit–II : Sound

Introduction to Acoustics – factors affecting acoustics of buildings and their remedies– absorption coefficient– Sabine's formula for reverberation time.

Introduction to Ultrasonics – production – magnetostriction and piezo electric methods – Detection of Ultrasonic waves (Acoustics grating) – Applications.

Unit–III : Optics

Interference-Air wedge-Michelson's interferometer – Diffraction – Dispersive power of prism and grating – Polarisation – Types of Polarisation – theory of plane, Circularly and elliptically polarized light – photo elasticity –Stress optic law – Effect of a stressed model in plane polar scope-Isoclinic and Isochromatic fringes – photo elastic bench – uses.

Unit–IV : Crystal Physics

Lattice-UNIT cell – Bravais lattice-Atomic radius, co-ordination number, Packing factor and their calculations of SC, BCC, FCC and HCP crystal structures – Miller indices – Crystal imperfections (Point defect, Line defect, surface defect and volume defect).

Unit–V : Nuclear Physics

Introduction – General properties of Nucleus – Mass defect, Binding energy, Nuclear models – Liquid drop model and Nuclear shell model – Nuclear detector – G.M counter – Scintillation Counter – Ionisation Chamber – Fission, Fusion, Thermonuclear reaction and Stellar energy – Nuclear reactor – General nuclear reactor – Breeder nuclear reactor.

TEXT BOOKS

1. Arumugam M., "Engineering Physics", Anuradha Agencies, Kumbakonam, 2000.
2. Gaur, R.K. and Gupta, S.L., "Engineering Physics", DhanpatRai Publishers, New Delhi, 2003.

REFERENCE BOOKS

1. Pillai, S.O., "Solid State Physics", New Age International Publication, New Delhi, Seventh Edition, 2015
2. Palanisamy, P.K., "Physics for Engineers", Scitech Publication (India) Pvt. Ltd., Chennai, Second Edition, 2005.
3. Mani, P., "Engineering Phyisics", Dhanam Publication, Chennai, 2011.
4. Rajendran, V. and Marikani, A., "Applied Physics for Engineers", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004.
5. Theraja B.L, "Modern Physics", Chand & company Ltd. , Edition 1990.
6. Tayal D.G., "Nuclear Physics", Himalaya publishing house, 2007.
7. Ghoshal.S.N., "Nuclear Physics", S. Chand & Company Ltd., 2012.
8. Avadhanulu M.N. and Kshirsagar P.G., "A Text Book of Engineering Physics", S. Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.

COURSE OUTCOMES

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

1. Describe the concept Hook's law of elasticity and its application towards I shaped grider.
2. Develop innovative methods of construction noise free halls.
3. Understand the different properties of light waves.
4. Gain knowledge on the importance of packing factor in crystal structure.
5. Analyze the different nuclear models and nuclear detector.

Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	2	-	3	2	-	-	-	-	-	1
CO2	3	2	-	-	2	1	1	1	-	-	-	-
CO3	3	-	1	-	-	-	1	1	-	-	-	-
CO4	2	1	2	2	-	-	-	-	-	-	-	-
CO5	3	-	-	-	1	1	-	-	-	1	-	1

00BS104	**APPLIED CHEMISTRY – I**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

To make the student conversant with the

- Water treatment techniques and disinfection methods.
- Working principle of electrochemical cells.
- Sources, refining and various types of fuels.
- Mechanism, classification, applications of lubricants and introduction adhesives.
- Surface chemistry, principle and applications of chromatography.

Unit–I : Water Treatment

Water – Hardness of water – softening of water by ion–exchange process and zeolite process – boiler feed water – specifications – boiler troubles (Sludge and scale formation, priming and foaming, caustic embrittlement and boiler corrosion) – removal of dissolved CO_2, O_2 and acids – internal treatment of boiler feed water (colloidal, carbonate,

phosphate, calgon and EDTA conditioning) – disinfection of water – break point chlorination – desalination of brackish water by reverse osmosis method – Determination of total hardness by EDTA method.

Unit–II : Electrochemistrty

Electrochemical cell – EMF – determination of EMF of electrochemical cell – single electrode potential – standard electrode potential – Nernst equation – reference electrodes – standard hydrogen electrode, calomel electrode, glass electrode-electrochemical series – concentration cell.

Unit–III : Fuels and Combustion

Classification of fuels – calorific value-HCV and LCV – Analysis of coal – proximate and ultimate analysis – carbonization of coal (HTC and LTC) – Manufacture of coke-properties of coke-flue gas analysis by Orsat's apparatus. Petroleum – Refining – Synthetic petrol – Fischer – Tropsch and Bergius process – cracking – polymerization process – knocking in petrol and diesel engines – octane number and cetane number – properties of straight run, cracked and polymer gasoline.

Unit–IV : Engineering Materials – I

Lubricants and their functions – Mechanisms of lubrication – classification of lubricants with example-lubricating oils – properties of lubricating oils (viscosity index, flash and fire points, cloud and pour points, oiliness, carbon residue and aniline point) – Solid lubricants – Greases – emulsion lubricants. Adhesives – Definition – adhesive action – development of adhesives strength – physical and chemical factors influencing adhesive action – bonding process of adhesives – adhesives for building and constructions – animal glues, casein glues.

Unit–V : Analytical Technique and Surface Chemistry

Chromatography – Definition – classifications – partition chromatography and adsorption chromatography.

Surface chemistry – Definition – types of adsorption – characteristics of adsorption – adsorption isotherms – Freundlich's adsorption isotherms and Langmuir's adsorption isotherms – applications of adsorption.

TEXT BOOKS

1. Sivasankar, B., (2012). '*Engineering Chemistry*', Tata McGraw Hill Publishing company Limited, New Delhi.
2. Sivakumar, R. and Sivakumar, N., (2013). '*Engineering Chemistry*', Tata McGraw Hill Company Limited, New Delhi.

REFERENCE BOOKS

1. Jain, P.C. and Monica Jain, (2010). '*Engineering Chemistry*', Dhanpat Rai & Sons, New Delhi.

2. Dara, S.S. and Umare, S.S. (2014). '*Text book of Engineering Chemistry*,' S. Chand & Co. Ltd., New Delhi.
3. Gopalan, R., D. Venkappayya, and S. Nagarajan, (2008). '*Engineering Chemistry*', Tata McGraw Hill Publishing Company Limited, New Delhi.

COURSE OUTCOMES

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

1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Apply the concepts of electrochemistry in electroplating and batteries.
3. Examine the properties and sources of fuels.
4. Categorize lubricants and adhesives according to their properties.
5. Predict chromatographic techniques and adsorption isotherms.

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	1	-	-	-	-	-
CO2	3	2	1	-	1	1	-	-	-	-	-	-
CO3	1	2	1	1	1	1	1	-	-	-	-	-
CO4	2	-	-	1	-	1	-	-	-	-	-	-
CO5	1	2	1	-	2	1	2	-	-	-	-	-

00SP105	COMPUTER PROGRAMMING LABORATORY	L	T	P	C
		0	1	3	3

COURSE OBJECTIVES

- To enable the students to have a good understanding about the concepts of "C" programming.
- To provide the hands on experience in basic concepts of AUTOCAD to students.

C Programs Based on the following Concepts

Basic structure of C Programs – Constants – Variables – Data Types – – Keywords – Identifiers – Operators – Expressions – IF, IF–ELSE, Nested IF–ELSE, Switch, WHILE, DO, FOR and GOTO statements – Arrays: one dimensional and two dimensional – Strings – Functions.

AUTOCAD

Introduction – Terminology – Coordinates – Operations – Control keys – Commands – Utility Commands –File Commands – Edit and Inquiry Commands – Display Control Commands – Modes – Layers – Colors – Blocks.

Special Features – Dimensioning – Angular, Diameter and Radius – Hatching – Patterns – Slides – Attributes – Configuring – Plotting– Exercises in AUTOCAD (2D Drawings only).

TEXT BOOKS

1. E. Balagurusamy, Programming in Ansi C, Tata McGraw Hill Education, (2012). 6th Edition.
2. Cheryl R. Shrock, AutoCAD Pocket Reference, BPB Publications, (2015).

REFERENCE BOOKS

1. Yashavant P. Kanetkar, Let us C, BPB Publications, 14th Edition, (2016).
2. David Byrnes, AutoCAD 2010 FOR DUMMIES, Wiley Publishing, Inc., (2010).

COURSE OUTCOMES

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

1. Analyze program requirements and develop programs using conditional and looping statements.
2. Develop programs for handling arrays and strings.
3. Create programs with user defined functions.
4. Study and Practice the basic drawing and editing commands of AUTOCAD for creating 2D drawing.
5. Apply basic drawing and editing commands of AUTOCAD for 2D drawing including dimensioning, hatching, sliding and pattern creation.

Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	-	1	-	-	-	-	-	-	-
CO2	2	2	3	-	1	-	-	-	-	-	-	-
CO3	1	2	3	-	1	-	-	-	-	-	-	-
CO4	1	1	1	-	2	-	-	-	-	-	-	-
CO5	1	1	1	-	2	-	-	-	-	-	-	-

00SP106	ENGINEERING WORKSHOP	L	T	P	C
		2	0	3	2

COURSE OBJECTIVES

- To provide the students simple hands–on–experience in the basic aspects of production engineering in fitting, carpentry and sheet metal.

Workshop Practice in the Shops

Carpentry: Use of hand tools – exercises in planning and making joints namely, half lap joint, dovetail joint, mortising and tenoning.

Fitting: Use of bench tools, vice, hammers, chisels, files, hacksaw, centre punch, twist drill, taps and dies – Simple exercises in making T joint and dovetail joints.

Sheet Metal Work: Use of hand tools – Simple exercises in making objects like cone, funnel, tray, cylinder.

Smithy: Demonstration of hand forging and drop forging.

COURSE OUTCOMES

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

1. Use basic tools of fitting, carpentry and sheet metal fabrication.
2. Experience in the fabrication of simple carpentry joints.
3. Develop skill to make simple fitting joints.
4. Train to make simple shapes of sheet material.
5. Distinguish hand forging and drop forging operation.

Mapping of Course Outcomes with Programme Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	-	-	-	-	-	-	-	1
CO2	3	-	1	-	-	1	-	-	2	-	-	2
CO3	3	-	1	-	-	-	-	-	2	-	-	1
CO4	3	-	1	-	-	-	-	-	2	-	-	1
CO5	3	-	-	-	-	-	-	-	-	-	-	1

SECOND SEMESTER

00BS201	ENGINEERING MATHEMATICS – II	L	T	P	C
		4	0	0	3

Course Objectives

- To acquaint the student with the concepts in ordinary differential equations and vector calculus.
- To acquaint the student with the techniques in the theory of analytic functions and complex integration.
- Above topics are most important in connection with practical engineering problems.

Unit–I : Ordinary Differential Equations

Second order linear differential equations with constant coefficients, Second order linear differential equations with variable coefficients (Euler and Legendre's linear equations), Simultaneous first order linear equations with constant coefficients, method of variation of parameters.

Unit–II : Vector Differentiation

Gradient, divergence and curl, directional derivative, UNIT normal vector, irrotational and solenoidal vector fields, expansion formulae for operators involving .

Unit–III : Vector Integration

Line, surface and volume integrals, Green's theorem in a plane, Gauss divergence theorem, Stoke's theorem – Verification of the above theorems and evaluation of integrals using them.

Unit–IV : Analytic Functions

Functions of a complex variable, Analytic function, the necessary conditions (Cauchy–Riemann equations), sufficient conditions, Properties of analytic functions, harmonic functions, construction of Analytic function by Milne-Thomson method, Conformal mapping: $w = z^2$, $1/z$, e^z, sin z, cos z.

Unit–V : Complex Integration

Statement and application of Cauchy theorem, Cauchy integral formulas, Taylor and Laurent expansion, Singularities – Classification; Residues – Statement and application of Cauchy residue theorem, Contour integration round the UNIT circle.

(In all UNITs, proof of theorems are not included)

TEXT BOOKS

1. Venkataraman, M.K., Engineering Mathematics, Volumes I (2008) and II (2009), The National Publishing Company, Chennai.

2. Veerarajan, T., Engineering Mathematics, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

REFERENCE BOOKS

1. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 40th Edition, 2007.
2. Erwin Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 8th Edition, 2002.

COURSE OUTCOMES

At the end of this course, students will able to

1. Solve double and triple integrals in finding area and volumes.
2. Apply line, surface and volume integrals in Gauss, Greens and Stoke's theorems.
3. Solve Second order linear differential equations with constant coefficients.
4. Construct analytic function and analyze conformal mappings.
5. Evaluate the complex integrals and contour integration.

Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	2	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	3	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-

00BS202	**APPLIED PHYSICS – II**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

At the end of the course the students would be exposed to fundamental knowledge in various materials and applications

- Application of lasers and fiber optics in engineering and technology.
- Astrophysics is the study of physics of the universe. In various objects, such as stars, planets and galaxies.
- To measure positions, brightness, spectra structure of gas clouds, planets, starts, galaxies, globular clusters, quasars etc.

- Physics of modern engineering materials.
- Electromagnetic phenomena and wave propagation
- Applications of nano materials, nano electronics and optoelectronic devices.
- Design of energy sources and applications of solar energy.

Unit–I : Laser and Fiber Optics

Introduction to laser – Einstein co-efficients (A&B) – properties of Laser– Types of laser – CO_2, Nd–YAG and Semiconductor lasers – Applications – Holography – Construction and reconstruction of hologram – Applications.

Fiber optics – Principle and propagation of light in optical fibers – Numerical aperture and acceptance angle-Types of optical fibers (Material, Mode and refractive index) – Applications – Fiber Optic communication system.

Unit–II : Dielectrics and Superconductors

Introduction to Dielectrics – Types of Dielectric materials – Dielectric constant – Determination of Dielectric constant (∑r) by Schering Bridge method – Different types of polarization – Local or Internal field – Clausius–Mosotti Equation – Dielectric Loss – Dielectric breakdown – Dielectric Properties and applications – Superconductivity – Properties – Meissner effect – Type I and Type II superconductors – BCS theory– High temperature Superconductors – Applications.

Unit–III : Nano Materials

Introduction to Nanomaterials – properties – Types of nanomaterials – synthesis of nanomaterials – Top–down approaches – Mechanical grinding, Lithiography – Types of Lithiography – Bottomup approaches – physical vapour deposition method, Sol–gel method. Applications of nanomaterial. Carbon Nanotubes (CNT) – Introduction – Types of Carbon Nanotubes – Synthesis of Carbon Nanotubes – Properties and its application.

Unit–IV : Quantum Mechanics

Heisenberg uncertainty Principle-Wave particle dual nature-De Broglie's matter Waves – wave Velocity and group velocity.

The wave Equation, Schrödinger's Time dependent wave equation, Schrödinger's time independent wave equation – The Wave function and its physical significance-The particle in a box – energy quantization – Eigen values and Eigen functions.

Unit–V : Energy Physics

Introduction to energy source-Energy sources and their availability (Conventional &Non-conventional energy sources) – Solar energy – Introduction – Methods of Harvesting Solar energy (Solar cells, Solar battery, Solar heat collectors and Solar water heater) – Wind energy – basic components of a WECS (Wind Energy Conversion System) – Classification of WEC Systems – Advantages and disadvantages of WECS – Biomass – Biomass conversion – Biogas Generation – Classification of Biogas plants.

TEXT BOOKS

1. Arumugam, M., "Engineering Physics", Anuradha Agencies, 2nd Edition, 1997.
2. Gaur, R.K. and Gupta, S.L., "Engineering Physics", DhanpatRai Publishers, New Delhi, 2003.

REFERENCE BOOKS

1. Rajendran, V., "Engineering Physics", Tata McGraw Hill Publishers, 2009.
2. Rai, G.D., "Non-conventional Energy Sources", Khauna Publications, 1993.
3. Martin Harwit, "Astrophysical Concepts", Springer, 4th Edition, 2006.
4. Dimitri Mihalas. "Stellar Atmospheres", San Francisco, W.H. Freeman & Company, 1978.
5. Wilson, M., Kannangara, K., Smitt, G., Simmons, M. & Boguse, B., "Nanotechnology", Basic Science and Emergine Technology, Raguse Chapman hall Publications, 2002.
6. Kenneth Klabunde, J., "Nanoscale Materials in Chemistry", A John Eiley & Sons, Inc., Publication, 2001.
7. Mani, P., "Engineering Phyisics", Dhanam Publication, Chennai, 2011.
8. Agarwal, M.P., "Solar Energy", S.Chand & Co., I Edn, New Delhi, 1983.
9. John Twidell & Tony Weir, "Renewable Energy Resources", Taylor & Francis, 2005.
10. Carroll, B.W. & D.A. Ostlie, "An introduction to Modern Astrophysics", 2nd Edition, 2011.
11. Avadhanulu, M.N. and Kshirsagar, P.G., "A Text Book of Engineering Physics", S. Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.
12. Rai, G.D., "*Solar Energy* Utilization", VolumE-1 & 2 by – Khanna Publishers, New Delhi.
13. Senthilkumar, G., Engineering Physics, VRB Publishers Pvt. Ltd., Chennai.
14. Ravikrishnan, A., Environmental Science and Engineering, Hitech Publishing Company Pvt. Ltd.
15. Rai, G.D., *"Non-Conventional Energy Sources"*, Khanna Publishers.
16. Senthilnathan, S., Gnanapoongothai, T., Oudayakumar, K., Jayavarthanan, T., "Material Science", SSMP Publications.

COURSE OUTCOMES

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

1. Description of different types of lasers and fibers optical materials and its application
2. Explain the diamagnetic properties of superconductor
3. Understand the different types of nanomaterials.
4. Evaluate the quantum mechanical concept of wave velocity and group velocity
5. Compared the different energy resources and their availability.

.Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	2	-	3`	2	-	-	-	-	-	1
CO2	3	2	2	2	2	1	1	-	2	-	-	-
CO3	3	2	1	-	-	--	1	-	-	-	-	-
CO4	3	1	-	2	-	-	1	-	-	-	-	-
CO5	3	-	2	-	1	2	1	1	3	1	-	1

00BS203	**APPLIED CHEMISTRY – II**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

To make the students to understand the

- Types of polymers and polymerization processes.
- Phase rule with different kinds of systems.
- Different types of corrosion and their mechanism.
- Working principle and applications of primary and secondary batteries.
- Engineering materials such as refractories and abrasives.

Unit–I : Polymers

High polymers: plastics – Thermoplastics and thermosetting resins. Addition polymerization and condensation polymerization – compounding of plastics – Moulding methods – Compression, injection and blow moulding – Important engineering plastics – polyethylene, PVC, Teflon, Polystyrenes, Nylon 6,6, Bakelite, Polyurethane-Rubber – natural rubber – vulcanization of rubber – Synthetic rubber – buna–S, butyl rubber, neoprene and polyurethane foams.

Unit–II : Phase Rule

Phase rule-statements and explanation of the terms involved – condensed phase rule-construction of phase diagram – water system – sulphur system – phase rule for two component alloy systems – thermal analysis – eutectic system – Lead–Silver system – simple eutectic formation – Zinc – Magnesium alloy system.

Unit–III : Corrosion and Prevention

Corrosion: Dry and wet corrosion – Pilling–Bedworth rule-mechanism of wet corrosion – types of wet corrosion – galvanic corrosion – differential aeration corrosion – factors affecting corrosions. Corrosion control methods – design and material selection – cathodic protections – sacrificial anode and impressed current method – corrosion inhibitors – protective coatings – surface preparations – Galvanizations, Tinning – electroplating – anodizing, phosphate coating, hot dipping.

Unit–IV : Energy Storage Devices

Types of battery – commercial voltaic cell – primary battery – secondary storage cell – lead – acid cell, nickel–cadmium cell, lithium battery – fuel cells – hydrogen–oxygen fuel cell – photovoltaic cell – principle, working and applications.

Unit–V : Engineering Materials – II

Refractories – classification (acidic, basic and neutral refractories) – properties (refractoriness, refractoriness under load, dimentional stability, porosity, thermal spalling) – fire clay bricks, alumina bricks and zirconia bricks. Abrasives – Moh's scale of hardness – natural abrasive (diamond, corundum, emery, garnets and quartz) – synthetic abrasives – silicon carbide, boron carbide and their uses.

TEXT BOOKS

1. Sivasankar, B., (2012). '*Engineering Chemistry*', Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Sivakumar, R. and Sivakumar, N., (2013). '*Engineering Chemistry*', Tata McGraw Hill Company Limited, New Delhi.

REFERENCE BOOKS

1. Jain, P.C. and Monica Jain (2010). '*Engineering Chemistry*', DhanpatRai & Sons, New Delhi.
2. Dara, S.S. and Umare, S.S. (2014). '*Text Book of Engineering Chemistry*', S. Chand& Co. Ltd., New Delhi.
3. Gopalan, R., Venkappayya, D., and Nagarajan, S., (2008). '*Engineering Chemistry*', Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Gowariker, V.R., Viswanathan, N.V. and Jayadev Sreedhar, (2006). '*Polymer Science*', New Age International P. (Ltd.,), Chennai. (Unit I)
5. Puri, B.R., Sharma, L.R. & Pathania, M.S., (2013). '*Principles of Physical Chemistry*', Vishal Publishing Company, New Delhi. (Unit II).

COURSE OUTCOMES

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

1. Illustrate the synthesis and applications of polymers and moulding processes.
2. Describe the concept of phase rule and its applications in alloy preparation.
3. Relate the concept of corrosion with the protection of metals from corrosion.

4. Examine about energy storage devices including solar cells.
5. Interpret the knowledge on classification, synthesis and applications of abrasives and refractories.

Mapping of Course Outcomes with Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	1	1	1	-	-	-	-	1
CO2	3	-	1	1	2	1	-	-	-	-	-	-
CO3	3	2	1	-	1	2	1	-	-	-	-	-
CO4	3	-	2	-	2	1	2	-	-	-	-	-
CO5	3	-	-	-	-	1	1	-	-	-	-	-

00ES204	BASIC ENGINEERING (CIVIL)	L	T	P	C
		2	0	0	3

COURSE OBJECTIVES

- To inculcate a knowledge on essentials of Civil Engineering
- To expose the students on the role, significance and contributions of Civil Engineering in satisfying societal needs
- To illustrate the concepts of various construction techniques

Unit–I

Introduction to Civil Engineering – various disciplines of Civil Engineering, relevance of Civil Engineering in the overall infrastructural development of the country. Introduction to various building materials – Stone, Bricks, Steel, Cement, Concrete, Timber – its characteristics, types and uses. Various types of buildings as per nbc; Selection of suitable site for buildings, Components of a residential building – its functions, Orientation of a building, simple definitions – plinth area / built up area, floor area/carpet area – floor space index.

Unit–II

Surveying – Principles and objectives of surveying; Types, Classifications of surveying, measurement of areas and distances – chain – compass: Introduction to Leveling, Total station, Remote sensing – fundamental principles and applications.

Building construction – foundations; Bearing capacity of soil, functions of foundations, Types – Shallow and Deep. Brick masonry – Header, Stretcher, Flemish and English Bond. Columns, Lintels, Roofs – functions, types, roofing materials, Floors – functions, types, flooring materials. Decorative finishes – plastering, interior design.

Unit–III

Bridges – necessity – selection of site-components of a bridge: Dams – types – selection site-forces acting on a dam – Roads – uses – classification of roads – components of a road; Railways – basic components of permanent way – water supply – per capita requirement – sources – need for conservation of water – rain water harvesting – basic water treatment – Sewage and its disposal – basic definitions – Septic tank – components and functions.

TEXT BOOKS

1. Ramesh Babu, V., A Text Book of Basic Civil Engineering, Anuradha Agencies, Kumbakonam, 1995.
2. Palanichamy, M.S., Basic Civil Engineering, Tata McGraw Hill Publishing Company Ltd., 2000.

REFERENCE BOOKS

1. Ramamrutham, V., Basic Civil Engineering, DhanpatRai Publishing Co. (P) Ltd., 1999.
2. Natarajan, K.V., Basic Civil Engineering, Dhanalakshmi Publications, Chennai, 2005.
3. Satheesh Gopi, Basic Civil Engineering, Pearson Publications, 2010.

COURSE OUTCOMES

1. Understand the basic knowledge on civil engineering materials.
2. Develops the skill to satisfy the social needs.
3. Describe the suitable method of construction technique.

00ES204	BASIC ENGINEERING (ELECTRICAL)	L	T	P	C
		2	0	0	3

COURSE OBJECTIVES

- To impart the basic principles of generation of electrical energy.
- To explain the operation of electrical machines and various measuring instruments.
- To understand the basic concepts of circuit analysis.
- To provide an overview of the principles, operation and application of semiconductor devices like diodes, BJT, FET and a basic knowledge of fundamentals of Communication Systems.

Unit–I

Sources of Electrical energy–Generation of electrical energy – working principles of DC generators and alternators– Advantages of electrical energy over other forms of Energy.

Operating principle of DC motors– Types of DC motors– Characteristics and uses of DC motors. Working principles of Single and Three phase transformers. Operating Principle of three phase and single phase induction motors– types and uses of induction motors.

Working principles of MC and MI voltmeters and Ammeters, Dynamo meter type wattmeter, Induction type energy meter and Multimeter–types of wiring– requirements for house wiring–typical layout for a small housE- earthing.

Unit–II

DC Circuits: Definition of current, voltage, power and energy– DC voltage and current sources– resistance, types of resistors, series and parallel connections of resistors, current and voltage division–loop method of analysis of simple circuits.

AC Circuits: Sinusoidal signals – average, r.m.s values –inductance, capacitance and their V–I relationships. Analysis of simple single phase series circuits– power and power factor–phasor diagrams – Introductions to three phase AC circuits.

Unit–III

Basic Electronics: Principle and characteristics, uses of PN junction Diode, Zenerdiode, BJT, FET, UJT, Thyristors,– Operating principle of Half wave, Full wave and Bridge rectifiers.

Digital Electronics and Principles of Communication Systems: Symbol, truth table and functions of basic logic gates, universal gates, Half adder, Full adder. Communication systems-Microwave, Satellite, Fibreoptic and ISDN (block diagram description only).

TEXT BOOKS

1. Nagrath, I.J., 2007. Elements of Electrical Engineering, 2nd Edition, 14th reprint, Tata McGraw Hill Publishing Co. Limited, New Delhi.

REFERENCE BOOKS

1. Gupta, B.R., 2002. *Principles of Electrical Engineering*, S. Chand & Co, New Delhi.
2. Theraja. B.L & Theraja. A.K., 2000. *Electrical Technology, Vol. I, II, and IV*, S. Chand and Co., New Delhi.
3. Floyd & Jain, 2009. *Digital Fundamentals*, 8th Edition, Person Education.

4. Anok Singh, 2006. *Principles of Communication Engineering*, 6th reprint, S. Chand & Company Ltd., Ram Nagar, New Delhi.

COURSE OUTCOMES

After the completion of the course, the student should be able to

1. Provide comprehensive idea about simple circuit analysis, working principles of machines and common measuring instruments
2. Analyze the behavior of any dc and ac circuits
3. Characterize semiconductor devices that include diodes, BJT and digital functions.
4. Understand fundamental principles of communication systems.

00ES204	BASIC ENGINEERING (MECHANICAL)	L	T	P	C
		2	0	0	3

COURSE OBJECTIVES

- To familiarize the students the functioning of different types of Boilers, the mountings and accessories.
- To provide basic knowledge about the use of various machine tools and the basic principles of welding, brazing and soldering.
- To illustrate the concepts of various metal forming operations and metal joining techniques.

Unit–I

Boilers: Classification – Description and working of Simple vertical boiler, Cochran boiler, Babcock and Wilcox boiler – Description and working of boiler mountings: water level indicator, Pressure gauge, Dead weight and Spring loaded Safety value, Fusible plug, Feed check value, Steam stop value and Blow–off cock – Description and working of boiler accessories: Economiser and Super heater.

Unit–II

Prime Movers: Steam turbines: Principles and working of Impulse and Reaction turbines – Comparison. Gas turbines: Principles and working of Open cycle and Closed cycle gas turbines. Internal Combustion Engines: Classification – principal parts – comparison of two strike and four stroke engines – working principle of petrol and diesel engines.

Unit–III

Machine Tools: Description of parts and operations performed – Lathe, Shaper and Drilling machine.

Metal Forming: Hot working versus cold working; Hand forging – Principle and operations; Rolling – Principle, rolling mill configurations; Extrusion – Direct versus indirect extrusion**.**

Metal Joining: Gas welding – principle, Oxy–acetylene welding – equipment, types of flames, advantages and disadvantages – Arc welding – principle, advantages and disadvantages – Brazing – Torch brazing, dip brazing, furnace brazing, resistance brazing – Soldering – Comparison of brazing and soldering.

TEXT BOOKS

1. Prabhu, T.J., Jaiganesh, V. and Jebaraj, S., Basic Mechanical Engineering, Scitech Publications Pvt. Ltd., Chennai, 2000.
2. Venugopal and Prabhuraj, T.J., Basic Mechanical Engineering, ARS Publishers, Sirkali, 1996.

REFERENCE BOOKS

1. Hajra Choudhury, S.K., Nirjhar Roy, Hajra Choudhury, A.K., Elements of Workshop Technology, (Vol 1 and Vol II,), Media Promoters, Pvt Ltd. (2008)
2. Rao, P.N., Manufacturing Technology: Foundry, Forming and Welding – Vol–1, McGraw Hill Education, (2013)
3. Steven R. Schmid, Serope Kalpakjian, Manufacturing Processes for Engineering Materials (English) 5th Edition, Pearson India, (2009)

COURSE OUTCOMES

1. Understand the construction and working principles of boiler operations
2. Distinguish between steam turbines and gas turbines.
3. Select suitable manufacturing methods to produce a new component.

COURSE OUTCOMES

1. Acquire Knowledge on the essentials of Civil, Mechanical and Electrical Engineering.
2. Familiarize with the various civil engineering materials, electrical equipment and machine tools.
3. Understand the working principle of boilers, turbines and electrical machines.
4. Gain overview on surveying, construction, bridges, electronic devices, communication systems, welding and soldering.
5. Develop skills to satisfy the societal needs.

Mapping with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	-	-	-	-	-	-	-	-	3
CO2	3	-	-	-	-	-	1	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	2	1		2	-	-	-
CO5	-	-	-	-	-	3	2	1	2	-	-	1

00HS205	COMMUNICATION SKILLS AND LANGUAGE LABORATORY	L	T	P	C
		0	2	3	4

COURSE OBJECTIVES

- The Language Lab focuses on the production and practices of sounds of language
- The Language Lab familiarizes the students with the use of English in everyday situations and contexts.

Theoretical Session (Internal Assessment only)

1. English sound pattern
2. Sounds of English
3. Pronunciation
4. Stress and Intonation
5. Situational Dialogues/ Role play
6. Oral presentations– Prepared or Extempore
7. 'Just a Minute' sessions (JAM)
8. Describing Objects /situations/ people
9. Debate
10. Giving Directions

Practical Session

- To make the students recognize the sounds of English through Audio Visual Aids
- To enable the students speak fluently without fear
- To develop their communicative skill with individual practice through the prescribed package
- The Globarena Package consists of the following exercises
  1. Reading comprehension
  2. Listening comprehension
  3. Vocabulary exercises
  4. Phonetics
  5. Role Play in dialogues
  6. Auto Speak

Minimum Requirement:

The English Language Lab shall have two parts:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language Globarena software for self-study by learners and Library with Books to improve their proficiency in English.

Suggested Software:

1. Globarena Package for communicative English
2. Cambridge Advanced Learner's English Dictionary

Books to be procured for English Language Lab Library:

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. A Practical course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand& D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
5. A text book of English Phonetics for Indian Students by T.Balasubramanian (Macmillan)
6. English Skills for Technical Students, WBSCTE with British Council, OL.

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 40 sessional marks and 60 year-end Examination marks. The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Course Outcomes:

1. Realize the essentiality of the informal conversation.
2. Become familiar with different speaking skills.
3. Gain confidence to speak and write on similar topic.
4. Improve listening & speaking skills. Includes oral reports conference procedures and everyday conversations.
5. Continue to speak with reduced anxiety by recognizing and using communication strategies.

Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	-	-	-	-	-	2	-	2	3	-	3
CO2	-	-	-	-	-	-	2	-	2	3	-	3
CO3	-	-	-	-	-	-	2	-	2	3	-	3
CO4	-	-	-	-	-	-	2	-	2	3	-	3
CO5	-	-	-	-	-	-	2	-	2	3	-	3

00BP206	APPLIED PHYSICS LABORATORY	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

The ability to offer students a variety of research opportunities.

- To determine the radius of curvature of the plano convex lens and the wavelength of the sodium light by measuring the diameter of Newton's rings.
- We can use a spectrometer to measure this angle of deviation.
- To measure the modulus of elastic material by torsional pendulum and bending of a beam.
- To determine the resistivity of a given steel and brass wire.
- To find the velocity of ultrasonic waves in a liquid.
- Less viscosity of the liquid by poiseuille's method.

List of Experiments (Any Ten)

1. Non-Uniform Bending – Determination of Young's modulus of the given scale or beam.
2. Newton's rings– Determination of Radius of curvature of the given Plano convex lens.
3. Viscosity –Determination of co-efficient of Viscosity of a highly viscous liquid by Stoke's method.
4. Spectrometer – Dispersive power of a given prism.
5. Torsional Pendulum – Determination of Moment of Inertia of the metallic disc and Rigidity Modulus of the material of a wire.
6. Field along the axis of a coil– Determination of horizontal earth magnetic flux density.
7. Air wedge-Determination of thickness of a given thin wire and paper.
8. Viscosity – Determination of co-efficient of Viscosity of a less viscous liquid by Capillary flow method
9. Uniform bending– Determination of Young's modulus of the given scale or beam.
10. Spectrometer – Determination of wavelength of the prominent spectral lines using Grating.
11. Semiconductor diode laser – Determination of wavelength of Laser source using Grating.
12. Band gap determination of a Semiconductor.

COURSE OUTCOMES

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

1. Acquired the knowledge of torsional properties of metals wire.
2. Generalized the dispersion of light through the prism.
3. Calculate the wavelength of monochromatic and polychromatic source of light.
4. Analyze diffraction patterns can be formed by light passing through a series

of fine lines.

5. Estimate the size and shape of given unknown fine powder using laser gratings.

Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	2	-	3	2	1	-	-	-	-	-
CO2	3	3	-	-	3	1	1	-	-	-	-	-
CO3	3	2	2	-	3	1	1	-	-	1	-	-
CO4	3	2	2	-	2	2	1	-	-	1	-	-
CO5	3	2	2	-	3	1	1	-	-	1	-	-

00BP207	**APPLIED CHEMISTRY LABORATORY**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To appreciate the practical significance of acidimetry, alkalimetry and permanganometry
- To analyse quantitatively the amount of a substance present in a given sample.
- To assess the composition of an alloy
- To test the water quality standards.

LIST OF EXPERIMENTS

1. Estimation of Potassium hydroxide
2. Estimation of Acetic acid in vinegar
3. Estimation of Temporary hardness of water sample
4. Estimation of Total hardness of water sample
5. Estimate separate amount of sodium carbonate and sodium hydroxide in a mixture
6. Estimation of Ferrous sulphate
7. Estimation of Mohr’s salt
8. Estimation of ferrous iron
9. Estimation of Oxalic acid
10. Determination of available free chlorine in a water sample.
11. Estimation of copper in brass by iodometry

12. Estimation of iron by dichrometry
13. Estimation of nickel in an alloy

COURSE OUTCOMES

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

1. Calculate the quantity of acids and bases in industrial waste water.
2. Estimate temporary and total hardness of water sample.
3. Estimate the available chlorine in industrial waste.
4. Determine the quantity of metals in alloy.
5. Determine the quantity of iron in solutions by permanganometric method.

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Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	1	-	1	2	-	-	-	-	-
CO2	3	2	-	1	-	1	1	-	-	-	-	-
CO3	2	2	-	-	-	1	1	-	-	-	-	-
CO4	1	2	-	1	-	-	1	-	-	-	-	-
CO5	1	1	-	-	-	-	-	-	-	-	-	-

00SP 208	ENGINEERING GRAPHICS	L	T	P	D	C
		0	2	0	3	4

COURSE OBJECTIVES

- To develop the ability to produce simple engineering drawing and sketches based on current practice.
- To develop the means for communication of ideas, thoughts and design of objects, related to engineering applications, to others though drawing.
- To develop the skills to read manufacturing and construction drawings used in industry.
- To develop a working knowledge of the layout of plant and equipment.
- To develop skills in abstracting information from calculation sheets and schematic diagrams to produce working drawings for manufacturers, installers and fabricators.
- To expose the international standards of technical drawing

Unit–I

Introduction to Engineering Drawing, Use of drafting instruments– Lettering and dimensioning.

Construction of conic sections –Ellipse, Parabola & Hyperbola (Eccentricity Method, Rectangle method, Intersecting arcs method) – Special curves– Simple cycloids and involutes– Tangent and normal at points on the curves only.

Unit–II

Orthographic projections – Projections of Points– Projections of Straight lines (given the projections, to determine the true length and true inclinations).

Unit–III

Projections of Solids like prism, pyramid, cylinder, cone, tetrahedron and octahedron in simple positions.

Auxiliary Projections of prism, pyramid, cylinder, cone when the axis is inclined to one plane only.

Unit–IV

Sections of prism, pyramid, cylinder, cone in simple position – true shape of sections. Intersection of surfaces – cylinder to cylinder and cylinder to cone with axis intersecting at right angles. Development of lateral surfaces of prism, pyramid, cylinder, cone and cut solids.

Unit–V

Isometric Projections of simple solids and combinations. Perspective Projections of simple solids. Conversion of Pictorial view of simple objects into Orthographic views.

TEXT BOOKS

1. Bhatt, N.D Engineering Drawing – Charotar Bookstall, Anand – 388001.
2. Venugopal, K Engineering Drawing and graphics – New age international (P) Ltd., Publishers, Chennai.

REFERENCE BOOKS

1. Gopalakrishna, K.R. Engineering Drawing Vol.I and Vol. II – Subhas stores, Avenue Road, BangalorE-560002.
2. Kumar, M.S Engineering Graphics – DD Publications, Chennai – 6400048.

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

1. Utilize drawing instruments effectively and present engineering drawings and sketches
2. Construct basic and intermediate geometries.
3. Understand the concept of orthographic, isometric projections of points, lines and regular solids, component drawing, building drawing.
4. Acquire visualization skills to develop new products.
5. Develop their technical communication skills and promote life-long learning.

Mapping of Course Outcomes with Program Outcomes												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	3	-	1	-	-	-	-	2	-	-
CO2	-	2	3	2	2	-	-	-	-	2	-	-
CO3	3	2	3	2	1	2	-	-	-	2	-	-
CO4	-	2	-	-	-	3	-	-	-	-	-	2
CO5	-	-	-	1	-	-	-	-	-	3	-	3

THIRD SEMESTER

00HS301	ENVIRONMENTAL STUDIES	L	T	P	C
		4	0	0	3

Course Objectives :

- To provide basic knowledge on natural resources.
- To describe the types, characteristic features, structure and function of an ecosystem.
- To expose information about biodiversity richness and the political angers to the species of plants, animals and microorganisms.
- To educate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To teach problem of over population, health and hygiene and also the role of technology in eliminating or minimizing above factors.

UNIT – I Introduction

Multidisciplinary nature of environmental studies - Definition, scope and importance - Need for public awareness. Natural resources - Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - Role of an individual in conservation of natural resources- Equitable use of resources for sustainable lifestyles.

UNIT – II Concept of an Ecosystem

Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological - pyramids - Introduction, types, characteristic features, structure and function of the following ecosystem - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT – III Bio Diversity

Definition: genetic, species and ecosystem diversity - Bio geographical classification of India - Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and

local levels - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation ofbiodiversity.

UNIT – IV Types ofPollution

Definition - Cause, effects and control measures of Air pollution - Water pollution - Soil pollution - Marine pollution- Noise pollution - Thermal pollution - Nuclear hazards- Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution – Disaster management: floods, earthquake, cyclone and landslides. Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, and watershed management - Resettlement and rehabilitation of people; its problems and concerns. - Environmental ethics: Issues and possible solutions - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation - Consumerism and waste products - Environment Protection Act - Air (Prevention and Control of Pollution) Act - Water (Prevention and control of Pollution) Act - Wildlife Protection Act - Forest Conservation Act - Issues involved in enforcement of environmental legislation.

UNIT – V Environment and Human Health

Population growth, variation among nations - Population explosion – Family Welfare Programme - Environment and human health - Human Rights - Value Education - HIV/AIDS - Women and Child Welfare - Role of Information Technology in Environment and human health -Case Studies.

TEXT BOOKS :

1. Textbook of Environmental Studies, ErachBharucha, University Press,2005.
2. Environmental Studies, MP Poonia& SC Sharma, Khanna Publishing House,2017.

REFERENCES :

1. Environmental Studies, Rajagopalan, Oxford University Press, 2005.
2. Brunner R.C., Hazardous Waste Incineration, McGraw Hill Inc., 1989.
3. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T., Environmental Encyclopaedia, Jaico Publ. House, Mumbai, 2001.
4. De A.K., Environmental Chemistry, Wiley Eastern Ltd. New Age International Limited, 3rd Edition, 2003.
5. Jadhav, H &Bhosale, V.M. Environmental Protection and Laws. Himalaya Pub. House, Delhi, 1995 .
6. Wanger K.D., Environmental Management. W.B. Saunders Co. Philadelphia, USA, 1998.

COURSE OUTCOMES :

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

1. Understand renewable and non-renewable resources of our ecosystem.
2. Compare ecological system, causes and their relationship.
3. Explain political angers to the species of plants, animals and microorganisms in the environment and the threats to biodiversity
4. Analyse the causes and consequences of natural and man induced disasters (flood, earthquake, landslides, cyclones) and measure pollutions and minimize their effects.
5. Design modes with the help of information technology for eliminating or minimizing the problems of Environment and human health.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	-	1	3	-	-	-	-	-	-	-	2
CO2	1	-	-	-	-	1	3	-	-	-	-	-	-	-	2
CO3	1	-	-	-	-	2	3	-	-	-	-	-	-	-	2
CO4	2	1	-	-	-	2	3	-	-	-	-	-	-	-	3
CO5	1	-	2	1	-	3	3	-	-	-	-	-	-	-	3

00BS302	**ENGINEERING MATHEMATICS – III**	**L**	**T**	**P**	**C**
		4	**1**	**0**	**3**

Course Objectives :

- To understand the basic concepts of partial differential equations which is helpful in solving Real world problems.
- Introduce Fourier series which is very useful in the study of electrostatics, acoustics and computing.
- Introduce Boundary value problems which is helpful in investigation of the important features of electromagnetic theory.
- The study of Fourier transform is useful in solving problems in frequency response of a filter and signal analysis.
- Provide a study of Z-transform which can played important role in the development of communication engineering.

UNIT - I Partial Differential Equations

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions - Solution of standard type of first order partial differential equations -

Lagrange's linear equation - Linear partial differential equations of second order with constant coefficients.

UNIT – II Fourier Series

Dirichlet's conditions - General Fourier series - Odd and Even functions - Half range sine series - Half range cosine series - Complex form of Fourier series – Parseval's identity.

UNIT – III Boundary Value Problems

Solutions of one-dimensional wave equation – One dimensional heat equation (without derivation) – Fourier series solutions in Cartesian co-ordinates.

UNIT – IV Fourier Transform

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem - Parseval's identity

UNIT – V Z – Transform and Difference Equations

Z – transform – Elementary properties – Inverse Z – transform - Convolution theorem – Solution of difference equations using Z – transform.

TEXT BOOKS :

1. Kandasamy P, Tilagavathy K and Gunavathy K, "EngineeringMathematics", 6th edition, (Vol I & II) S.Chand& Co Ltd. New Delhi, 2006.
2. Ventakataraman M K, "Engineering Mathematics", The National Publishing Co., Chennai, 2003.

REFERENCES :

1. Ramana B V, "Higher Engineering Mathematics", Tata McGraw Hill Pub, 3rd edition, 2007.
2. Veerarajan T, "Engineering Mathematics", 3rd edition, Tata McGraw Hill Pub., 2005.
3. Singaravelu A, "Engineering Mathematics", Meenakshi Publications, Chennai, 2004.

COURSE OUTCOMES :

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

1. Acquire basic understanding of the most common partial differential equations.
2. Understand the concepts of Fourier series.
3. Ability to solve boundary value problems.
4. Able to investigate signals problems using Fourier transform
5. Familiarize Z-transform that play important roles in many discreate engineering problems.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-

00ES303	**ENGINEERING MECHANICS**	**L**	**T**	**P**	**C**
		4	0	0	3

Course Objectives:

- To make the students to understand the forces and its related laws of mechanics in static and dynamic conditions
- To teach the forces and its motions on particles, rigid bodies and structures.
- To train the students to find the moment inertia of any sections and masses for the structural members.
- To impart skills to solve problems in dynamic conditions
- To explain the significance of friction

UNIT - I

Introduction - Units and Dimensions - Laws of Mechanics - Lami's Theorem - Parallelogram, Triangular and Polygon Law of Forces - Classification of Forces - Vectorial Representation of Forces

Coplanar Forces - Resolution of Forces.

Equilibrium of Particle - Vector representation of Space Force - Equilibrium of Particle in Space - Equivalent System of Forces - Principle of Transmissibility

UNIT - II

Free Body Diagram - Types of Supports - Types of loads - Types of beams - Action and Reaction of Forces - Moments and Couples - Moment of a Force - Vectorial Representation of Moments and Couples.

Varignon's Theorem - Stable Equilibrium - Single Equivalent Force - Equilibrium of Rigid Bodies in Two Dimensions and Three Dimensions.

UNIT - III

Centroid and Centre of Gravity - Determination of Centroid of Sections of Different Geometry - Centre of Gravity of a Body - Area Moment of Inertia – Parallel Axis

Theorem - Perpendicular Axis Theorem - Determination of Moment of Inertia of Rectangular, Triangular, Circular and Semi-circular areas from the first principle- Moment of Inertia of structural Steel Sections of Standard Flanged and Composite Sections.

Polar Moment of Inertia - Radius of Gyration - Principal Moment of Inertia - Mass Moment of Inertia

Determination of Mass Moment of Inertia of a Rod, Thin Rectangular Plate, Thin Circular Disc, solid Prism, Cylinder, Sphere and Cone from the first principles.

UNIT - IV

Introduction - Kinematics and Kinetics - Displacements, Velocity and Acceleration - Equations of Motion - Types of Motion-Rectilinear Motion - Relative Motion - Curvilinear Motion - Projectiles.

Newton's Laws of Motion - Linear Momentum - Impulse and Momentum - D'Alembert's Principle - Dynamic Equilibrium - Work Energy Equations - Law of Conservation of Energy - Principle of Work and Energy.

UNIT - V

Friction Force - Laws of Sliding Friction - Equilibrium Analysis of simple systems with Sliding Friction - Wedge Friction.

Rolling Resistance- Translation and Rotation of Rigid Bodies - Velocity and Acceleration - General Plane Motion of Simple Rigid Bodies such as Cylinder, Disc/Wheel and Sphere.

Text Books:

1. Beer F.P and Johnson R, Vector Mechanics for Engineers (Statics), McGraw- Hill Book Company, New Delhi, 2004.
2. Palanichamy M.S and Nagan, S, Engineering Mechanics (Statics and Dynamics), Tata McGraw Hill Publishing Company, Ltd., New Delhi, 2010.

Reference Books:

1. Bansal.R.K, Engineering Mechanics, Laxmi Publications, New Delhi, 2007.
2. Bhavikatti.S.S. and Rajasekarappa K.G.,Engineering Mechanics, New Agent International (P) Ltd, New Delhi, 1999.
3. Sadhu Sing,Engineering Mechanics, Oxford & IBH Publishing Co., New Delhi, 2000.
4. Irving H. Shames,Engineering Mechanics, Prentice Hall of India Ltd., New Delhi, 2006.
5. Hibbeller, R.C and Ashok Gupta, Engineering Mechanics: Statics and Dynamics, Edition, Pearson Education, Chennai, 2010.
6. Natesan S.C, Engineering Mechanics (Statics and Dynamics), First Edition, Umesh Publications, New Delhi,2002.

Course Outcomes:

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

1. Understand the forces and its related laws of mechanics in static and dynamic conditions
2. Analyze the forces and its motions on particles, rigid bodies and structures.
3. Solve the moment inertia of any sections and masses for the structural members.
4. Able to solve problems in dynamic conditions.
5. Understand the significance of friction.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	-	-	-	-	-	-	-	2	3	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	2	1	-
CO4	3	3	3	3	-	-	-	-	-	-	-	2	2	1	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-	1	-	-

09ES304	**BASIC ELECTRONICS ENGINEERING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**2**

COURSE OBJECTIVES

- To understand the fundamentals of semiconductor devices, transistors and amplifiers
- To introduce the laws of Boolean algebra and solve problems in combinational logic
- To explain sequential logic and memory circuits and systems
- To learn the combinational logic circuits using Boolean expressions
- To study the counters using flip-flops.

Unit–I

Semiconductor Devices: Review of behaviour of PN junction diode-Characteristics–piecewise linear model of a diode-Applications – Rectifier circuits – filters – critical inductance and bleeder resistance-Zener diode-principle of operation – characteristics – Zener diode as a voltage regulator. Principle of operation, characteristics and applications of FET, UJT, SCR, IGBT.

Unit–II

Transistors: Bipolar junction transistor–Current components – CB, CE, CC, Configuration–input and output characteristics– Transistor biasing and thermal stabilization – Transistor as an amplifier– Classification of amplifiers – Low frequency response of a RC coupled amplifier and influence of bypass capacitor. Transformer coupled amplifier– Power amplifiers–Classification–class A, B, AB–single ended, push pull configurations–power dissipation–output power, efficiency, distortion–complementary symmetry.

Unit–III

Feedback And Differential Amplifiers: Positive and negative feedback – Effects of negative feedback– Loop gain–Types of negative feedback. Oscillators – Requirements for oscillation – phaseshift oscillator –weinbridge oscillator, Hartley, Colpitts and crystal oscillator– Multivibrators– Schmitt trigger circuit–.Analysis of BJT differential amplifiers–Differential voltage gain – CMRR.

Unit–IV

Combinational Logic: Transistor as a switch – Reversible stable states – Laws of boolean algebra–Boolean expressions and logic diagrams- Negative logic – Introduction to mixed logic **–** Min Terms and Max Terms – Truth tables and maps – Solving digital problems using maps – Sum of products and product of sums map reduction – Hybrid functions–Incompletely specified functions – Multiple output minimization – Implementation of Boolean expressions using AND, OR, INVERT Logic gates& Universal gates–Multiplexer – Demultiplexer – Decoder – Code converter.

Unit–V

Sequential Logic: Sequential logic – Flip–flops – Counters – Types of counters – Ripple counter design – Type T, type D and type JK design – Design using state equations – Shift registers– Asynchronous sequential circuits– Memory circuit and systems ROM, PROM, EPROM,EEPROM, RAM, DRAM – PLA,PAL architecture.

TEXT BOOKS

1. Morris Mano, “Digital Logic and Computer Design”, Prentice Hall, Fourth Edition, 2013.
2. Rashid, “Microelectronic circuits”, Thomson Publications, 2010.

REFERENCES

1. Floyd, “Electron Devices”, Pearson Asia, 5th Edition, 2013.
2. R.P. Jain, “Modern Digital Electronics”, Tata McGraw Hill, 4th Edition, 2010.
3. Donald P Leach, Albert Paul Malvino, Goutan Saha, “Digital Principles and Applications”, Seventh Edition, 2010.

4. V.K. Mehta, Rohit Mehta, "Principles of Electronics", S.Chand Publications, 2005.
5. Donald A. Neamen, "Electronic Circuit Analysis and Design", Tata McGraw Hill, 5th Edition, 2007.

COURSE OUTCOMES

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

1. Acquire knowledge of diodes, rectifiers and transistors.
2. Understand the operation of amplifiers and oscillators.
3. Analyze the feedback and differential amplifiers.
4. Implement Boolean expressions using gates.
5. Design counters using flip flops.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	-	-	3	-	-	-	3	-	-	-	2	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	-	1	-
CO3	-	-	3	3	2	2	-	-	-	-	-	-	-	2	-
CO4	-	-	3	3	3	3	-	-	-	-	2	2	-	-	3
CO5	-	-	3	3	3	-	-	-	1	-	2	2	-	-	3

09PC305	**MICROPROCESSORS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To study the architecture of 8086 microprocessor and other processors.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To interface microprocessors with supporting chips.
- To study the architecture of 8051 microcontroller.
- To design a microcontroller based system

Unit–I

Introduction to 8086 – Microprocessor architecture-Addressing modes – Instruction set and assembler directives – Assembly language programming – Modular Programming

– Linking and Relocation – Stacks – Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

Unit–II

8086 Architecture –Basic Configuration – 8086 Minimum and Maximum mode configurations – Addressing modes – Basic Instructions – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure — 8086 Interrupts – Assembly levels programming – Introduction to 80186 – 80286 – 80386 – 80486 and Pentium processors.

Unit–III

Memory Interfacing and I/O interfacing – Parallel communication interface-Serial communication interface-D/A and A/D Interface-Timer – Keyboard/display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller.

Unit–IV

Architecture of 8031/ 8051 – Special Function Registers (SFRs) – I/O Pins, Ports and Circuits – Instruction set – Addressing modes – Assembly language programming – Introduction to 16 bit Microcontroller.

Unit–V

Programming 8051 Timers – Serial Port Programming – Interrupts Programming – LCD & Keyboard Interfacing – ADC, DAC & Sensor Interfacing – External Memory Interface- Stepper Motor and Waveform generation.

TEXT BOOKS

1. Yu–Cheng Liu, Glenn A. Gibson, “Microcomputer Systems: The 8086 / 8088 Family –Architecture, Programming and Design”, Prentice Hall of India, Second Edition, 2007.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, RolinMcKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Pearson Education, Second Edition, 2011.

REFERENCES

1. Doughlas V. Hall, “Microprocessors and Interfacing : Programming and Hardware”, TMH, 2012.
2. Ramesh S. Gaonkar, “Microprocessor Architecture, Programming and Applications with 8085”, Penram International Publishing, Fourth Edition, 2000.
3. Kenneth J. Ayala., “The 8051 Microcontroller Architecture Programming and Applications”, Penram International Publishing (India), 1996.

COURSE OUTCOMES:

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

1. Develop programs based on 8086 microprocessor.
2. Design Memory and I/O interfacing with microprocessors
3. Interface microprocessors with supporting chips
4. Develop Assembly programming for microcontrollers
5. Design and implement 8051 microcontroller based systems

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	1	1	1	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	1	1	-	-	-	-	-	1	1	3	1	-
CO3	3	3	3	1	1	-	-	-	1	-	1	1	3	1	-
CO4	3	1	1	1	1	-	-	-	-	-	1	1	3	3	3
CO5	3	3	3	1	1	-	-	-	1	-	-	-	3	3	3

09PC306	**DATA STRUCTURES AND ALGORITHMS**	**L**	**T**	**P**	**C**
		4	**1**	**0**	**3**

COURSE OBJECTIVES

- To understand Abstract Data Types (ADT).
- To know the applications of lists and Stacks.
- To understand the various types of Balanced Trees with its working procedures.
- To learn about Hashing, Separate chaining, open addressing, rehashing and extendible hashing.

Unit–I

Linear structures: Abstract Data Types (ADT) – List ADT – array–based implementation – linked list implementation – cursor–based linked lists – doubly–linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and Queues.

Unit–II

Tree structures: Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search

tree ADT – Threaded Binary Trees– AVL Trees – Splay Trees – B–Tree-heaps – binary heaps – applications of binary Heaps.

Unit–III

Hashing and set: Hashing – Separate chaining – open addressing – rehashing – extendible hashing – Disjoint Set ADT – dynamic equivalence problem – smart union algorithms – path compression – applications of Set.

Unit–IV

Algorithms: Definition – Efficiency of Algorithms – Average and worst case Analysis– What is an elementary Operations– Asymptotic Notation – Notation for the order of – Other Asymptotic Notations – Analysing control structures – Greedy Algorithms-Minimum Spanning Tree-Prim's and Kruskal's algorithms – Knapsack problem.

Unit–V

Graphs: Divide and Conquer Methods – Quick sort – Binary Search– Dynamic Programming – The principle of optimality – Shortest Path problem – Chained matrix Multiplication – Exploring Graphs – Depth first Search – Breath first search – Backtracking – 8 Queen's Problem.

TEXT BOOKS

1. G. Brassard and P. Bratley, Fundamentals of Algorithmics, Prentice Hall, 2009.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2005.

REFERENCE BOOKS

1. A.V. Aho, J.E. Hopcroft, and J.D. Ullman, "Data Structures and Algorithms", Pearson Education, First Edition Reprint 2003.
2. R.F. Gilberg, B.A. Forouzan, "Data Structures", Second Edition, Thomson India, 2005.
3. M.A. Weiss, "Data Structures and Algorithm Analysis in C++", Benjamin Cummings, 1994.

COURSE OUTCOMES

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

1. Understand the concepts of data structure, data type and array data structure and analyze algorithms and determine their time complexity.
2. Implement linked list data structure to solve various problems.
3. Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C++programming language.
4. Implement and know when to apply standard algorithms for searching and sorting.
5. Effectively choose the data structure that efficiently model the information in a problem

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	-	-	1	2	1	1	1	3	2	3
CO2	3	3	3	2	2	-	-	1	2	1	1	1	3	3	2
CO3	3	3	3	2	2	-	-	1	2	1	1	1	3	2	3
CO4	3	3	3	3	2	-	-	1	2	1	1	1	3	2	2
CO5	3	2	3	3	2	-	-	1	2	1	1	1	3	3	2

09SP307	**BASIC ELECTRONICS ENGINEERING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To get familiar with basic electronic compounds such as registers, capacitor, inductor diodes, transmitters, etc.
- To text and understand the function of various electronic components.
- The student will be equipped with IC interfacing and its applications.

LIST OF EXPERIMENTS

1. Characteristics of Semiconductor Diodes.
2. Characteristics of Zener Diode.
3. Characteristics of Bipolar Junction Transistor (BJT).
4. Estimation of Ripple factor and efficiency in a full wave rectifier with and without filter.
5. Verification of logic gates using integrated chips.
6. Simplification of Boolean expressions using Karnaugh Map.
7. Verification of Digital Multiplexer and DeMultiplexer.
8. Design and Simulation of 3–bit Synchronous Counter using electronic work bench software.

COURSE OUTCOMES

At the end of this course, the student will be able to

1. Understand the characteristics of basic electronic devices.

2. Analyze the operations of simple electronics circuits
3. Build simple digital logic circuits

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	3	3	3	-	-	-	-	-	-	-	2	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	-	-	1	-
CO3	-	-	-	3	3	3	-	-	2	1	1	1	-	2	-

09CP308	**MICROPROCESSOR LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- The students will be able to understand the microprocessor programs and its applications.
- The students will be able to understand the architecture of 8085 and 8086 microprocessor.
- To study and understand the assembly language programming using 8085 microprocessor.
- The students will be equipped with microprocessor interfacing and its applications.

LIST OF EXERCISES

1) Study of 8085 and study of 8086 microprocessor.
2) 8–bit Arithmetic Operation.
3) 16–bit Arithmetic Operation.
4) Find the number of even and odd number in a block of data.
5) Fibonacci series
6) Hexadecimal to binary conversion.
7) Matrix Addition.
8) Sorting an array of number.
9) Searching a string
10) Digital clock
11) Square wave generation using 8253IC.
12) Stepper motor interface using 8255IC.
13) Data transfer using USART.

14) Keyboard status
15) Message display 8279IC.
16) Simulation of traffic light control signal.

COURSE OUTCOMES:

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

1. Familiarize with assembly language programming.
2. Design circuits for various applications using interfaces.
3. An in– depth knowledge of applying concepts on real time applications.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	3	-	-	-	-	-	2	-	-	-	-	-	-
CO2	3	2	2	3	3	3	-	-	2	2	2	-	-	2	-
CO3	3	3	3	2	-	3	3	-	2	-	2	-	-	2	-

FOURTH SEMESTER

09BS401	DISCRETE MATHEMATICS	L	T	P	C
		4	0	0	4

Course Objectives :

- To introduce the basic concepts of Mathematical Logic that deals with the method of reasoning.
- To impart knowledge about sets and relations.
- To provide basic understanding of Boolean algebra.
- To familiarize the basic properties and concepts of general algebraic systems.
- To illustrate graph theory and its application to Computer Science.

UNIT - I Mathematical Logic

Propositions – Connectives – Tautology and contradiction – Equivalence of prepositions Tautological Implication – Normal Forms – Theory of Inference – Rules of Inference.

UNIT - II Set Theory and Relations

Set operations – Ordered pairs and Cartesian product – Relations – Type of relations – Operations or relations – Properties of relations – Equivalence classes – Partition of set – Matrix and Graphical representation of relation.

UNIT - III Lattice and Boolean Algebra

Partial ordered set – Hasse diagram – Lattices – Properties of Lattices –Boolean Algebra – Karnaugh map method.

UNIT - IV Group and Group code

Algebraic systems – Semi groups and Monoids – Groups – Permutation Group– Subgroups – Coding Theory – Group codes – Hamming codes – Procedure for Encoding and Decoding Group codes.

UNIT - V Graph Theory

Graphs – Special simple graphs – Matrix representation of graphs – Path cycles and connectives – Eulerian and Hamiltonian graphs – Shortest path algorithms.

TEXT BOOKS :

1. Veerarajan T, “Discrete Mathematics with Graph Theory and Combinatorics”, Tata McGraw Hill Publishing Company Ltd,2014.
2. Discrete Mathematics and Its Applications, S. K. Chakraborty and B. K. Sarkar,Oxford,2011

REFERENCES :

1. Venkataraman M K, “Discrete Mathematics”, The NationalPublishing Company, 2008.
2. Kolman Busby Ross, “Discrete Mathematical Structures”,Pearson Education Pvt Ltd, 2000.
3. Trembley J P and Manohar R P, “Discrete Mathematical Structures with

Applications to Computer Science", Tata McGraw Hill Publishing Company Ltd, 2005.

COURSE OUTCOMES :

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

1. Acquire the basic concepts in Mathematical Logic and theory of inferences.
2. Understand the concepts of Set theory, Relations and equivalence classes with matrix representation.
3. Implement Lattice theory and Boolean algebra in circuit design.
4. Design coding and encoding group codes.
5. Understand the basic concepts of Graph theory, Eulerian and Hamiltonian graphs.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	-	-	-	2	-	-	-	3	3	2
CO2	3	3	2	-	-	-	-	-	-	-	-	-	3	3	2
CO3	3	3	2	-	2	-	-	-	-	-	-	-	3	3	2
CO4	3	3	2	2	-	-	-	-	-	-	-	-	3	3	2
CO5	3	3	1	-	-	-	-	-	2	-	-	-	3	3	2

09ES402	**MATERIALS SCIENCE**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

Course Objectives:

- To enable the students to understand the electrical conduction in materials using free electron theory.
- To provide in-depth knowledge on carrier concentration and the Fermi energy level of the p-type and n-type extrinsic semi-conductors.
- To explain the magnetic and dielectric nature of the materials.
- To impart knowledge for developing applications using optic materials
- To disseminate the knowledge on new engineering materials including nano phase materials and bio materials.

UNIT - I

Conducting Materials: Classical free electron theory of metals-electrical conductivity of Al - drawbacks of classical theory - quantum free electron theory of metals and its importance – density of states - Fermi-Dirac statistics - calculation of Femi energy and its importance - concept of hole-origin of band gap in solids (qualitative treatment only) -

effective mass of electron-high resistivity alloys superconductors-properties and applications.

UNIT - II

Semiconducting Materials: Elemental and compound semiconductors and their properties-carrier concentration intrinsic semiconductors-carrier concentration in n-type and p-type semiconductors - variation of Fermi level and carrier concentration with temperature - Hall effect – applications.

UNIT - III

Magnetic And Dielectric Materials: Different types of magnetic materials and their properties-domain theory of ferromagnetism-Heisenberg criteria-Hysteresis Energy product of a magnetic material- merits and their applications- magnetic recording materials-metallic glasses - Active and passive dielectrics and their applications - Ferro electrics – Piezo electrics .

UNIT - IV

Optical Materials: Optical properties of metals, insulators and semiconductors - phosphorescence and fluorescence - excitons, traps and colour centres and their importance-different phosphors used in CRO screens-liquid crystals display material-Thermography and its applications-photoconductivity and photo conducting materials.

UNIT - V

New Engineering Materials: Metallic glasses as transformer core materials - Nano phase materials- Shape memory alloys-Bio-materials-Non-linear materials – Second harmonic generation-Optical mixing – Optical phase conjugation – Solutions – IC packaging material.

Text Books:

1. Arumugam M., "Materials Science", Anuradha Technical Book Publishers, 2005.
2. Indulkar C.S$_{th}$ and Thiruvengadem. S, "Introduction to Electrical Engineering Materials", 5 Edition, S.Chand & Co New Delhi, 2010.

Reference Books:

1. Raghavan.V., "Materials Science and Engineering", Prentice Hall of India, New Delhi, 2005.
2. Dekker A.J.,"Electrical Engineering Materials", Prentice Hall of India, 2006.
3. Rajput, R.K., "Electrical Engineering Materials", Laxmi Publications NewDelhi, 1993.
4. Simon S.M., "Physics of Semiconductor devices", 3rd Edition, Wiley Eastern, 2007.
5. Van Vlack L.H., "Material Science for Engineers", Addision Wesley 2000.

Course Outcomes:

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

1. Understand the electrical conduction in materials using free electron theory
2. Derive the carrier concentration and the Fermi energy level of the p-type and n-type extrinsic semi-conductors.
3. Understand the magnetic and dielectric nature of the materials.
4. Develop applications using optic material.
5. Build solution using nano phase materials and bio materials.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO4	3	-	1	1	-	-	-	-	-	-	-	-	2	2	-
CO5	3	-	1	1	-	-	-	-	-	-	-	-	2	2	-

09PC403	**OBJECT ORIENTED PROGRAMMING AND C++**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To get a clear understanding of object–oriented concepts.
- To understand the basics of C++, objects and classes, Inheritance, Polymorphism.
- To understand the basics of I/O and file management, and advance topics including templates, exceptions and Standard Template Library.

Unit–I

Introduction: Traditional Versus Object Orientation Approach – Benefits and applications of OOP– Characteristics of Object Oriented Programming Languages: Objects – Classes – Data encapsulation – Data hiding–Inheritance-Polymorphism – Overloading– Dynamic Binding – Message Passing – Extensibility.

Unit–II

C++ Programming Basics: Overview–C++ Data Types–Basics of object and class in C++– Program structure- Member Functions and Member Variable-Techniques for

Creating and Initialising Objects – Initialising and Cleaning Objects – Data Hiding – Namespace- Identifiers– Variables – Constants– Operators– Typecasting– Control structures– Loops and Decisions –Constructors and their types – Destructor – Access specifiers: Private Public and Protected members.

Unit–III

C++ Functions: Simple functions– Arguments passed by value and by reference- Overloading of functions – Constructor Overloading–Inline functions – Passing and returning of objects– friend function – Friend Classes –Static Functions – Operator Overloading: Overloading Unary Operators– Overloading Binary Operators – Data Conversion: Conversions Between Objects and Basic Types –Conversions Between Objects of Different Classes.

Unit–IV

Inheritance: Concept of Inheritance –Types of Inheritance: Single –Multiple- Multilevel – Hierarchical –Hybrid – Virtual Functions: Normal Member Functions Accessed with Pointers – Virtual Member Functions Accessed with Pointers – Abstract Classes and Pure Virtual Functions – Virtual Destructors –Virtual Base Classes – THIS Pointer.

Unit–V

I/O and File Management, Templates, Exceptions and STL: C++ streams –C++ streams classes –Unformatted I/O Operations –Formatted console I/O Operations – Managing output with manipulators –File stream classes – Opening and Closing a Files – Finding end of file –File opening modes –File pointers and manipulators –Sequential input and Output operations –Exception Handling Fundamentals–try –catch –throw – multiple catch –Catching All Exceptions –Restricting Exceptions –Rethrowing an Exception –Implementing user defined exceptions –Overview and Use of Standard Template Library.

TEXT BOOKS

1. Robert Lafore, "Object – Oriented Programming in C++", Sams Publication, Fourth Edition, 2002.
2. Balagurusamy, E., "Object Oriented Programming with C++", Tata McGraw–Hill Publication, 2013.

REFERENCES

1. Herbert Schildt, "The Compete Reference C++" , Tata McGraw–Hill Publication, Third Edition, Fourth Edition,1998.
2. SafeeVohra, "Object Oriented Programming with C++", Bookrent.in Publication, First Edition, 2015.

3. M.T. Guru, D.S. Nagendraswamy, H.S. Manjunatha, K.S. Somashekara, "Object Oriented Programming with C++", PHI Publication, Second Edition, 2012.
4. R.S. Salaria, "Mastering Object Oriented Programming with C++", Khanna Publishing House, New Delhi.
5. D. Samantha, "Object Oriented Programming in C++ and Java", PHI.

COURSE OUTCOMES:

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

1. Analyze and design a computer program based on Object Oriented Principles
2. Solve a real world problems based on Object Oriented Principles
3. Gain the basic knowledge on function and overloading concepts
4. Develop applications using inheritance Concepts
5. Implement features of file management and exception handling

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO3	2	2	2	1	-	-	-	-	-	-	-	-	-	-	3
CO4	2	2	2	2	-	-	-	-	-	-	-	-	-	-	3
CO5	2	2	3	3	-	-	-	-	-	-	-	-	-	-	3

09PC404	**COMPUTER ARCHITECTURE**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the basic structure and operation of digital computer.
- To study the basic processing concepts and bus organization.
- To study the two types of control UNIT techniques and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.

- To study the different ways of communicating with I/O devices and standard I/O interfaces.

Unit–I

Functional UNIT s – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – HardwarE-Software interfacE-Instruction set architecturE-Addressing modes – RISC – CISC – ALU design – Fixed point and floating point operations.

Unit–II

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.

Unit–III

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

Unit–IV

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performancE-Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

Unit–V

Accessing I/O devices – Programmed I/O – Interrupts – Direct memory access – Buses – Interface Circuits – Standard I/O interfaces (PCI, SCSI, and USB) – I/O Devices and processors.

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, McGraw–Hill, Fifth Edition, Reprint 2012.
2. David A. Patterson and John L. Hennessy, “Computer ArchitecturE-A Quantitative Approach”, Elsevier, a division of reed India Private Limited, Fifth edition, 2012.

REFERENCE BOOKS

1. William Stallings, “Computer Organization and ArchitecturE-Designing for Performance”, 6th Edition, Pearson Education, 2003.
2. Hayes, J.P., “Computer Architecture and Organization”, 3rd Edition, Tata Mc–Graw Hill, 1998.
3. Ghosh T. K., “Computer Organization and Architecture”, Tata McGraw–Hill, Third Edition, 2011.

4. Behrooz Parahami, "Computer Architecture", Oxford University Press, Eighth Impression, 2011.
5. Heuring, V.P. and Jordan, H.F., "Computer Systems Design and Architecture", 2nd Edition, Pearson Education, 2004.

COURSE OUTCOMES

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

1. Understand the functional UNIT s of a computer, bus structures and addressing modes.
2. Learn about single bus, multiple bus organization.
3. Design and analyze the pipelining concepts.
4. Analyze RAM, ROM, cache memory and virtual memory concepts.
5. Evaluate the various I/O interfaces.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	1	-	-	1	2	1	1	1	2	1	1
CO2	3	3	2	2	1	-	-	1	2	-	1	1	2	3	-
CO3	3	3	2	3	1	-	-	1	2	-	2	1	2	3	1
CO4	3	3	2	3	1	-	-	1	2	-	2	1	3	2	-
CO5	3	3	2	2	1	-	-	1	2	-	1	1	2	3	-

09PC405	**ANALOG AND DIGITAL COMMUNICATION**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To emphasize the fundamentals of analog and digital communication systems.
- To explore the various modulation techniques of digital transmission.
- To provide the basic ideas about synchronous and asynchronous communication, error detection, control and correction techniques.
- To study about the working of low–speed and high–speed modems.
- To provide a broad introduction to wireless communication and different types of noises.

Unit–I

Fundamentals of Analog communication: Principles of amplitude modulation – AM envelope, frequency spectrum and bandwidth – modulation index and percent modulation – AM Voltage distribution – AM power distribution – Angle modulation – FM and PM waveforms, phase deviation and modulation index – frequency deviation and percent modulation – Frequency analysis of angle modulated waves – Bandwidth requirements for Angle modulated waves.

Unit–II

Digital communication: Introduction – Shannon limit for information capacity – digital amplitude modulation – frequency shift keying – FSK bit rate and baud – FSK transmitter – BW consideration of FSK – FSK receiver – phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude Modulation – bandwidth efficiency, carrier recovery – squaring loop, Costas loop – DPSK.

Unit–III

Digital Transmission: Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, Companding – analog and digital – percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Inter symbol interference (ISI), and eye patterns.

Unit–IV

Data Communication: Introduction, History of Data communications, Standards Organizations for data communication, data communication circuits, data communication codes, Error control, Error Detection, Error correction, Data communication Hardware, serial and parallel interfaces, data modems, Asynchronous modem, Synchronous modem, low–speed modem, medium and high speed modem, modem control.

Unit–V

Spread Spectrum and Multiple Access Techniques: Introduction, Pseudo–noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

TEXT BOOKS

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, 6th Edition, Pearson Education, 2007.

2. H. Taub, D.L. Schilling and G. Saha, “Principles of Communication”, 3rd Edition, Pearson Education, 2007.

REFERENCE BOOKS

1. Simon Haykin, “Communication Systems", 4th Edition, John Wiley & Sons, 2001.
2. Rappaport T.S., "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education, 2007.
3. B.P. Lathi, “Modern Analog and Digital Communication Systems”, 3rd Edition, Oxford University Press, 2007.
4. Blake, “Electronic Communication Systems”, Thomson Delmar Publications, 2002.
5. Martin S. Roden, “Analog and Digital Communication System”, 3rd Edition, Prentice Hall of India, 2002.

COURSE OUTCOMES

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

1. Demonstrate the knowledge and understanding of basic concepts in analogue and digital communication systems.
2. Understand the practical implementation and limitations of modulation techniques.
3. Design and assess the basic communication systems.
4. Utilize the fundamental principles for signal analysis.
5. Design and test the analog and digital modems.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	1	3	2	3	-	-	-	-	-	3	-	-
CO2	3	2	1	1	3	1	3	-	-	-	-	-	3	-	-
CO3	3	2	1	-	2	2	3	-	-	-	-	-	3	-	-
CO4	3	3	2	2	2	2	3	-	-	-	-	-	-	3	-
CO5	3	3	2	2	2	2	3	-	-	-	-	-	-	3	-

09PC406	DATA BASE MANAGEMENT SYSTEM	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To understand the fundamentals of DBMS and E-R Diagrams.
- To impart the concepts of the Relational model and SQL.
- To disseminate the knowledge on various Normal Forms.
- To inculcate the fundamentals of transaction management and Query processing.
- To give an introduction on current trends in data base technologies.

Unit–I

Introduction : File System vs. DBMS – Views of data – Data Models – Database Languages – Database Management System Services – Overall System Architecture-Data Dictionary – Entity – Relationship (E-R) – Enhanced Entity – Relationship Model.

Unit–II

Relational Approach : Relational Model – Relational Data Structure-Relational Data Integrity – Domain Constraints – Entity Integrity – Referential Integrity – Operational Constraints – Keys – Relational Algebra – Fundamental operations – Additional Operations –Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – SQL – Basic Structure-Set operations – Aggregate Functions – Null values – Nested Sub queries – Derived Relations – Views – Modification of the database-Joined Relations – Data Definition Language-Triggers.

Unit–III

Database Design**:** Functional Dependencies – Pitfalls in Relational Database Design – Decomposition – Normalization using Functional Dependencies – Normalization using Multi–valued Dependencies – Normalization using Join Dependencies – Domain – Key Normal form.

Unit–IV

Query Processing and Transaction Management **:**Query Processing Overview – Estimation of Query Processing Cost – Join strategies – Transaction Processing – Concepts and States – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Implementation of Isolation – Testing for Serializability – Concurrency control – Lock Based Protocols – Timestamp Based Protocols.

Unit–V

Trends in Data Base Technologies **:** Distributed Databases – Homogeneous and Heterogeneous Databases – Distributed Data Storage-Distributed Transactions – Commit Protocols – Concurrency Control in Distributed Databases – Availability – Distributed Query Processing – Heterogeneous Distributed Databases – Cloud–Based Databases – Directory Systems.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Tata McGraw Hill, Sixth Edition, 2010.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Addision Wesley, Sixth Edition, 2010.

REFERENCE BOOKS

1. Raghu Ramakrishnan, Johannes Gehrke "Database Management Systems", McGraw Hill, Third Edition, 2002.
2. Peter Rob and Carlos Coronel, "Database Systems – Design, Implementation and Management", Thompson Learning, Course Technology, Seventh Edition, 2006.
3. C.J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Addison Wesley, 8th Edition, 2012

COURSE OUTCOMES

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

1. Differentiate database systems from file systems by enumerating the features provided by database systems.
2. Analyze data storage problem and derive a data model using E-R Diagrams.
3. Formulate the solutions to a broad range of query and data update problems using SQL.
4. Understand the normalization theory and apply such knowledge to the normalization of a database.
5. Inculcate the various implementation techniques and current trends.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	3	3	2	1	-	-	-	-	-	-	-	-	-	2
CO4	3	-	2	1	-	-	-	-	-	-	-	-	1	-	-
CO5	-	2	-	3	3	1	-	1	-	-	-	-	-	-	2

09CP407	OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES LAB	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

- To prepare the students to solve mathematical and scientific problems using object oriented programming concepts.
- To develop skills to design and analyze simple linear and non linear data structures.
- To strengthen the ability to identify and apply suitable data structure for the given real world problem.

LIST OF EXERCISES

1. Constructors & Destructors, Copy Constructor.
2. Friend Function & Friend Class.
3. Inheritance.
4. Polymorphism & Function Overloading.
5. Virtual Functions.
6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.
7. Class Templates & Function Templates.
8. Exception Handling Mechanism.
9. Standard Template Library concept.
10. File Stream classes.
11. Applications of Stack and Queue
12. List operations
13. Binary Search Tree
14. Linear Search Algorithm
15. Tree traversal Techniques
16. Minimum Spanning Trees
17. Shortest Path Algorithms
18. Sorting algorithms

COURSE OUTCOMES

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

1. Demonstrate object oriented programming concepts and features in C++ language
2. Implement linear and non-linear data structures , and apply them for developing various IT related applications.
3. Demonstrate an ability to listen and answer the viva questions related to

programming skills needed for solving real-world problems using Information Technology.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	-	-	-	-	-	-	-	-	-	-	3	3	2
CO2	2	2	3	3	-	-	-	-	-	-	-	-	3	3	2
CO3	2	2	-	-	-	-	-	-	-	2	-	2	2	2	-

09CP408	**DATABASE MANAGEMENT SYSTEM LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To apply basic database concepts, including the structure and operation of the relational data model.
- To construct simple and moderately advanced database queries using Structured Query Language (SQL).
- To understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
- To design and implement a small database project using Microsoft Access.

LIST OF EXERCISES

1. Implementation of queries for student data base
2. Data Definition Language-with constraint and without constraint
3. Data Manipulation language-Insert, Delete, Update, Select and truncate
4. Transaction Control Statement – Commit, Save point, Roll back
5. Data Control Statement – Grant, Revoke
6. Data Projection Statement – Multi column, alias name, arithmetic operations, distinct records, concatenation, where clause
7. Data Selection Statement – Between, and, not in, like, relational operators and logical operators
8. Aggregate functions – count, maximum, minimum, sum, average, order by, group by, having
9. Joint queries – inner join, outer join, selfjoin, Cartesian join, or cross join
10. Sub queries – in, not in, some, any, all, exist, not exist
11. Set operations – union, union all, intersect, minus
12. Database objects – synonym, sequences, views and index
13. Cursor
14. Functions and procedures

15. Trigger
16. Exceptions
17. Packages
18. Factorial of a number
19. Checking whether a number is prime or not
20. Fibonacci series
21. Reverse the string
22. Swapping of numbers
23. Odd or even number
24. Duplication of records

COURSE OUTCOMES

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

1. Apply the Database Concepts and Relational Data Model.
2. Construct various Queries using SQL.
3. Design Database Projects using Microsoft Access.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	1	-	-	1	-	-	-	-	-	3	-	-
CO3	2	3	2	2	1	-	-	-	-	-	-	-	-	-	2

FIFTH SEMESTER

09PC501	THEORY OF COMPUTATION	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES:

- To introduce and explain the method of constructing Regular Expression, NBA, DFA and Minimal DFA.
- To learn types of grammars and eliminate useless symbols, unit and null productions.
- To introduce the concepts of pushdown automata.
- To provide in-depth understanding of Turing machine and its applications.
- To impart knowledge about decidable and undecidable problems.

UNIT- I Finite Automata

Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA and NDFA – Finite Automaton with €- moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT- II Grammars

Grammar Introduction– Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions – Null productions – Greibach Normal form – Chomsky normal form – Problems related to CNF and GNF.

UNIT - III Pushdown Automata

Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL - problems based on pumping Lemma.

UNIT – IV Turing Machines

Definitions of Turing machines – Models – Computable languages and functions – Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomskian hierarchy of languages.

UNIT – V Unsolvable Problems and Computable Functions

Primitive recursive functions –Recursive and recursively enumerable languages - Universal Turing machine. Measuring and Classifying Complexity: Tractable and

Intractable problems-Tractable and possibly intractable problems – P and NP completeness - Polynomial time reductions.

TEXT BOOKS :

1. Hopcroft J.E., Motwani R. and Ullman J.D, "Introduction to Automata Theory, Languages and Computations", Pearson Education, 2nd edition, 2008 (UNIT 1, 2,3).
2. John C Martin, "Introduction to Languages and the Theory of Computation", Tata McGraw Hill Publishing Company, 3 rdedition, New Delhi, 2007 (UNIT 4,5).

REFERENCES :

1. Mishra K L P and Chandrasekaran N, "Theory of Computer Science - Automata, Languages and Computation", Prentice Hall of India, 3rdedition,2004.
2. Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Pearson Education, 2nd edition, New Delhi,2003.
3. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishers, 3rdedition, New Delhi, 2002.
4. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education,2009.

COURSE OUTCOMES:

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

1. Construct NFA, DFA and Minimal DFA
2. Derive a grammar without useless symbols and obtain CNF and GNF
3. Construct pushdown automata for a given context free grammar and language
4. Design a Turing Machine for a given recursively enumerable language
5. Acquire the knowledge on decidable and undecidable problems

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	1	3	1	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	3	1	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-

09PC502	COMPUTER NETWORKS	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To impart knowledge on layered approach that makes design, implementation and operation of extensive networks possible.
- To teach the components required to build networks.
- To provide basic concepts related to network addressing and routing.
- To make the students to understand the concepts of end-to-end flow of Information and congestion control.
- To familiarize with the concepts of electronic mail, HTTP, DNS and SNMP.

Unit–I

Fundamentals & Link Layer: Building a network – Requirements – Layering and protocols – Internet Architecture-Network software-Performance ; Link layer Services – Framing – Error Detection – Flow control.

Unit–II

Media Access & Internetworking**:** Media access control – Ethernet (802.3) – Wireless LANs – 802.11 – Bluetooth – Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP).

Unit–III

Routing**:** Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM).

Unit–IV

Transport Layer**:** Overview of Transport layer – UDP – Reliable byte stream (TCP) – Connection management – Flow control – Retransmission – TCP Congestion control – Congestion avoidance (DECbit, RED) – QoS – Application requirements.

Unit–V

Application Layer: Traditional applications –Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.

TEXT BOOKS

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A systems approach”, Fifth Edition, Morgan Kaufmann Publishers, 2011.
2. James F. Kurose, Keith W. Ross, “Computer Networking – A Top–Down Approach Featuring the Internet”, Fifth Edition, Pearson Education, 2009.

REFERENCE BOOKS

1. Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.
2. Ying–Dar Lin, Ren–Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGraw Hill Publisher, 2011.
3. Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw – Hill, 2011

COURSE OUTCOMES

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

1. Understand the functions of layering and protocols.
2. Summarize the devices, protocols and standards to design a network.
3. Construct and implement the concept of switching and routing.
4. Select appropriate protocol and techniques related to transport layer in order to maintain consistent flow of information.
5. Illustrate the functions of electronic mail, HTTP, DNS and SNMP.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	3	3	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	3	-
CO3	3	1	3	2	-	-	-	-	-	-	-	-	3	2	1
CO4	3	1	3	2	-	-	-	-	-	-	-	-	3	2	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	2	-	-

09PC503	COMPUTER GRAPHICS AND MULTIMEDIA	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To develop, design and implement two dimensional and three dimensional graphical structures.
- To provide knowledge about transformations and clipping techniques.
- To acquire knowledge in OpenGL programming.

- To understand various aspects of multimedia and the concepts of audio, video, images and animation.

Unit–I

Introduction: Overview of Graphics System – Coordinate Representation – Graphics Output Primitives – Attributes of Graphics Primitives – Implementation Algorithms for Graphics Primitives – Introduction to OpenGL – OpenGL functions for Graphics Primitives.

Unit–II

2D Concepts: 2D Transformations – 2D Viewing – Window Viewport Transformation – Line, Polygon, Curve and Text Clipping Algorithms – OpenGL Functions for 2D Transformations and 2D Viewing.

Unit–III

3D Concepts: 3D Transformations – 3D Viewing – 3D Object Representations – Spline Representation – Visible Surface Detection Methods – Color Models – OpenGL Functions for 3D Transformations and 3D Viewing.

Unit–IV

Multimedia Systems Design: Multimedia Basics − Multimedia Applications − Multimedia System Architecture − Evolving Technologies for Multimedia − Defining Objects for Multimedia Systems − Multimedia Data Interface Standards − Multimedia Databases.

Unit–V

Multimedia File Handling and Hypermedia: Compression and Decompression − Data and File Format Standards − Multimedia I/O Technologies − Digital Voice and Audio − Video Image and Animation − Full Motion Video − Storage and Retrieval Technologies – Multimedia Authoring and User Interface − Hypermedia Messaging.

TEXT BOOKS

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, “Computer Graphics with OpenGL”, Fourth Edition, Pearson Education, 2010.
2. Andleigh, P. K and Kiran Thakrar, “Multimedia Systems and Design”, PHI, 2003.

REFERENCES

1. Francis S. Hill Jr. and Stephen M Kelley, “Computer Graphics Using OpenGL”, Third Edition, Prentice Hall, 2007.
2. Foley, Vandam, Feiner and Huges, “Computer Graphics: Principles and Practice”, Second Edition, Pearson Education, 2003.
3. Ralf Steinmetz and Klara Steinmetz, "Multimedia Computing, Communications and Applications", Pearson Education, 2004.
4. Judith Jeffcoate, “Multimedia in practice: Technology and Applications”, PHI, 1998.

COURSE OUTCOMES:

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

1. Demonstrate knowledge on graphical system, 2D & 3D transformation and multimedia systems.
2. Analyze and apply suitable transformations for modeling 2D & 3D objects.
3. Investigate on different objects representation methods and identify visible surface in a 3D environment.
4. Design and develop multimedia system and construct multimedia databases.
5. Perform compression and decompression on the multimedia data using modern tools and techniques.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	2	3	-	-	2	-	-	-	-	-	-	-	-	3	-
CO3	2	1	-	3	-	-	-	-	-	-	-	-	2	-	-
CO4	2	1	3	-	-	-	-	-	-	-	-	-	-	3	-
CO5	2	1	-	-	3	-	-	-	-	-	-	-	-	-	-

09PC504	**OPERATING SYSTEM**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication.
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management and memory management.
- To appreciate the emerging trends in operating systems.

Unit–I

Introduction: Introduction to Operating Systems – Review of Computer Organization – Computer System Architectures – Types of Operating System – Operating System Structure-Operating System Service-System Calls – System Programs – System Structure-Layered – Microkernel–Monolithic Operating Systems – Concept of Virtual Machines.

Unit–II

Processes Management: Process Management: Process Scheduling – Multiprocessor and Real – Time Scheduling Algorithms – Process Synchronization –Peterson's Solution – Hardware Support to Process Synchronization – Semaphores –Critical Regions – Monitors – Deadlocks Prevention – Avoidance-Detection and Recovery – Bankers Algorithm – Threads.

Unit–III

Memory Management: Background– Swapping–Contiguous Memory Allocation– Paging Segmentation–Segmentation with Paging. Virtual Memory: Back Ground – Demand Paging Process Creation– Page Replacement – Allocation of Frames– Thrashing.

Unit–IV

Input / Output and File Systems: I/O Management and Disk Scheduling– I/O Devices – Organization of I/O Functions– OS Design Issues–I/O Buffering– Disk Scheduling– Disk Cache. File Management Organization – Directories– File Sharing and Record Blocking– Secondary Storage Management.

Unit–V

Case Study of Unix: UNIX History –Design Principles– Programmer Interface-User Interface-Process Management– Memory Management – File System – I/O System– Inter–process Communication

TEXT BOOKS

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Wiley India Pvt. Ltd, 9th Edition 2013.
2. William Stallings, “Operating Systems – internals and design principles”, Prentice Hall, 7thEdition, 2011.

REFERENCE BOOKS

1. Andrew S. Tannenbaum, “Modern Operating Systems”, Prentice Hall, 4th Edition, 2015.
2. Pramod Chandra P.Bhatt, “An Introduction to Operating Systems Concepts and Practice”, Prentice Hall India, 3rd Edition, 2010.
3. Andrew S. Tannenbaum& Albert S. Woodhull, “Operating System Design and Implementation”, Prentice Hall, 3rd Edition, 2006.

COURSE OUTCOMES

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

1. Identify the significance of operating system in computing devices.
2. Compare and illustrate various process scheduling algorithms.
3. Apply appropriate memory and file management schemes.
4. Illustrate various disk scheduling algorithms.
5. Acquire a detailed understanding of various aspects of I/O management.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	-	1	1	-	1	1	-	1	-	2	2	2
CO2	2	2	2	1	1	1	1	-	-	-	1	1	-	2	-
CO3	1	2	2	1	2	1	-	-	-	-	1	1	1	2	-
CO4	3	1	2	1	1	-	-	-	1	-	1	1	1	2	-
CO5	3	2	2	1	1	-	-	-	2	-	1	1	2	2	-

09CP507	**COMPUTER GRAPHICS AND MULTIMEDIA LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To develop, design and implement two dimensional and three dimensional graphical structures.
- To provide knowledge in OpenGL programming.
- To understand various aspects of multimedia and to learn the concept of sound, images and videos.

LIST OF EXERCISES

1) Implementation of Bresenhams Algorithm – Line and Circle.
2) Implementation of Bresenhams Algorithm – Ellipse.
3) Implementation of Line, Circle and Ellipse attributes.
4) Two Dimensional transformations – Translation, Rotation, Scaling, Reflection, Shear.
5) Cohen Sutherland 2D line clipping and Windowing.
6) Sutherland – Hodgeman Polygon clipping Algorithm.
7) Three dimensional transformations – Translation, Rotation, Scaling.

8) Drawing three dimensional objects and Scenes.
9) Lline DDA, chain of diamonds, chessboard.
10) Generating Fractal images

GIMP

1) Creating Logos.
2) Simple Text Animation.

Audacity

1) Silencing, Trimming and Duplicating the Audio Signal.
2) Giving the Advancing Effect to the Audio Signal.

Windows Movie Maker

1) Applying effect to Video.
2) Creating Titles in Video.

Swish

1) Text Effects.
2) PrE-Loader.

Flash:

1) Changing the shape of the object.
2) Imaging Viewing using Mask.

Photo Impact

1) Text Effects.
2) Image Slicing.

COURSE OUTCOMES:

On completion of this course, the student will be able to:

1. Implement the basic drawing algorithms, 2D and 3D transformations, line and polygon clipping algorithms.
2. Design and draw 3-D objects and scenes, generate fractal images.
3. Implement projects using multimedia software.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	2	-	-	-	-	3	-	-	-	3	-	-
CO2	3	2	2	2	-	-	-	-	3	-	-	-	-	3	-
CO3	3	3	2	2	-	-	-	-	3	-	-	-	-	3	-

09CP508	OPERATING SYSTEM LAB	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

- To understand basic concepts such as techniques, management, know how to use them.
- To understand Operating System features and its difference from structured design.
- To use the UNIX as a modeling and communication utilities.
- To utilize the step of the process to produce better software.

LIST OF EXERCISES

1) Job scheduling techniques.
2) Disk scheduling techniques.
3) Memory allocation techniques.
4) Memory management techniques.
5) Page replacement techniques.
6) Producer consumer problem.
7) Bankers algorithm.
8) Dining Philosophers problem.
9) Write a shell script to perform the file operations using UNIX commands.
10) Write a shell script to perform the operations of basic UNIX utilities.
11) Write a shell script for arrange‘n’numbers using ‘awk’.
12) Write a shell script to perform ^{n}Cr calculation using recursion.
13) Write a shell script to sort numbers and alphabetic from a text file using single ‘awk’ command.
14) Write a Shell script to display all the files which are accessed in the last 10 days and to list all the files in a directory having size less than 3 blocks, greater than 3 blocks and equal to 3 blocks.
15) Write a Shell script to display the numbers between 1 and 9999 in words.
16) Write a Shell script for Palindrome Checking.

COURSE OUTCOMES:

On completion of this course, the student will be able to:

1. Compare the performance of various CPU Scheduling Algorithms
2. Implement memory management schemes and page replacement schemes.
3. Analyze the performance of the various Page Replacement Algorithms.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	1	1	1	1	1	1	-	1	-	2	2	2
CO2	2	2	2	1	1	1	1	1	1	-	1	1	-	2	-
CO3	2	2	2	2	2	1	1	1	1	-	1	1	1	2	1

SIXTH SEMESTER

09PC601	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

The student should be made:

- Be familiar with the concepts of Data Warehouse.
- Acquainted with the tools and techniques used for Knowledge Discovery in Databases.
- Contented with the concepts of Data Mining.
- Learn and know the concepts of mining, Classification, prediction and Association rule mining and its application in Data Mining.
- Acquire the knowledge of Cluster Analysis and its applications in Data Mining.

Unit–I

Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

Unit–II

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi–relational OLAP – Categories of Tools – OLAP Tools and the Internet.

Unit–III

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse -Issues –Data Preprocessing.

Unit–IV

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

Unit–V

Cluster Analysis – Types of Data – Categorization of Major Clustering Methods – K–means– Partitioning Methods – Hierarchical Methods – Density–Based Methods – Grid Based Methods – Model–Based Clustering Methods – Clustering High Dimensional

Data – Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TEXT BOOKS

1. Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill Edition, Thirteenth Reprint, 2008.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.

REFERENCES

1. Pang–Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
3. G.K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wiley–Interscience, 2006.

COURSE OUTCOMES

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

1. Build Data Warehousing and methods to use large data sets.
2. Use different tools available for Data Warehousing, OLAP and Data Mining.
3. Imply the use of Data Mining applications in different fields.
4. Apply, Compare and contrast Data Mining techniques for Prediction and Association Rule Mining.
5. Equate and distinct the various Clustering Methods and its applications in Data Mining.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	1	1	1	1	2	1	1	3	2	3
CO2	3	3	2	2	2	1	1	1	1	2	1	1	3	3	2
CO3	3	2	2	2	2	1	1	1	1	2	1	1	3	2	3
CO4	3	3	2	2	2	1	1	1	1	2	1	2	3	2	2
CO5	3	3	2	2	1	1	1	1	1	2	1	2	3	3	2

09PC602	DIGITAL SIGNAL PROCESSING	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To understand the basic components of DSP systems and classification of signals and systems.
- To study the properties of DFT, methods to implement DFT & FET computations.
- To analyze and study the design techniques for digital filters (IIR & FIR).
- To learn the truncation and rounding off errors using floating point and fixed point representations
- To learn the applications of DSP and Multi-rate signal processing.

Unit–I

Basic Elements of Digital Signal Processing Systems – Classification of Signals – The concept of frequency in Continuous time and Discrete time domain – DiscretE-time Signals and Systems – Analysis of Discrete Time-Linear Shift–Invariant Systems – Linearity – Causality and Stability criterion. Discrete-time Systems described Difference Equation – Correlation of Discrete-Time Signals

Unit–II

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – Relation between DTFT and DFT – FFT computations using Decimation in time and Decimation in frequency algorithms – Overlap–add and save methods.

Unit–III

General Consideration – Design of IIR filters – IIR Filter Design by Impulse Invariance & Bilinear Transformation – pre warping – Realization using direct, cascade and parallel forms – Design of Linear Phase FIR Filters – Design of FIR filter using Windows and by Frequency Sampling Method – Frequency Transformation in the Analog Domain and Digital Domain – Realization of FIR filters – Transversal, Linear phase and Polyphase structures..

Unit–IV

Fixed point and floating point number representations – Comparison – Truncation and Rounding errors – Quantization noise-derivation for quantization noise power – coefficient quantization error – Product quantization error – Overflow error – Round off noise power – limit cycle oscillations due to product round off and overflow errors – signal scaling.

Unit–V

Multirate Signal Processing – Speech Compression – Adaptive Filter – Musical Sound Processing – Image enhancement – Applications of Multi rate signal Processing.

TEXT BOOKS

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing Principles, Algorithms & Applications", Fourth edition, Pearson education/ Prentice Hall, 2007.
2. Alan V. Oppenheim, Ronald W.Schafer & Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education, 2nd edition, 2005.

REFERENCES

1. S. Salivahanan, A. Vallavaraj, C. Gnanapriya, "Digital Signal Processing", TMH/McGraw Hill International, 2007.
2. S.K. Mitra, "Digital Signal Processing, A Computer Based approach", Tata McGraw Hill, 1998.
3. Johny R. Johnson, Introduction to Digital Signal Processing, PHI, 2006.

COURSE OUTCOMES:

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

1. Understand the concepts of DSP systems
2. Perform DFT and FFT computations
3. Design both analog and digital filters and their conversions.
4. Analyze different types of errors in filters
5. Develop projects in Signal processing, Image processing and Speech Processing

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	2	2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	3	3	2	1	-	-	-	-	-	-	-	-	-	2
CO4	-	-	1	1	-	-	-	-	-	-	-	-	1	-	-
CO5	-	-	-	3	3	1	1	1	2	-	-	-	-	-	2

09CP607	**DATA WAREHOUSING AND DATA MINING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

The student should be made to:

- Understand the basic principles, concepts and applications of

data warehousing and data mining.

- Introduce the task of data mining as an important phase of knowledge recovery process.
- Have the ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment.
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
- Design a data warehouse or data mart to present information needed by management in a form that is usable for management client.

LIST OF EXERCISES

1) Evolution of data management technologies, introduction to data warehousing concepts.
2) Develop an application to implement defining subject area, design of fact dimension table, data mart.
3) Develop an application to implement OLAP, roll up, drill down, slice and dice operation
4) Develop an application to construct a multidimensional data.
5) Develop an application to implement data generalization and summarization technique.
6) Introduction to exploratory data analysis using R
7) Introduction to regression using R
8) Introduction to the Weka machine learning toolkit
9) Performing data preprocessing for data mining in Weka
10) Classification using the Weka toolkit
11) Performing clustering in Weka
12) Association rule analysis in Weka
13) Data mining case study.

COURSE OUTCOMES

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

1. Learn the different approaches of data warehousing with various technologies.
2. Develop various applications to perform the operations of OLAP.
3. Perform data analysis using R programming.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	-	1	1	1	1	-	1	2	3	3	2
CO2	3	3	2	2	-	1	2	-	1	-	1	2	3	3	2
CO3	2	2	3	1	-	-	-	-	1	-	1	3	1	1	1

09CP608	**DIGITAL SIGNAL PROCESSING AND INFORMATION CODING TECHNIQUES LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To generate a matlab code for elementary signals.
- To design and create a linear and circular convolution of discrete sequences.
- To understand the concept of Z–transform.
- To design a matlab program for IIR and FIR filters.
- To execute a matlab program for Huffman and Linear Predictive coding.

LIST OF EXERCISES

1. Generation of Elementary Signals.
2. Verification of Sampling Theorem.
3. Impulse and Step Response of LTI System.
4. Linear and Circular Convolution of Discrete Sequences.
5. Correlation and Auto Correlation of Discrete Sequences.
6. Z–Transform and Inverse Z–Transform.
7. Computation of DFT & IDFT of a Signal.
8. Spectral Analysis of a Signal.
9. Alteration of Sampling Rate of a Signal.
10. Design of IIR Filters.
11. Design of FIR Filters.
12. Finding the Sum of two Sinusoidal Signals.
13. N Point FFT of a given sequence.
14. Frequency Response of Analog Low Pass and High Pass Filters.
15. FFT of a given 1–D signal.
16. Implementation of Huffman Coding.
17. Implementation of Linear Predictive Coding.
18. Implementation of Arithmetic Coding.
19. Study of RSA Encryption and Decryption.

20. Implementation of Delta Modulation.
21. Construction of Huffman Encoding Tree.

COURSE OUTCOMES

At the end of this course, the student will be able to

1. Design and write a Matlab program for Z-transform, IIR and FIR filters.
2. Write and execute a program for Huffman and Linear Predictive coding
3. Formulate research problems in the field of signal processing, image processing and speech processing

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	3	-	-	-	-	-	-	-	1	-	-
CO2	-	3	3	3	3	-	3	-	-	-	1	-	-	3	-
CO3	-	-	-	-	3	3	-	1	2	1	-	2	-	-	2

SEVENTH SEMESTER

00HS701	ENGINEERING ETHICS	L	T	P	C
		4	0	0	3

Course Objectives:

- To provide basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.
- To familiarize about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards,
- To educate the Safety and Risk, Risk Benefit Analysis.
- To teach about the Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights.
- To impart knowledge about MNC's, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.

UNIT-I Introduction

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

UNIT-II Challenges

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study.

UNIT – III Risk Analysis

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal.

UNIT – IV Loyalty

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT – V Business Ethics

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct.

TEXT BOOKS:

1. Govindarajan M, Natarajan S and Senthilkumar V S, "Professional Ethics and Human values", PHI Learning, New Delhi,2013.
2. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill,

New York,2005.

REFERENCES :

1. Charles E Harris, Michael S Pritchard and Michael J Rabins, Engineering Ethics – Concepts and Cases", Thompson Learning, 2000.
2. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999. John R Boatright, "Ethics and the Conduct of Business", Pearson Education,2003.
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press,2001.
4. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press,2003.

COURSE OUTCOMES:

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

1. Understand the basic concepts of engineering Ethics.
2. Analyze the importance of codes in engineering practice.
3. Comprehend the Risk analysis in Ethics.
4. Describe about Collegiality and Loyalty.
5. Acquire knowledge on Business Ethics.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1	-	-	-	-	1	1	3	-	-	-	-	-	-	3
CO2	2	-	-	-	-	2	-	3	-	-	-	-	-	-	3
CO3	1	-	-	-	-	2	-	3	-	-	-	-	-	-	3
CO4	1	-	-	-	-	2	-	3	-	-	-	-	-	-	3
CO5	1	-	-	-	-	1	2	3	-	-	-	-	-	-	3

09PC702	INFORMATION SYSTEM AND NETWORK SECURITY	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand classical and modern cryptosystems
- To learn various Public key cryptographic techniques
- To study the concepts to design access control mechanisms for different vulnerabilities
- To learn different security protocols used in real time applications

Unit–I

An Overview of Computer Security–Security Services–Security Mechanisms-Security Attacks–Access Control Matrix, Policy–Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

Unit–II

Classical Cryptography–Substitution Ciphers–permutation Ciphers–Block Ciphers–DES Modes of Operation– AES–Linear Cryptanalysis, Differential Cryptanalysis– Hash Function – SHA 512– Message Authentication Codes–HMAC–Authentication Protocols.

Unit–III

Introduction to Public key Cryptography– Number theory– The RSA Cryptosystem and Factoring Integer– Attacks on RSA–The ELGamal Cryptosystem– Digital Signature Algorithm–Finite Fields–Elliptic Curve Cryptography– Key management – Session and Interchange keys, Key exchange and generation–PKI.

Unit–IV

Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem Secure Software Development: Secured Coding – OWASP/SANS Top Vulnerabilities–Buffer Overflows – Incomplete mediation – XSS – Anti Cross Site Scripting Libraries – Canonical Data Format – Command Injection – Redirection – Inference –Application Controls.

Unit–V

Secret Sharing Schemes–Kerberos– Pretty Good Privacy (PGP)–Secure Socket Layer (SSL)– Intruders – HIDS– NIDS – Firewalls – Viruses.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2006.

2. Matt Bishop, "Computer Security art and science", Second Edition, Pearson Education, 2002.

REFERENCES

1. Wade Trappe and Lawrence C. Washington, "Introduction to Cryptography with Coding Theory", Second Edition, Pearson Education, 2007.
2. Jonathan Katz, and Yehuda Lindell, Introduction to Modern Cryptography, CRC Press, 2007.
3. Douglas R. Stinson, "Cryptography Theory and Practice", Third Edition, Chapman & Hall/CRC, 2006
4. Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, First Edition, 2006.
5. Menezes Bernard, "Network Security and Cryptography", Cengage Learning, New Delhi, 2011 Man Young Rhee, Internet Security, Wiley, 2003.
6. Atul Kahate, "Cryptography and Network Security", McGraw Hill.
7. V.K. Jain, "Cryptography and Network Security", Khanna Publishing House.
8. OWASP top ten security vulnerabilities: http://xml.coverpages.org/ OWASPTopTen.pdf

COURSE OUTCOMES:

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

1. Identify and classify various security threats in a network
2. Apply modern cryptography to provide confidential data transmission
3. Apply Public key cryptographic techniques for secured data transmission
4. Design access control mechanisms to protect systems from attacks
5. Develop firewalls and intrusion detection system

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	1	-	2	-	-	-	-	1	1	1	3	-	-
CO2	3	2	2	1	3	1	-	-	-	1	2	1	3	2	1
CO3	3	3	2	1	3	1	-	-	3	1	2	1	3	2	1
CO4	3	3	2	1	3	1	-	-	3	3	2	1	3	3	1
CO5	1	3	-	-	3	1	-	1	3	3	3	1	2	3	3

09CP706	INFORMATION SYSTEM AND NETWORK SECURITY LAB	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

The student should be made to:

- Be exposed to the different cipher techniques
- Learn to implement the algorithms DES, RSA,MD5,SHA–1
- Learn to use network security tools like GnuPG, KF sensor, Net Strumbler

LIST OF EXERCISES

1. Implement the following substitution & transposition techniques:
    a. Caesar Cipher
    b. Playfair Cipher
    c. Hill Cipher
    d. Vigenere Cipher
    e. Rail fencE-row & Column Transformation
2. Implement the following algorithms
    a. DES
    b. RSA Algorithm
    c. DiffieE-Hellman
    d. MD5
    e. SHA–1
3. Implement the SIGNATURE SCHEME-Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honey pot and monitor the honeypot on network (KF Sensor)
6. Installation of rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA.(Net Stumbler)
8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

COURSE OUTCOMES:

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

1. Apply the cryptographic algorithms for data communication
2. Apply the Digital Signature for secure data transmission
3. Demonstrate intrusion detection system utilizing open source network security tool

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	2	0	2	2	2	0	3	3	2	2
CO2	3	3	3	3	2	3	0	3	2	2	0	3	3	3	3
CO3	3	3	2	1	3	3	0	2	2	1	0	3	3	2	3

09ST708	**SEMINAR / INDUSTRIAL TRAINING**	**L**	**T**	**P**	**S**
		0	**0**	**0**	**1**

COURSE OBJECTIVES

- To expose the students to understand technical and professional skill requirements in IT industries.
- To impart professional skills for solving problems in industries.
- To train the students to design innovative solutions for a problem.
- To motivate the students to become an Entrepreneur.
- To develop communication and technical report writing skill.

The students will work for two periods per week guided by student counselor. They will be asked to present a seminar of not less than 15 minutes and not more than 30 minutes on any technical topic of student's choice related to Information Technology and to engage in discussion with audience. They will defend their presentation. A brief copy of their presentation also should be submitted. Evaluation will be done by the student counselor based on the technical presentation, the report and also on the interaction shown during the seminar.

The students will individually undertake a training program in reputed concerns in the field of Information Technology during summer vacation (at the end of sixth semester) for a minimum stipulated period of four weeks. At the end of training the student has to submit the detailed report on the training undertaken within ten days from the commencement of the seventh semester. The student will be evaluated by a team of staff members nominated by the Head of the Department through a viva-voce examination.

COURSE OUTCOMES :

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

1. Understand the day-to-day job in IT industries, and technical and professional skills needed for an industry.

2. Develop and refine technical and professional skills through hands-on work experience.
3. Design an innovative solution for an Industry requirement by applying the knowledge learned from industry and in academics.
4. Develop a startup for product or services based on the people or industry requirements.
5. Communicate effectively the knowledge learned in internship through document and PowerPoint presentation.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1	1	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	1	2	2	-	-	-	-	-	-	-	-	3	-	3	-
CO3	1	-	2	1	2	-	-	-	-	-	-	-	-	2	3
CO4	1	-	-	-	-	-	-	-	2	-	2	1	-	2	3
CO5	1	-	-	-	2	-	-	-	-	3	-	-	-	2	3

EIGHTH SEMESTER

09PV803	PROJECT WORK AND VIVA VOCE	L	T	P
		0	0	15

COURSE OBJECTIVES

- To inculcate the ability of the student to solve specific problems right from its identification.
- To review literatures based on the problem statement.
- To label methodology for solving the problem.
- To solve problems using modern tools if required.
- To impart the students in preparing project reports and to defend their reports during evaluation.

COURSE OUTCOMES

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

1. Understand and articulate problem statement and identify the objectives of the project.
2. Review the state-of-the-art literature on the topic of the proposed work.
3. Design the methodology of the work in terms of block diagram.
4. Design experiments and conduct investigations of the work using modern IT tools and infer the results in graph, table and charts.
5. Communicate effectively through technical report and PowerPoint presentation.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	-	-	-	-	-	-	3	-	3	-	3	-	-
CO2	1	2	-	-	-	-	-	-	3	-	3	3	2	3	-
CO3	1	-	2	-	-	-	-	-	3	-	3	-	-	2	3
CO4	1	-	2	2	2	-	-	-	3	-	3	-	-	2	3
CO5	1	-	-	-	-	-	-	-	3	3	3	3	-	2	3

PE-PROFESSIONAL ELECTIVES

09PExxx	JAVA AND WEB DESIGN	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To understand the concept of web designing using HTML.
- To understand the concept of server–side web designing using Java applets and Swings.
- To understand the concept of server–side web designing using Servlets and JSP.
- To understand the concept of client–side web designing using Java Script.

Unit–I

HTML: Introduction to Internet – HTML: Introduction to HTML5 – Cascading Style Sheets – Canvas – Web Sockets and Web Workers.

Unit–II

Java and Java Swing: Applet class – Event Handling – Introduction to AWT – AWT controls – Layout managers – Menus – Images – Creating a Swing Applet and Application – Labels – Text fields – Buttons – Toggle Buttons – Checkboxes – Radio Buttons – Tabbed PanE-Scroll Panes – Scroll Bars – List – Combo Box – Menu Bar – Menu – Menu Item – Popup Menu – Toolbar.

Unit–III

Java Servlets: Servlet basic – Servlet API basic – Life cycle of a Servlet – Running Servlet – Debugging Servlet – Thread – Safe Servlet – HTTP Redirects – Cookies.

Unit–IV

JSP: JSP overview – JSP language basics – JSP translation and Compilation directives – Standard Java objects from JSP – JSP configuration and deployment – Actions and tags of JSP.

Unit–V

Java Script: Introduction to Scripting – Control Statements – Functions – Arrays– Objects– Event Handling.

TEXT BOOKS

1. Paul Deitel, Harvey Deitel, and Abbey Deitel, “Internet and World Wide Web How to Program”, Pearson education, 3rd Edition, 2012.
2. Herbert Schildt, “The Complete Reference JAVA2”, Tata McGraw Hill, 9th Edition, 2014.

REFERENCES

1. Dustin R. Callway, "Inside Servlets: Server–Side Programming for the Java Platform", Addison Wesley, 1999.
2. Venkata S. R. Krishna R. Chaganti and Paul J. Perrone, "Building Java™ Enterprise Systems with J2EE™", SAMS, 2000.
3. Steven Holzner, "Java2 Black Book", Coriolis Group Books, 2001.
4. Budi Kurniawan, "Java for the Web with Servlets, JSP, and EJB: A Developer's Guide to J2EE Solutions", New Riders Publishing, 2002.
5. Balagurusamy, E., "Programming with A Perimer 3 Java", Tata McGraw Hill, 2007

COURSE OUTCOMES:

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

1. Design static web page using HTML.
2. Develop server-side web page using java applets and swings.
3. Acquire engineering knowledge on server-side web page using servlets.
4. Work individual and team based projects and architect server-side web page using JSP.
5. Perform client-side event handling using Java script.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	1	3	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	1	-	-	-	-	-	-	-	-	3	-
CO4	2	-	-	-	-	-	-	-	3	-	-	-	3	-	-
CO5	2	3	-	-	1	-	-	-	-	-	-	-	-	-	-

09PExxx	**PERL PROGRAMMING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the basic Perl language features.
- To understand Perl language as a tool for convenient text, data storage and file processing.
- Execute programs from Perl environment and process their result.
- To enable with subroutines and modules.

- Describe the implementation of regular expression and function.

Unit–I

An overview of Perl: Getting started, Scalar data – Numbers – Strings – Built–in warnings – Operators – Variables – Output with print – Control structures – Getting user input – More control structures.

Unit–II

Lists and Hashes: Introduction to lists, Simple lists, Complex lists, Accessing list values, List slices, Ranges, Combining ranges and Slices. Arrays – Accessing single and Multiple elements from an array – Interpolating Arrays into Strings – For Control Structure-Array functions (pop, push, shift, unshift, and sort) – Array manipulations; Introduction to Hashes – Hash element access – Hash functions – Typical use of hash.

Unit–III

Files and Data: Input from standard input – Diamond operator – Invocation Arguments – Standard Output – Formatted Output using printf – File Handles – Opening a file handle-Fatal errors – Using file handle-Reopening a standard file handle-Output with say – File handles in a scalar**.**

Unit–IV

Subroutines and Modules: Introduction to subroutines – Defining – Invoking – Return Values – Arguments – Private variables – Variable length parameter list – Lexical variables – Use strict pragma – Return operator – Non-scalar return values – Perl Modules – Finding and Installing Modules – Using simple Modules–CGI.

Unit–V

Regular Expressions: Introduction to regular expressions– Simple patterns – Character classes – Matching with regular expression – Processing text with regular expression – Substitutions – Split operator – Join function.

TEXT BOOKS

1. Stephen Spainhour, Ellen Siever, Nathan Patwardhan," Perl in a Nutshell", O'Reilly Media Publications, 1998.
2. Simon Cozens, Peter Wain Wrigth, "Beginning Perl", Wrox press, First Edition, 2000.

REFERENCES

1. Tom Christiansen, Brian D Foy, Larry Wall, Jon Orwant, "Programming Perl", O'Reilly Media, Fourth Edition, 2012.
2. Randal L. Schwartz, Brian D Foy, Tom Phoenix, "Learning Perl", O'Reilly Media, Sixth Edition, 2011.
3. Ellie Quigley, "Perl by Example", Prentice Hall, Fifth Edition, 2014.

COURSE OUTCOMES

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

1. Apply prerequisite basic programming concepts to Perl
2. Write, compile, and run Perl programs, Analyze the effects of using Perl structures that implement decisions, loops, and store arrays and use these structures in a well–designed, OOP program
3. Create Perl programs that make use of various directories and use several files linked together
4. Knowledge to using variables, argument , strict pragma ,operator and modules in Perl programming
5. Knowledge about using regular expression and function

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	1	1	-	-	1	-	1	1	1	3	1	1
CO2	3	3	2	2	1	-	-	1	-	-	1	1	2	2	-
CO3	3	3	2	2	2	1	-	1	-	-	1	1	3	2	1
CO4	3	2	2	1	2	-	1	1	-	-	1	1	3	2	-
CO5	3	2	2	1	1	-	-	1	-	-	1	1	2	1	-

09PExxx	PYTHON PROGRAMMING	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To learn the syntax and semantics of Python language, and understand basic programming concepts using Python.
- To effectively use available builtin functions of Python, and develop user defined functions for the requirements of the user.
- To implement object oriented concepts and various network protocols using Python.
- To efficiently handle files, databases, and exceptions in Python.
- To create user interfaces with a wide range of features, and develop simple real world applications using Python.

Unit–I

Elementary Programming, Selections and Loops: History of Python – Getting Started with Python – Programming Style-Writing a Simple Program – Reading Input from the Console-Identifiers – Variables, Assignment Statements, and Expressions – Simultaneous Assignments – Named Constants – Numeric Data Types and Operators – Type Conversions and Rounding–Introduction – Boolean Types, Values, and Expressions –if Statements – Two–Way if–else Statements – Nested if and Multi–Way if–elif–else Statements – Logical Operators – Conditional Expressions – Operator Precedence and Associativity – Detecting the Location of an Object Case Study: Computing Body Mass Index – The while Loop – The for Loop –Nested Loops – Keywords break and continue-Case Studies: Displaying Prime Numbers and Random Walk.

Unit–II

Mathematical Functions, Strings and User Defined Functions: Simple and Mathematical Python Built–in Functions – Strings and Characters –Introduction to Objects and Methods – Formatting Numbers and Strings– Drawing Various Shapes – Drawing with Colors and Fonts – Defining a Function – Calling a Function –Functions with/without Return Values – Positional and Keyword Arguments –Passing Arguments by Reference Values – Modularizing Code-The Scope of Variables – Default Arguments – Returning Multiple Values –Function Abstraction and Stepwise Refinement – Case Study: Generating Random ASCII Characters.

Unit–III

Classes and Objects: Introduction to Object – Oriented Programming – Basic principles of Object – Oriented Programming in Python – Class definition, Inheritance, Composition, Operator Overloading and Object creation – Python special modules –

Python Object System – Object representation, Attribute binding, Memory Management, and Special properties of classes including properties, Slots and Private attributes.

Unit–IV

Files, Exception Handling and Network Programming: Introduction –Text Input and Output – File Dialogs Exception Handling – Raising Exceptions – Processing Exceptions Using Exception Objects – Defining Custom Exception Classes – Binary IO Using Pickling – Case Studies: Counting Each Letter in a File and Retrieving Data from the Web–Client Server Architecture-sockets – Creating and executing TCP and UDP Client Server UNIT s – Twisted Framework – FTP – Usenets – Newsgroup – Emails – SMTP – POP3.

Unit–V

Database and GUI Programming: DBM database-SQL database-GUI Programming using Tkinter: Introduction – Getting Started with Tkinter – Processing Events – The Widget Classes – Canvas – The Geometry Managers –Displaying Images – Menus – Popup Menus – Mouse, Key Events, and Bindings –Listboxes – Animations – Scrollbars – Standard Dialog Boxes–Grids.

TEXT BOOKS

1. Guttag, John, “Introduction to Computation and Programming Using Python”, MIT Press, 2013.
2. Wesley J Chun “Core Python Applications Programming”, Prentice Hall, 2012.

REFERENCE BOOKS

1. Mark Lutz, “Learning Python, Powerful OOPs”, O’Reilly, 2011.
2. Jennifer Campbell, Paul Gries, Jason montajo, Greg Wilson, “Practical Programming An Introduction To Computer Science Using Python” The Pragmatic Bookshelf , 2009
3. Mark summerfield “Programming in python 3: A Complete Introduction to Python Languauge”, Addison Wesley, Pearson Education, 2010.
4. Zelle, John M. “Python Programming: An Introduction to Computer Science”, 1st ed. Franklin Beedle and Associates, 2003.
5. Budd, Timothy, “Exploring Python”, McGraw–Hill Science, 2009.
6. Seema Thareja, “Python Programming”, Pearson.

COURSE OUTCOMES:

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

1. Represent and manipulate basic data types such as Numbers, Strings, List, Tuples, Set and Dictionaries in Python. Become fluent in the use of control flow and looping statements.
2. Express proficiency in the handling of built-in functions, and developing user defined and lambda functions. Able to generate random data as per the requirements.
3. Develop applications in Python using object oriented programming concepts.
4. Handle various file operations and exceptions using Python. Design and develop Client Server network applications using Python
5. Manage various databases and perform different database operations using Python. Design and develop GUI Applications in Python.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	3	-	-	-	-	-	-	-	-	3	-
CO2	3	2	-	-	3	-	-	-	-	-	-	-	-	3	-
CO3	3	2	3	2	3	1	-	-	-	-	-	-	-	-	3
CO4	3	3	3	3	3	2	-	-	-	-	-	-	-	-	3
CO5	1	3	3	3	3	3	-	-	-	-	-	-	-	-	3

09PExxx	**INFORMATION CODING TECHNIQUES**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To acquire knowledge about information and entropy.
- To acquire knowledge about Hamming weight, minimum distance decoding and different types of codes.
- They also learn about syndrome calculation and design of an encoder and decoder.
- To gain knowledge about text compression techniques. They also learn about speech and audio coding.

- To know about, image compression, graphics interchange format, JPEG and MPEG standards.

Unit–I

Information theory : Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, ShanNon-Fano coding, Huffman coding, Extended Huffman coding – Joint and conditional entropies, Mutual information – Discrete Memory less channels – Binary Symmetric Channel – Channel capacity, Shannon limit.

Unit–II

Error control coding: block codes: Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding – Single parity codes, Hamming codes, Repetition codes – Linear block codes, Cyclic codes – Syndrome calculation, Encoder and decoder.

Unit–III

Error control coding: convolutional codes:Convolutional codes – code tree, trellis, state diagram – Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding.

Unit–IV

Source coding: text, audio and speech: Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 – Speech: Channel Vocal coder, Linear Predictive Coding.

Unit–V

Source coding: image and video: Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF – Image compression: Read, JPEG – Video Compression: Principles– I, B, P frames, Motion estimation, Motion compensation, H.26-, MPEG standard.

TEXT BOOKS

1. R. Bose, “Information Theory, Coding and Cryptography”, TMH 2007.
2. Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols and Standards”, Perason Education Asia, 2002.

REFERENCES

1. K. Sayood, “Introduction to Data Compression” 3/e, Elsevier, 2006.
2. S. Gravano, “Introduction to Error Control Codes”, Oxford University Press 2007.
3. Amitabha Bhattacharya, “Digital Communication”, TMH, 2006.

COURSE OUTCOMES:

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

1. Analyze and design an Information coding system.
2. Able to solve a discrete symmetric channel.

3. Gain the basic knowledge on Error Control Coding and Convolutional codes
4. Ability to develop applications using Text, Audio and Speech source codes
5. Develop skill to implement the image and video source codes

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	-	-	-	-	2	-	-	-	-	-	-
CO2	3	3	2	3	-	-	-	-	-	-	-	-	2	-	2
CO3	3	3	2	3	2	-	-	-	-	-	-	-	2	2	2
CO4	3	3	3	3	2	-	2	-	3	2	-	-	2	2	2
CO5	3	3	2	2	2	-	-	2	3	2	-	-	-	-	-

09PExxx	**SIGNALS AND SYSTEMS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the fundamental ideas of signals and systems analysis and characterization.
- To provide a foundation to numerous applications that deal with signal and system concepts directly or indirectly. Application areas of signals and systems include audio and image processing, communications, control systems, machine learning, and finance.
- To serve as a central building block for students interested in further studying information processing in any form.

Unit–I

Introduction: Signals and Classification of Signals – Basic Continuous–Time Signals – Basic Discrete-Time Signals – Systems and Classification of Systems – Problems.

Linear Time-Invariant Systems: Introduction – Response of a Continuous–Time LTI System and the Convolution Integral – Properties of Continuous–Time LTI Systems – Eigen functions of Continuous–Time LTI Systems – Systems Described by Differential Equations – Response of a Discrete-Time LTI System and Convolution Sum – Properties of Discrete-Time LTI Systems – Eigen functions of Discrete-Time LTI Systems – Systems Described by Difference Equations – Problems.

Unit–II

Laplace Transform and Continuous–Time LTI Systems: Introduction – The Laplace Transform – Laplace Transforms of Some Common Signals – Properties of the Laplace Transform – The Inverse Laplace Transform – The System Function – The Unilateral Laplace Transform – Problems.

Unit–III

The z–Transform and Discrete-Time LTI Systems: Introduction – The z–Transform – z–Transforms of Some Common Sequences – Properties of the z– transform – The Inverse z–Transform – The System Function of Discrete-Time LTI Systems – The Unilateral z–Transform – Problems.

Unit–IV

Fourier Analysis of Continuous–Time Signals and Systems: Introduction – Fourier Series Representation of Periodic Signals – The Fourier Transform – Properties of the Continuous–Time Fourier Transform – The Frequency Response of Continuous–Time LTI Systems – Filtering – Bandwidth – Problems.

Fourier Analysis of Discrete-Time Signals and Systems: Introduction – Discrete Fourier Series – The Fourier Transform – Properties of the Fourier Transform – The Frequency Response of Discrete-Time LTI Systems – System Response to Sampled Continuous –Time Sinusoids – Simulation – The Discrete Fourier Transform – Problems.

Unit–V

State Space Analysis: Introduction – The Concept of State-State Space Representation of Discrete-Time LTI Systems – State Space Representation of Continuous–Time LTI Systems – Solutions of State Equations for Discrete- time LTI Systems – Solutions of State Equations for Continuous–Time LTI Systems – Problems.

TEXT BOOKS

1. Hwei P. Hsu, “Schaum’s Outline of Signals and Systems”, McGraw–Hill Education, Third Edition, 2014.
2. Oppenheim, A.V., Willsky, A.S., “Signals and Systems, Pearson”, Second Edition, 2013.

REFERENCE BOOKS

1. Simon Haykin, Barry Van Veen, “Signals and Systems”, John Wiley & Sons, Second Edition, 2007.
2. Oppenheim, A.V. , Willsky, A.S., Nawab, S.H., “Signals and Systems”, Prentice Hall, Second revised Edition, 1997.
3. Ziemer, R.E. and Tranter, W.H. and Fanin, D.R., “Signals and Systems: Continuous and Discrete”, MacMillan, Third Edition, 1993.

4. Roberts, M.J., "Signals and Systems: Analysis Using Transform Methods and MATLAB", McGraw–Hill Higher Education, Second Edition, 2012.

COURSE OUTCOMES

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

1. Understand the fundamental ideas of signals and systems analysis and characterization.
2. Classify Continuous time (CT) and Discrete time (DT) signals and systems.
3. Analyze periodic and aperiodic Signals using Fourier series.
4. Analyze and characterize CT system through Laplace transform and DT system through Z transform.
5. Understand numerous applications that deal with signal and system concepts directly or indirectly. Application areas of signals and systems include audio and image processing, communications, control systems, machine learning, and finance.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	-	3	-
CO3	1	-	-	3	-	-	-	-	-	-	-	-	-	2	-
CO4	3	-	1	-	-	-	-	-	-	-	-	-	2	-	-
CO5	3	-	-	1	-	-	-	-	-	-	-	-	2	-	-

09PExxx	**LINEAR INTEGRATED CIRCUITS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

The student should be made to:

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and Non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.

Unit–I

BJT differential amplifier analysis – concept of CMRR – methods to improve CMRR – constant current source-active load – current mirror – Darlington pair –

differential input impedance-Fundamental MOS differential amplifier The Ideal Op–Amp, Block diagram Representation of Op–Amp, Voltage Transfer Curve of Op–Amp, AC–DC Characteristics of an Op–Amp, Frequency Response, Frequency response of Non-compensated Op–Amp, Compensating Networks, Closed–Loop Frequency Response, Circuit Stability, Slew Rate. Inverting and Non-Inverting Configuration, Ideal Open–Loop and Closed–Loop Operation of Op–Amp, Block diagram Representation of Feedback Configurations.

Unit–II

DC & AC Amplifiers, Peaking Amplifier, Summing, Scaling and Averaging amplifier, Instrumentation Amplifier, Voltage-to–Current Converter, Current to Voltage Converter, The Integrator, The Differentiator, Log and Antilog Amplifier, Peak Detector, Precision Rectifiers, Comparator, Zero Crossing Detector, Schmitt Trigger, Sample and Hold Circuit, Clippers and Clampers, A/D and D/A Converters.

Unit–III

Active Filters: – Butterworth Filters, Band–Pass Filters, Band Reject Filters, All–Pass Filters. Oscillators and Wave Generators:– Phase Shift Oscillator, Wien Bridge Oscillator, Voltage-Controlled Oscillator(VCO), Square Wave Generator, Triangular Wave Generator, Saw–tooth Wave Generator.

Unit–IV

PLL: Closed loop analysis of PLL, Phase Detectors, Analog Multipliers , Applications using PLL: AM, PM and FSK modulators and demodulators, Frequency synthesizers**,** Timer IC 555: 555 Timer Functional Diagram and Specifications, Application as Monostable, Astable, Bistable, Pulse width modulator.

Unit–V

Voltage Regulators: Fixed, Variable and switching mode, Universal Active Filter, Amplifiers: Power, Audio, Video, Tuned and Isolation. Campander, Optocouplers, Voltage to Frequency Converter. Control ICs: Temperature control and small D.C. motor speed regulation by ICs like SL440, PA436, CA3059 – their block diagram and operational details.

TEXT BOOKS

1. D. Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, New Age International Pvt. Ltd., 2000.
2. Sergio Franco, ‘Design with operational amplifiers and analog integrated circuits’, McGraw Hill, -997.

REFERENCES

1. OP–AMP and Linear IC’s By Ramakant A. Gayakwad, Prentice Hall
2. Digital Integrated Electronics, By Taub and Schilling, McGraw Hill
3. Integrated Electronics, By Millman J. and Halkias C.C., McGraw Hill.

4. Op–Amp and Linear IC's, By Caughlier and Driscoll, PHI

COURSE OUTCOMES:

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

1. Understand the characteristics of Op Amp.
2. Understand the applications ICs in the processing of analog signals.
3. Analyze and design high frequency amplifier using Op Amp.
4. Analyze and design the electronic circuits using linear integrated circuit
5. Analyze and design the Voltage Regulators using ICs`.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	2	-	-	-	-	-	-	2	3	-	-
CO2	3	-	-	-	2	-	-	-	-	-	-	3	3	2	2
CO3	3	3	2	3	2	-		-	-	-	-	3	3	-	-
CO4	3	3	3	2	3	-	-	-	-	-	-	3	3	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	2	3	2	2

09PExxx	**SOFTWARE ENGINEERING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the phases of development of a Software Project.
- To understand the major considerations for enterprise integration and deployment concepts of Requirements engineering and Analysis Modeling.
- To learn various testing, maintenance measures and risk management methods.
- To learn the Software quality management and configuration management concepts.

Unit–I

The Software process– A Generic Process Model– Perspective Process Models– Specialized Process Models– The Unified Process–Personal and team process models– Agile Development–Extreme Programming (XP) – Requirements Engineering– Requirements Analysis–Establishing the Groundwork– Eliciting Requirements– Developing Use Cases– Negotiating Requirements– Validating Requirements– Requirements Analysis–Scenario–Based Modeling.

Unit–II

Design concepts–The Design Process–Design Concepts–The Design Model–Architectural Design–Assessing Alternative Architectural Designs– Architectural Mapping Using Data Flow–Component–level design–Designing Class–Based Components–Conducting Component–Level Design–User Interface design–User Interface Analysis and Design– Interface Analysis–Pattern based Design– WebApp design–WebApp Design Quality–WebApp Interface design.

Unit–III

Quality Management– Software Quality– The Software Quality Dilemma–Achieving Software Quality– Review techniques–Cost Impact of Software Defects–Defect Amplification and Removal–Review Metrics and Their Use-Informal Reviews–Formal Technical Reviews–Software Quality Assurance- Test Strategies for Conventional Software-Test Strategies for Object–Oriented Software-SQA Tasks, Goals, and Metrics–Statistical Software Quality Assurance-A Strategic Approach to Software Testing–System Testing–The Art of Debugging.

Unit–IV

Software Configuration Management–The SCM Repository–The SCM Process–Configuration Management for WebApps–A Framework for Product Metrics–Metrics for the Requirements Model–Metrics for the Design Model– Project Management concepts–The management spectrum–People-The Product– The Process–Metrics in the Process and Project Domains.

Unit–V

Software Project Estimation–Decomposition Techniques–Empirical Estimation Models–The Make/Buy Decision–Project Scheduling–Defining a Task Set for the Software Project–Defining a Task Network–Reactive versus Proactive Risk Strategies–Risk Identification–Risk Projection–Risk Refinement–The RMMM Plan–Business Process Reengineering–Software Reengineering–Reverse Engineering–Restructuring–Forward Engineering–The SPI Process–The CMMI–The People CMM–SPI Return on Investment–SPI Trends.

TEXT BOOKS

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, McGraw Hill International Edition, 2010.
2. Ian Sommerville, “Software Engineering”, 9th Edition, Pearson Education Asia, 2011.

REFERENCES

1. Rajib Mall, “Fundamentals of Software Engineering”, Third Edition, PHI Learning Private Limited, 2009.
2. Pankaj Jalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.

3. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, "Software Engineering", Tata McGraw–Hill Publishing Company Limited, 2007.
5. Nasib Singh Gill, "Software Engineering", Khanna Publishing House.
6. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International.

COURSE OUTCOMES

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

1. Comprehend the basic elements of Software Project Models.
2. Visualize the significance of the different kind of Software Testing methods.
3. Ability to analyze the strategies in Software Designing.
4. Understand the significance of Software Reengineering.
5. Estimate the cost of software, risks of handling, do software planning and configuration management.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	-	1	1	2	-	1	2	2	1	2	2	2
CO2	3	2	2	1	2	1	1	-	1	1	1	1	-	2	-
CO3	1	2	2	1	2	1	1	2	1	1	1	1	1	2	-
CO4	3	1	2	1	1	2	1	1	1	1	1	1	1	2	-
CO5	3	2	2	1	1	1	1	1	2	1	1	1	2	2	-

09PExxx	**DISTRIBUTED OBJECTS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To know about the fundamentals to programming in distributed objects using Microsoft's COM/DCOM architecture.
- To understand foundations of Distributed Objects.
- To understand the concepts of peer to peer services and file system.
- To understand in detail the system level and support required for distributed Objects.

Unit–I

Fundamental programming architecture-parallel processing – advantages of distributed computing – building distributed systems – COM background – three faces of

COM –component ware-COM interfaces – types of components – the COM library – COM as a foundation – activex on COM – The interface definition language-the component's client – the component – COM reuse mechanisms .

Unit–II

Type libraries – C++ client utilizing type library –active template library – COM programming in visual basic – COM programming in java – Threads – apartments– apartment interactions – implementing multithreaded components – the ten threading commandments – COM facilities – automation and component categories – the dispatch interface-building an automation client in C++ – building an automation client in visual basic – building an automation client in VB Script – script lets: building COM objects in HTML – error handling – component categories.

Unit–III

Introduction – Communication between distributed objects – Remote procedure call Events and notifications – Java RMI case Study – Introduction to DFS – File service architecture-Google file system – Introduction to Name Services – Name services and DNS – Directory and directory services – Cluster Computing – mapreduc/bigtable.

Unit–IV

Support – The operating system layer – Protection – Processes and threads – Communication and invocation – Operating system architecture-Virtualization at the operating system level – Distributed Objects and Components Distributed objects – Case study: CORBA – From objects to components – Case studies: Enterprise JavaBeans and Fractal

Unit–V

Web Services –Web services–Service descriptions and IDL for web services – A directory service for use with web services – XML security–Coordination of web services–Applications of web services– Peer–To–Peer Systems –Napster and its legacy– Peer–to–peer middleware-Routing overlays – Overlay case studies: Pastry, Tapestry – Application case studies: Squirrel – OceanStore-Ivy.

TEXT BOOKS

1. Guy Eddon and Henry Eddon, "Inside distributed COM", WP, Microsoft press, 1998.
2. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

REFERENCES

1. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.

2. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
3. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003
4. Andrew S. Tanenbaum, "Modern OS", Prentice Hall, Second Edition, 2001.
5. Kenneth P. Birman, "Reliable Distributed Systems: Technologies, Web Services, and Applications", Springer.

COURSE OUTCOMES

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

1. Understand the Knowledge on fundamental of distributed objects using Microsoft's COM/DCOM architecture.
2. Understand and apply the basic theoretical concepts and algorithms problem solving.
3. Ability to analyze the Distributed Objects and Components.
4. Gaining experienced skills on Distributed Objects.
5. Familiarizing the peer to peer services and file system.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	-	1	-	-	-	1	-	2	1	3	2	1
CO2	3	2	2	1	2	-	-	-	-	-	1	1	-	2	-
CO3	3	2	2	1	2	-	-	-	-	-	1	1	1	2	-
CO4	3	1	2	1	1	-	-	-	1	-	1	1	2	2	-
CO5	3	2	2	1	1	-	-	-	2	-	1	1	2	2	1

09PExxx	**SERVICE ORIENTED ARCHITECTURE**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

The student should be made to:

- Learn XML fundamentals and be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

Unit–I

XML document structure – Well–formed and valid documents – Namespaces – DTD – XML Schema – X–Files.

Unit–II

Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.

Unit–III

Characteristics of SOA, Comparing SOA with Client–Server and Distributed architectures – Benefits of SOA – Principles of Service orientation – Service layers.

Unit–IV

Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions.

Unit–V

Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines — Composition – WS–BPEL – WS–Coordination – WS–Policy – WS–Security – SOA support in J2EE.

TEXT BOOKS

1. Ron Schmelzer et al. “XML and Web Services”, Pearson Education, 2002.
2. Thomas Erl, “Service Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2005.

REFERENCES

1. Frank P.Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005
3. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall, 2004.
4. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2003

COURSE OUTCOMES

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

1. Build applications based on XML.
2. Develop web services using technology elements.
3. Implement SOA – based applications for intra–enterprise and inter–enterprise applications
4. Explain advanced concepts such as service composition, orchestration and Choreography.

5. Discuss about various WS-* specification standards.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	-	1	2	2	2	2	1	2	2	2	2
CO2	3	2	1	1	1	1	2	2	1	2	2	2	2	1	1
CO3	3	2	2	1	2	1	2	2	2	2	2	2	2	2	2
CO4	3	2	2	2	2	1	2	2	2	2	2	2	2	2	2
CO5	3	2	1	1	2	1	2	2	2	2	1	2	2	1	1

09PExxx	**DIGITAL IMAGE PROCESSING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To learn the fundamental concepts of digital imaging and MATLAB.
- To introduce basic concepts like acquiring, storing and processing of images using filters.
- To provide details about enhancing the quality of images and to introduce techniques for extraction and processing of region of interest.
- To know the data compression in images
- To understand the morphological processing and its representation

Unit–I

Fundamentals: Digital Imaging: Introduction – Steps in Image Processing Systems – Image Acquisition – Image Sampling and Quantization – Pixel Relationships – Linear and Nonlinear Operations.

Matlab: The MATLAB Desktop – Using the MATLAB Editor/Debugger – Getting Help – Saving and Retrieving work Session Data – Digital Image Representation – Image I/O and Display – Classes and Image Types – M–Function Programming.

Unit–II

Image enhancement: Spatial Domain – Gray level Transformations – Histogram Processing – Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

Unit–III

Image segmentation: Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological Watersheds – Motion Segmentation.

Unit–IV

Multi resolution analysis and compression: Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms. Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards..

Unit–V

Morphological processing and representation: Morphological Image Processing – Preliminaries – Dilation and Erosion – Opening and Closing– The Hit–or–Miss Transformation.

Representation – Boundary Descriptors – Regional Descriptors – Use of Principal Components for Description – Relational Descriptors – Applications of Image Processing –

Image Watermarking – Fingerprint Recognition – Iris Recognition.

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, “Digital Image Processing Using Matlab”, Second Edition, McGraw Hill, 2010.
2. AL. Bovik, “The Essential Guide to Image processing”, Second Edition, Elsevier, 2009.

REFERENCES

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 2006.
2. Sanjit K. Mitra, & Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.
3. Maria Petrou, Costas Petrou, “Image Processing: The Fundamentals”, Wiley, Second Edition, 2010.

COURSE OUTCOMES:

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

1. Understand the basic steps of image processing, and the implementation of image processing using Matlab
2. Enhance the quality of the image using transformations and filtering methods
3. Do the segmentation of the images in different types.
4. Analyze and design data compression in images
5. Apply the designing concepts of image processing in various applications.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	3	-	-	-	3	2	-	-	3	-	-
CO2	3	3	3	3	3	-	-	-	-	1	1	-	2	2	-
CO3	-	3	3	3	2	-	-	-	3	-	1	1	2	-	1
CO4	-	-	3	3	3	3	-	-	1	-	2	-	1	2	-
CO5	-	-	-	-	-	1	1	-	3	1	3	3	-	-	3

09PExxx	**BUSINESS INTELLIGENCE AND ITS APPLICATIONS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- Be exposed with the basic rudiments of business intelligence system.
- Understand the modeling aspects behind Business Intelligence.
- Understand of the business intelligence life cycle and the techniques used in it.
- Study the applications of business intelligence
- Be exposed with different data analysis tools and techniques..

Unit–I

Business Intelligence: Effective and timely decisions – Data, information and knowledge-Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

Unit–II

Knowledge Delivery: The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self–Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

Unit–III

Efficiency: Efficiency measures – The CCR model: Definition of target objectives– Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis.

Unit–IV

Business Intelligence Applications: Marketing models – Logistic and Production models – Case studies.

Unit–V

Future of Business Intelligence: Future of business intelligence - Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXT BOOKS

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.
2. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003

REFERENCES

1. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
2. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
3. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw–Hill, 2007.
4. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

COURSE OUTCOMES:

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

1. Organize and apply individual decision–making to develop business intelligent system.
2. Know about the delivery of the knowledge and to optimize the presentation of the message.
3. Develop the efficiency of the system using good practicing concepts.
4. Apply the business intelligence techniques in various applications.
5. Know the business intelligence in future aspects.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	3	-	-	-	-	-	-	-	-	-	1
CO2	-	3	-	2	-	1	1	-	-	-	-	-	-	3	-
CO3	-	-	3	3	3	-	2	1	-	-	-	-	-	-	3
CO4	-	-	-	3	3	-	-	-	-	2	2	3	3	-	-
CO5	-	-	-	-	3	3	-	1	1	-	3	2	-	-	3

09PExxx	FREE AND OPEN SOURCE SOFTWARE	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

The student should be made to:

- Learn about various open source licenses and implications for users, developers and the software community in general
- Use the communication modes particular to the open source world through participation in such things as mailing lists, IRC, wikis, etc.
- Learn and understand Agile development methodology and use it to develop open source software within the project
- Work collaboratively with fellow students and other members of the project's community

Unit–I

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources – Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode-Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

Unit–II

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time – Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

Unit–III

PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

Unit–IV

PYTHON: Syntax and Style-Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

Unit–V

Web Server: Apache Web server – Working with Web Server – Configuring and Using apache web services MDA: Introduction to MDA – Genesis of MDA – Meta Object Facility – UML – UML Profiles – MDA Applications.

TEXT BOOKS

1. Steve Suchring, "MySQL Bible", John Wiley, 2002.
2. Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002.

REFERENCES

1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003.
2. Wesley J. Chun, "Core Python Programming", Prentice Hall, 2001.
3. Peter Wainwright, "Professional Apache", Wrox Press, 2002.
4. Stephen J. Mellor, Marc Balces, "Executable UMS: A foundation for MDA", Addison Wesley, 2002.

COURSE OUTCOMES

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

1. Have a good understanding of how to develop a software system in a team with other developers.
2. Able to develop web–enabled software using common software components such as Spring and Hibernate.
3. Learn the basic understanding of Scripting languages and how to develop modern web enabled applications.
4. Understand the Python syntax and semantics and be fluent in the use of Python flowcontrol and functions.
5. Develop the basic understanding of mobile app development using native applications.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	-	-	1	2	1	1	1	1	2	2
CO2	3	3	3	2	2	-	-	1	2	1	1	1	1	3	2
CO3	3	3	3	2	2	-	-	1	2	1	1	1	-	2	1
CO4	3	3	3	3	2	-	-	1	2	1	1	1	-	2	1
CO5	3	2	3	3	2	-	-	1	2	1	1	1	-	2	1

09PExxx	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To understand objects, classes and inheritance.
- To understand utilization of software objects to build software projects.
- To use UML in requirements elicitation and designing.
- To develop applications using UML.

Unit–I

Overview of Object Oriented System Development: Introduction – Object Oriented System Development Methodology – Overview of Unified Approach – Object Basics – Systems Development Life Cycle-Unified Approach.

Unit–II

Methodology and Modelling: Introduction –Rumbaugh et al.'s Object Modelling Technique - Booch Methodology – Jacobson et al. Methodologies – Patterns – Framework – Unified approach – Unified Modelling Language.

Unit–III

Object Oriented analysis: Use Case Driven Object Oriented Analysis Object Oriented Analysis: Classification Noun Phrase Approach – Common Class Patterns Approach – Object Relationship analysis.

Unit–IV

Object Oriented Design: Object Oriented Design Process – Object Oriented Design Axioms – Corollaries – Designing Classes: Defining Attributes and methods – Object Store and Access layer – Designing the View Layer Classes.

Unit–V

Applications: Data Acquisition: Weather Monitoring Station – Frameworks: Foundation Class library – Client/Server Computing: Inventory Tracking.

TEXT BOOKS

1. Ali Bahrami, "Object oriented systems development using the unified modelling language", Tata McGraw Hill, 1st Edition 2008.
2. Grady Booch, "Object Oriented Analysis and Design with Applications", Pearson Education, Inc, Second Edition, 2008.

REFERENCES

1. John Deacon, "Object Oriented Analysis and Design", Addison Wesley, 1st Edition,2005.
2. Pinson L. and Wiener R., "Application of Object Oriented Programming",Addison Wesley Publishing Company, 1990.
3. Taylor D., "Object Oriented Information Systems", John Wiley and Sons, 1992.

COURSE OUTCOMES

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

1. Introduce the Object Oriented Development Approach.
2. Analyze the Systems Development Life Cycle.
3. Identify the basic software requirements UML Modelling.

4. Express software design with UML diagrams.
5. Develop applications using UML.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	2	-	-	1	-	-	-	-	-	3	-	-
CO3	3	3	3	2	1	-	2	-	1	-	-	-	3	-	-
CO4	3	-	2	1	-	1	-	-	-	-	-	-	1	-	-
CO5	-	2	1	3	-	1	-	1	-	-	-	-	-	1	-

09PExxx	**SYSTEM SOFTWARE AND COMPILER DESIGN**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- View some of the major tasks of the system software of a computer system, focusing on internal working of the hardware and software interface of a typical system.
- Identify and understand the design, function and implementation of assemblers, linkers, loaders, macro processors and system software tools.
- Understand the theory and practice of compiler implementation.
- To learn context free grammars, compiler parsing techniques, construction of syntax trees, symbol tables, intermediate representations and actual code generation.

Unit–I

Basics of System Software and Assembler, Loaders And Linkers: Introduction – System software and SIC/XE machine architecture-Basic assembler functions: Assembler algorithms and data structures – Machine dependent assembler features – Machine independent assembler features. Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader – Machine dependent loader features – Machine independent loader features.

Unit–II

Macro Processors and Other System Software: Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures –

Implementation examples: MASM Macro Processor – Text editors – Overview of Editing Process – User Interface-Editor Structure-Interactive Debugging Systems – Debugging functions and capabilities – Relationships with Other parts of the system – User Interface Criteria – Virtual Machines.

Unit–III

Compiler – Lexical Analysis: Phases of Compiler – Compiler Construction Tools – Lexical Analysis: Role of a Lexical analyzer – input buffering – specification and recognition of tokens – Finite Automata – Designing a lexical analyzer generator – Pattern matching based on NFA.

Unit–IV

Compiler– Syntax Analysis, Syntax–Directed Translation: Role of Parser – Top–down parsing – recursive descent and predictive parsers (LL) – Bottom–Up parsing – Operator precedence parsing – LR, SLR and LALR parsers – parser generators – syntax–directed translation – S–attributed definition– L–attributed definition.

Unit–V

Compiler – Code Generation, Optimization: Intermediate languages – graphical representations – DAGs – Three address code-types of three address statements – syntax directed translation into three address code-implementation of three address statements – Code Optimization: Machine dependent and machine independent code generation – Sources of optimization – Code Generation – Semantic stacks – evaluation of expressions – control structures and procedure calls.

TEXT BOOKS

1. Leland Beck, – “System Software-An Introduction to Systems Programming”, Pearson Education, Inc., Third Edition, 2008
2. A.V. Aho, R. Shethi and J. D. Ullman; “Compilers – Principles, Techniques and Tools”, Pearson Education, Second Edition, 2002.

REFERENCES

1. D.M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Second Edition, 2009.
2. John J. Donovan, “Systems Programming”, Tata McGraw Hill Company, Second Edition, 2000.
3. V. Raghavan, “Principles of Compiler Design”, Tata McGraw Hill Education Publishers, 2010.
4. Srimanta Pal, “Systems Programming”, Oxford University Press, 2011.

COURSE OUTCOMES

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

1. Illustrate system software such as assemblers, loaders, linkers.

2. Discuss about macro processor for implementing different concepts of system software.
3. Design and develop lexical analyzers and finite automata.
4. Design algorithm for parser.
5. Understand the concept of intermediate code generation technique.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	2	1	1	1	1	2	1	1	1	2	2
CO2	3	3	2	2	2	1	1	1	1	1	1	1	1	3	2
CO3	3	2	2	2	2	1	1	1	1	2	1	1	-	2	1
CO4	2	2	2	2	2	1	1	1	1	2	1	2	-	2	1
CO5	2	2	2	2	2	1	1	1	1	1	1	1	-	2	1

09PExxx	**SOFTWARE TESTING AND QUALITY ASSURANCE**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To impart knowledge on software testing, quality and Software Quality Assurance (SQA).
- To introduce the various software testing techniques and different levels of testing.
- To introduce the SQA standards and components of SQA system.
- To explain the components of quality plan for software projects.
- To describe the planning of both development and quality objectives

Unit–I

Phases of Software project – Quality, Quality assurance and quality control – Testing, Verification and Validation – White box testing – Static testing – Structural testing – Black box testing – Definition, need for black box testing – Black box testing techniques – Requirements based testing, Positive and Negative testing, Boundary Value Analysis, Decision Tables, Equivalence Partitioning, Graph based Testing, Compatibility Testing, Domain Testing.

Unit–II

Integration testing – Integration testing as a type of testing – Integration testing as a phase of testing – Scenario testing – Defect bash – System and Acceptance testing – System testing overview – Need for System testing – Functional system testing – Non-functional testing – Acceptance testing.

Unit–III

Performance testing – Factors governing performance testing – Methodology for performance testing – Tools for performance testing – Process for performance testing – Regression testing – Types of Regression testing – When and how to do Regression testing – Test planning – Test management – Test process – Test reporting.

Unit–IV

Software quality – definition – Software quality assurance-definition and objectives – Software quality assurance and software engineering – Software quality factors – The components of the software quality assurance system – The SQA system – SQA architecture Pre-project components – Software project life cycle components – Infrastructure components for error prevention and improvement – Management SQA components – SQA standards, system certification, and assessment components – Organizing for SQA – The human components – Considerations guiding construction of an organization's SQA system.

Unit–V

Development plan and quality plan objectives – Elements of the development plan – Elements of the quality plan – Development and quality plans for small projects and for internal projects – Integrating quality activities in the project life cycle-Classic and other software development methodologies – Factors affecting intensity of quality assurance activities in the development process – Verification, validation and qualification – A model for SQA defect removal effectiveness and cost.

TEXT BOOKS

1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing: Principles and Practices", Pearson Education India, 1st Edition, 2005.
2. Daniel Galin, "Software quality assurance-from theory to implementation", Pearson Education India, 1st Edition, 2009.

REFERENCES

1. Aditya Mathur, "Foundations of software testing", Pearson Education, 1st Edition, 2008.
2. Ron Patton, "Software Testing", Pearson education, 2nd Edition, 2007.

3. William E. Perry, "Effective Methods for Software Testing: Includes Complete Guidelines, Checklists, and Templates", Wiley Publishing, 3rd Edition, 2006.
4. Alan C Gillies, “Software Quality Theory and Management”, Cengage Learning, 2nd Edition, 2003.
5. Yogesh Singh, “Software testing”, University Press.
6. Chauhan, “Software Testing Principles and Practices”, Oxford University Press.

COURSE OUTCOMES

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

1. Techniques and skills on use of modern software testing tools to support software testing projects.
2. Planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generating a test report.
3. Advanced software testing topics, such as object–oriented software testing methods, and component–based software testing issues, challenges, and solutions.
4. To gathering the knowledge about quality of software metrics
5. Know how to plan development and quality objectives for software product.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	1	-	-	1	1	-	1	1	2	1	1
CO2	3	3	2	1	1	-	-	1	1	-	1	-	2	3	-
CO3	3	1	2	3	1	-	-	1	2	1	1	-	2	1	1
CO4	3	3	1	3	1	1	1	1	2	-	1	1	2	1	-
CO5	3	1	2	2	1	1	1	1	2	-	1	1	1	1	-

09PExxx	**MOBILE COMMUNICATION**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To study the concepts of mobile internet protocol and transport layer.
- To understand the concepts of mobile telecommunication system.
- To understand the concept of mobile ad–hoc networks.

- To study the concepts of mobile platforms and applications.

Unit–I

Introduction to wireless communication – Applications – Wireless transmission – Frequencies for radio transmission – signals – antennas – signal propagation – need and types of multiplexing techniques – modulation types – use of spread spectrum – cellular Systems. Motivation for a specialized MAC – SDMA – FDMA – TDMA – CDMA and comparison of these methods.

Unit–II

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP– Adaptation of TCP Window – Improvement in TCP Performance.

Unit–III

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

Unit–IV

Ad–Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – VANET – MANET Vs VANET – Security.

Unit–V

Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, Black Berry, Windows Phone-M–Commerce-Structure-Pros & Cons – Mobile Payment System – Security Issues.

TEXT BOOKS

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning Pvt. Ltd, New Delhi – 2012.
2. Jochen H. Schller, “Mobile Communications”, Second Edition, Pearson Education, New Delhi, 2007.

REFERENCES

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
3. William C.Y. Lee, “Mobile Cellular Telecommunications – Analog and Digital Systems”, Second Edition, Tata Mc Graw Hill Edition, 2006.
4. C.K. Toh, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.

5. Android Developers : http://developer.android.com/index.html
6. Apple Developer : https://developer.apple.com/
7. Windows Phone Dev Center : http://developer.windowsphone.com
8. BlackBerry Developer : http://developer.blackberry.com/

COURSE OUTCOMES:

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

1. Understand the principles and concepts of mobile communication.
2. Describe the characteristics and design issues of ad– hoc networks.
3. Analyze and compare the multiplexing techniques.
4. Understand the concepts of ADHOC networks
5. Analyze the advanced Mobile OS concepts

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	-	-	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	-	-	-	-	2	-	-	-	-	-	-	3	-
CO3	3	3	3	3	-	2	-	-	-	-	-	-	3	-	-
CO4	2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CO5	2	2	3	2	3	-	-	-	-	-	-	-	2	-	-

09PExxx	**OPTICAL COMMUNICATION**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures
- To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers
- To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration
- To learn fiber slicing and connectors, noise effects on system performance, operational principles of WDM and solutions

Unit–I

Motivation –optical spectral bands –key elements of optical fiber systems – optical fibers –basic optical laws and definition –optical fiber modes and configurations –mode theory for circular wave guides –single mode fibers –graded–index fiber structure –fiber materials –photonic crystal fibers – fiber fabrication –fiber optic cables.

Unit–II

Light emitting diodes(LED) : structures –materials –quantum efficiency –LED power – modulation of an LED –Laser diodes: modes –threshold conditions –laser dioderate equations –external quantum efficiency –resonant frequencies –structure and radiation patterns –single mode lasers –modulation of laser diodes – power launching and coupling –source to fiber power launching –fiber of fiber joints –LED coupling to single mode fibers –fiber splicing –optical fiber connectors.

Unit–III

pin photo detector – avalanche photodiodes – photo detector noise –detector response time-avalanche multiplication noise-signal degradation in optical fibers –attenuation – UNIT s –absorption –scattering losses –bending losses – core and cladding losses –signal distortion in fibers –overview of distortion origin –modal delay –factors contributing to delay –group delay – material dispersion – wave guide dispersion –polarization – mode dispersion – characteristics of single mode fibers.

Unit–IV

Fundamental receiver operation – digital receiver performance-eye diagrams – coherent detection – homo dyne and heterodyne-burst mode receiver – analog receivers. Digital links – point to point links – link power budget – rise time budget –power penalties – Analog links – overview of analog links – carrier to noise ratio – multichannel transmission techniques.

Unit–V

Wavelength division multiplexing (WDM) concepts – operational principles of WDM – passive optical star coupler – isolators – circulators –active optical components – MEM Stechnology – variable optical attenuators – tunable optical filters – dynamic gain equalizers – polarization controller – chromatic dispersion compensators – Optical amplifiers – basic applications and types of optical amplifiers – Erbium Doped Fiber Amplifiers(EDFA) –amplification mechanism – architecture-power conversion efficiency and gain – Amplifier noise-optical SNR – system applications.

TEXT BOOKS

1. Gerd Keiser, “Optical Fiber Communication”, McGraw Hill International, Singapore, 3rd ed., 2000.
2. Govind P. Agrawal, “Fiber–optic communication Systems”, Third Edition, John Wiley & Sons, 2004.

REFERENCES

1. J. Senior, “Optical Communication, Principles and Practice”, Prentice Hall of India, -994.
2. J. Gower, “Optical Communication System”, Prentice Hall of India, 200-.
3. R.P. Khare, “Fiber Optics and Optoelectronics”, Oxford University Press, 2007.

COURSE OUTCOMES:

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

1. Comprehend the basic elements of optical fiber transmission link, fiber modes and structure configurations.
2. Visualize the significance of the different kind of losses, signal distortion in optical wave guides, signal degradation factors and dispersion management techniques in optical system performance.
3. Compare the various optical source materials, LED structures, quantum efficiency as well as structures and figure of merit of Laser diodes.
4. Analyze the fiber optic receiver operation and configuration.
5. Identify and integrate fiber optical components in variety of schemes and operational principles WDM.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	2	-	-	-	-	-	-	2	3	2	2
CO2	3	3	2	-	2	-	-	-	-	-	-	3	3	2	2
CO3	3	2	2	3	2	-		-	-	-	-	2	3	-	-
CO4	3	3	3	2	3	2	-	-	-	-	-	2	3	-	-
CO5	3	3	-	3	3	-	-	-	-	-	-	2	3	2	2

09PExxx	**ADHOC AND SENSOR NETWORKS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the basics of routing in cellular and ad hoc networks.
- To impart knowledge about quality of service, QoS solutions, QoS routing protocols.

- To enable the students to understand the importance of Energy Management schemes in Mobile ad hoc and wireless sensor networks.
- To describe about sensor networks, its architecture and Standards.
- To expose the students to hybrid wireless networks.

Unit–I

Routing: Cellular and Ad hoc wireless networks – Issues of MAC layer and Routing – Proactive, Reactive and Hybrid Routing protocols – Multicast Routing – Tree based and Mesh based protocols – Multicast with Quality of Service Provision.

Unit–II

Quality of Service: Real–time traffic support – Issues and challenges in providing QoS – Classification of QoS Solutions – MAC layer classifications – QoS Aware Routing Protocols – Ticket based and Predictive location based QoS Routing Protocols.

Unit–III

Energy Management: Need for Energy Management – Classification of Energy Management Schemes – Battery Management and Transmission Power Management Schemes – Network Layer and Data Link Layer Solutions – System power Management schemes.

Unit–IV

Sensor Networks: Introduction – Sensor Network architecture-Data Dissemination – Data Gathering – MAC Protocols for sensor Networks – Location discovery – Quality of Sensor Networks – Evolving Standards – Other Issues – Recent trends in Infrastructure less Networks.

Unit–V

Hybrid Wireless Networks : Introduction – Next Generation Hybrid Wireless Architectures – Routing in Hybrid Wireless Networks – Pricing in Multi–Hop Wireless Networks – Power Control Schemes in Hybrid Wireless Networks – Load Balancing in Hybrid Wireless Networks

TEXT BOOKS

1. C. Siva Ram Murthy and B.S.Manoj, “Ad hoc Wireless Networks – Architectures and Protocols”, 1st Edition, Pearson Education, 2006.
2. Feng Zhao and Leonidas Guibas, “Wireless Sensor Networks – An Information Processing Approach”, 1st Edition, Morgan Kaufman Publishers, 2004.

REFERENCES

1. C.K. Toh, “Adhoc Mobile Wireless Networks: Protocols and Systems”, Pearson Education, 2002.
2. Thomas Krag and Sebastin Buettrich, “Wireless Mesh Networking”, O’Reilly Publishers, 2007.

3. Carlos De Morais Cordeiro, Dharma Prakash Agarwal, "Adhoc and Sensor Networks: Theory and Applications", World Scientific Publishing Company Private Limited, 2006.

COURSE OUTCOMES:

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

1. Implement Routing in cellular and Ad Hoc Networks
2. Estimate quality of service in Mobile ad hoc and wireless sensor networks
3. Analyze Energy Management in mobile and wireless sensor networks
4. Gain knowledge about architecture standards, recent trends in sensor networks
5. Design hybrid wireless networks

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	-	3	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-	3	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-

09PExxx	**GIS AND REMOTE SENSING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the students to the basic concepts and principles of various components of remote sensing.
- To provide an exposure to Geographic Information System (GIS) and its practical applications.
- To understand the nature of remote sensing data and techniques for data entry, storage and processing.

Unit–I

EMR and its Interaction with Atmosphere & Earth Material: Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan–Boltzman and Weins Displacement Law – Atmospheric scattering, absorption – Atmospheric windows –

spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

Unit–II

Platforms and Sensors: Types of platforms – orbit types, Sun–synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

Unit–III

Image Interpretation And Analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

Unit–IV

Geographic Information System: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS softwares – Data type-Spatial and Non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

Unit–V

Data Entry, Storage And Analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

TEXT BOOKS

1. Lillesand,T.M., Kiefer, R.W. and J.W.Chipman. “Remote Sensing and Image Interpretation” 5th Edition., John Willey and Sons Asia Pvt. Ltd., New Delhi, 2004.
2. Anji Reddy, M. “Textbook of Remote Sensing and Geographical Information System” 2nd edition. BS Publications, Hyderabad, 2001.

REFERENCES

1. Lo. C.P. and A.K.W.Yeung, “Concepts and Techniques of Geographic Information Systems”, Prentice Hall of India Pvt. Ltd., New Delhi, 2002
2. Peter A. Burrough, Rachael A. McDonnell, “Principles of GIS”, Oxford University Press, 2000.
3. Ian Heywood “An Introduction to GIS”, Pearson Education Asia, 2000.

COURSE OUTCOMES:

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

1. Cognize the spectral signature concepts and spectral reflective characteristics of water.
2. Perform analysis of images and apply suitable interpretation technique.
3. Process and analyze spatial and attribute data for preparing theoretic maps.
4. Design solutions for complex problems such as GIS highway alignment.
5. Formulate and solve the problems using modern tools and techniques.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	3	-
CO3	-	3	-	2	-	-	-	-	-	-	-	-	-	3	-
CO4	-	2	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	2	-	-	-	3	-	-	-	-	-	-	-	-	3	-

09PExxx	**GRID AND CLOUD COMPUTING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

The student should be made to:

- Understand how Grid computing helps in solving large scale scientific problems
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing
- Learn how to program the grid and the cloud
- Understand the security issues in the grid and the cloud environment

Unit–I

Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers – Grid computing Infrastructures– cloud computing – service oriented architecture-Introduction to Grid Architecture and standards–Elements of Grid – Overview of Grid Architecture.

Unit–II

Introduction to Open Grid Services Architecture(OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

Unit–III

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software-Pros and Cons of cloud computing–Implementation levels of virtualization–virtualization structure-Virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

Unit–IV

Open source grid middleware packages – Globus Toolkit (GT4) Architecture, Configuration – Usage of Globus – Main components and Programming model – Introduction to Hadoop Framework – Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job –Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

Unit–V

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure-Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TEXT BOOKS

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, “Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.
2. Jason Venner, “Pro Hadoop– Build Scalable, Distributed Applications in the Cloud”, A Press, 2009.

REFERENCES

1. Tom White, “Hadoop The Definitive Guide”, First Edition. O’Reilly, 2009
2. Bart Jacob (Editor), “Introduction to Grid Computing”, IBM Red Books, Vervante, 2005
3. Ian Foster, Carl Kesselman, “The Grid: Blueprint for a New Computing Infrastructure”, 2nd Edition, Morgan Kaufmann.
4. Frederic Magoules and Jie Pan, “Introduction to Grid Computing” CRC Press, 2009.
5. Daniel Minoli, “A Networking Approach to Grid Computing”, John WileyPublication,2005.
6. Barry Wilkinson, “Grid Computing: Techniques and Applications”, Chapman and Hall, CRC, Taylor and Francis Group, 2010.

COURSE OUTCOMES

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

1. Apply grid computing techniques to solve large scale scientific problems.
2. Introduce the concept of virtualization.
3. Use the grid and cloud tool kits.
4. Configuring the various Grid Packages.
5. Authenticating the Security Methods.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	-	2	-	-	1	-	-	-	-	-	-	2	-
CO3	3	-	3	2	1	-	2	-	1	-	-	-	3	-	-
CO4	3	-	2	1	-	1	-	-	-	-	-	-	1	-	-
CO5	-	2	1	3	-	1	-	1	-	-	-	-	-	1	-

09PExxx	**NATURAL LANGUAGE PROCESSING**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To familiarize the students with the basic concepts involved in Natural Language Processing.
- To impart knowledge on Speech Recognition, and Hidden Markov model.
- To educate about part-of-speech tagging and parsing with context free grammars.
- To inculcate knowledge on feature structures and predicate calculus.
- To enable the student to learn semantic analysis and language generation.

Unit–I

Natural Languages – Language and grammar – Understanding Indian Languages – NLP applications – Information Retrieval –Introduction to language modelling – Various grammar based Language Models – Statistical language model – Regular expressions – Finite state Automata – Morphology and finite state transducers.

Unit–II

N–gram models of syntax – Counting words – Unsmoothed N–grams – Smoothing – Back off – Deleted Interpolation – Entropy – Speech Recognition – Speech Recognition architecture-Hidden Markov models – Prosody and Intonation.

Unit–III

Word classes and Part–of–Speech Tagging – Tagsets – Transformation based tagging – Context free rules and trees – The noun phrase-Co-ordination – Verb phrase-Finite state and context free grammars – Parsing with context free grammars – Top down parsing – Bottom up parsing – Problems with top and Bottom up parsing – The Earley algorithm.

Unit–IV

Feature structures – Implementing unification – Unification constraints – Probabilistic context free grammars – Problems – Lexicalized context free grammars – Dependency grammars – Human parsing – Representing meaning – First order predicate calculus.

Unit–V

Semantic analysis – Attachments – Idioms – Compositionality – Robust semantic analysis – Lexical semantics – Introduction to Language Generation – An Architecture for generation – Different methods of Machine Translation.

TEXT BOOKS

1. Daniel Jurafsky and James H Martin, ”Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, Pearson Education, Eighth Edition, 2012.
2. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.

REFERENCE BOOKS

1. Miechael W. Berry, “Survey of Text Mining: Clustering, Classification and Retrieval Systems”, Springer Verlilag, 2003.
2. James Allen, Bejamin/cummings, “Natural Language Understanding”, 2nd edition, 1995.
3. C. Manning and H.Schutze, “Foundation of Stastical Natural Language Processing, MIT Press. Cambridge, MA: May 2000.
4. Bharati A., Chaitanya V and Sangal R, "Natural Language processing: A Paninian Perspective", Prentice Hall of India, 1993.

5. Nitin Indurkhya and Fred J. Damerau, "Handbook of Natural Language Processing", 2nd edition, Chapman & Hall/Crc: Machine Learning & Pattern Recognition, CRC press, Feb 2010.

COURSE OUTCOMES

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

1. Summarize the basic concepts involved in Natural Language Processing.
2. Analyze the techniques involved in speech recognition.
3. Construct part-of-speech tagging and parsing with context free grammars.
4. Elaborate about feature structures and predicate calculus.
5. Examine the perception related to semantic analysis and language generation.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	1	-	-	-	-	-	-	-	-	-	3	3	-
CO2	3	2	1	-	1	-	-	-	-	-	-	-	3	3	2
CO3	2	1	2	2	1	-	-	-	-	-	-	-	3	3	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO5	1	2	1	-	1	-	-	-	-	-	-	-	2	2	-

PROFESSIONAL ELECTIVES LAB

09PExxx	JAVA AND WEB DESIGN LAB	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

- To learn the basic syntax and semantics of the Java language and programming environment
- To design a webpage.
- To develop webpage using scripting.

LIST OF EXERCISES

1. A program to display total marks of five students.
2. A program to find a largest and smallest number in an array.
3. A program for menu based shopping.
4. A program to inherit three classes.
5. A program to create a package for book details.
6. A program for Exception handling.
7. A program for multithreading concept.
8. A program to create a text file.
9. To create a simple HTML page using different tags.
10. To create a webpage for the use of predefined functions.
11. To demonstrate exception handling in JavaScript.
12. To display an E-calendar using JavaScript.
13. To design a webpage to validate registration form.
14. To develop a webpage for cookies using ASP.
15. To create a simple servlet program to display the date.
16. To create a CD catalog using XML.

COURSE OUTCOMES

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

1. Understanding concepts and basics of Java programming.
2. Write programs and design a website using HTML.
3. Design GUI using applets/Swing and write events to handle it.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	1	2	-	-	-	-	-	-	2	2	2	-
CO2	3	3	2	1	2	-	-	-	-	-	-	2	2	3	-
CO3	2	2	-	1	1	-	-	-	-	-	-	2	2	3	-

09PExxx	**PERL PROGRAMMING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To design and create effective reusable Perl script that could be run on UNIX, Linux and Windows OS.
- To understand the concept of Perl Programming features.
- Execute programs from Perl environment and process their result

LIST OF EXERCISES

1. Perl program to display the text “hello world”.
2. Addition of two numbers with and without using Command line arguments.
3. Perl program to check a number for prime or not.
4. Perl program to check a number for Armstrong or not.
5. To find average of numbers using Function. (call by value and return argument).
6. Recursive function to find factorial of a number.
7. Perl program for Copying content of one file to another.
8. Adding and Removing Elements in an Array.
9. Perl script to send a plain message and attachment.
10. Perl code to implement a simple client–server program using Perl socket
11. Passing Radio Button Data to CGI program.
12. Perl program to accept UNIX command from a HTML form and display the output of the command execute.
13. Perl program to accept the user name and display a greeting message randomly chosen from a list of 4 greeting messages.
14. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.

15. Write a Perl program to display a digital clock which displays the current time of the server.
16. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.

COURSE OUTCOMES

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

1. Develop substantial Perl scripts, when appropriate reusing previously created scripts.
2. Design and develop input validation tests.
3. Design and develop callback functions to handle events.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO2	3	2	2	1	2	-	-	-	1	1	-	-	2	1	-
CO3	2	2	-	1	1	-	-	-	1	1	-	-	2	1	-

09PExxx	**PYTHON PROGRAMMING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, array, recursion and function calls.
- To learn how to use basic mathematical problems are evaluated and be able to manipulate text files and file operations.
- To understand the process and will acquire skills necessary to effectively attempt a programming problem and implement it with a specific programming language-Python.

LIST OF EXERCISES

1. Python Program to check if a Number is Positive, Negative or Zero.
2. Python program to check prime numbers.
3. Python Program to check Armstrong Number.
4. Python Program to Solve Quadratic Equation.

5. Python Program to Transpose a Matrix.
6. Python Program to Find the Size (Resolution) of Image.
7. Python Program to Display the Multiplication Table using FOR loop.
8. Python Program to Find ASCII Value of Character.
9. Python Program to Convert Decimal to Binary, Octal and Hexadecimal.
10. Python Program to Swap Two Variables Using Function.
11. Python Program to Display Fibonacci Sequence Using Recursion.
12. Python Program to Shuffle Deck of Cards.
13. Python Program to Merge Mails.
14. Python Program to Find Hash of File.
15. Python Program to Root search.
16. Python Program to Solving initial value problem using 4th order Runge-Kutta method.

COURSE OUTCOMES

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

1. Acquaint the latest programming language for the implementation of object based and procedure-based applications using Python.
2. Write, test, and debug simple Python programs.
3. Implement python language to develop real world complex applications.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	3	2	-	3	2	2	-	3	3	2	2
CO2	3	2	2	1	2	2	-	2	2	2	-	3	3	3	2
CO3	3	3	2	1	3	2	-	3	2	1	-	3	3	2	3

09PExxx	**OBJECT ORIENTED ANALYSIS AND DESIGN LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To study basic concepts such as types, inheritance , interfaces and know how to use them.
- To study object oriented analysis and design and its difference from structured design.
- To use UML as a Modeling and communication to and to develop applications using UML.

LIST OF EXERCISES

1. Study of UML and Notation
2. Create a UML model for Online Purchase System
3. Create a UML model for Library Management System
4. Create a UML model for E- Ticketing
5. Create a UML model for Student Mark Analyzing System
6. Create a UML model for E-Mail Client System
7. Create a UML model for Course Registration System
8. Create a UML model for Online Banking System
9. Create a UML model for Online Aptitude Test System
10. Create a system to design Bank ATM Transactions and generate code by using MS-Access as back end and VB as the front end.
11. Create a system to design Employee Payroll System and generate code by using MS-Access as back end and VB as the front end.
12. Create a systemto design a Stock Maintenances in Hospital and generate code by using MS-Access as back end and VB as the front end.
13. Create a system to design Student Performances Analysis system and generate code by using MS-Access as back end and VB as the front end.
14. Create a system to design Airline Ticket Reservation System and generate code by using MS-Access as back end and VB as the front end.
15. Create a system to design Quiz System and generate code by using MS-Access as back end and VB as the front end.

COURSE OUTCOMES

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

1. Identify software requirements using UML modelling.
2. Design software models using UML.
3. Develop software applications using UML.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**		**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	3	3	-	-	-	-	-	-	-		3	-	-
CO2	3	3	3	3	3	-	-	-	-	2	2	-		-	3	-
CO3	3	3	3	3	3	-	-	-	-	2	2	-		-	3	-

09PExxx	COMPILER DESIGN AND NETWORKING LAB	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES

- To perform syntax directed translation of a high level programming language to into an executable code.
- To provide deeper insights into more advanced semantics aspects of programming languages, code generation.
- Implement aspects of Networking and their applications.

LIST OF EXERCISES

1. Implementation of Lexical Analyzer for IF Statement.
2. Implementation of Lexical Analyzer for Arithmetic Expression
3. Construction of NFA from Regular Expression
4. Construction of DFA from NFA
5. Implementation of Shift Reduce Parsing Algorithm
6. Implementation of Operator Precedence Parser
7. Implementation of Code Optimization Techniques
8. Implementation of Code Generator
9. Network Primitives.
10. (a) To Find the IP Address of Local Host
11. (b) To Find the IP Address of Remote Host
12. Implementation of Echo Server and Client Using TCP Sockets
13. Implementation of Echo Server and Client Using UDP Sockets
14. Send and Receive Message between Client and Server Using TCP
15. Send And Receive Message between Client and Server Using UDP
16. Sliding Window Protocols.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

1. Understand the Lexical Analyzer Operations.
2. Implementation of various Parsers and Code Optimization.
3. Implementation of Networking and its applications.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	2	-	2	-	-	3	2	-	-	2	-	-
CO2	3	3	2	2	-	-	2	2	3	-	-	2	-	3	-
CO3	3	2	2	2	-	-	-	-	3	2	-	-	2	-	-

09PExxx	**SOFTWARE TESTING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To provide the students with simple experiments to understand the basic aspects about the behavior of the testing techniques to detect the errors in the software
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tool

LIST OF EXERCISES

1. Write a C program for matrix multiplication to understand the causes of failures
2. Write a C program for Binary Search – Path Testing
3. Write a C program to derive test cases based on boundary value analysis
4. Write a C program for cause effect graph to check whether defect is found in the program
5. Write a C program to perform data flow testing for the given code and find out all d–use pairs
6. Write a C program to demonstrate the working of the looping constructs:
7. Write and test a program to count number of check boxes on the page checked and unchecked count using selenium tool.
8. Write and test a program to provide total number of objects present available on the page using selenium tool.
9. Write and test a program to login a specific web page using selenium tool.
10. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11. Write a Java script to develop a web page which calculates the GCD of 2 numbers using Selenium server.

12. Write and test a program to update 10 student records into table into Excel file using selenium tool.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

1. Apply the various testing techniques to test the software.
2. Able to test the applications in the specialized environment using various automation tools.
3. Evaluate the web applications using bug tracking tools and performance of the software.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	2	-	-	-	-	3	-	-	-	3	-	-
CO2	3	3	2	2	-	-	-	-	3	-	-	-	-	3	-
CO3	3	2	2	2	-	-	-	-	3	-	-	-	2	-	-

09PExxx	**GIS AND REMOTE SENSING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

- To understand the concept of geographical referencing, various types of maps.
- To test knowledge of students in geography, various geographical referencing and map types.
- To compute geometric measurements and perform spatial analysis.

LIST OF EXERCISES

1. To Study Geography, concept of geographical referencing, Applications of GIS.
2. To Study Various types of maps
3. GIS application –Program in C for finding sitting for nuclear radioactive waste
4. Disposable site.
5. GIS application – Program in C to assist in house hunting.
6. GIS application – Program in C to identify conservation zones in Zdarske Vrchy
7. To Study GIS data Model and Spatial entity

8. To study layer based and object oriented approach in building computer world.
9. To study data analysis in GIS.
10. To study data quality and GIS project management.
11. Case study –GIS project

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to

1. To prepare the different geospatial referencing, various types of maps.
2. Develop geospatial models and tools to address the social and engineering problems.
3. Compute geometric measurements and perform spatial analysis.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	2	-	-	-	-	3	-	-	-	3	-	-
CO2	3	2	2	2	-	-	-	-	3	-	-	-	-	3	-
CO3	3	3	2	2	-	-	-	-	3	-	-	-	-	3	-

09PExxx	**GRID AND CLOUD COMPUTING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

COURSE OBJECTIVES

The student should be made to:

- To apply the tool kits for grid and cloud environment.
- To understand and develop with web services/Applications in grid framework
- To design and implement a virtual machines of different configuration.
- To Learn and use Hadoop.

LIST OF EXERCISES

1. Use Globus Toolkit or equivalent and do the following:
2. Develop a new Web Service for Calculator.
3. Develop new OGSA–compliant Web Service.
4. Using Apache Axis develop a Grid Service.
5. Develop applications using Java or C/C++ Grid APIs

6. Develop secured applications using basic security mechanisms available in Globus Toolkit.
7. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.
8. Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
9. Find procedure to run the virtual machine of different configuration.
10. Check how many virtual machines can be utilized at particular time.
11. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
12. Install a C compiler in the virtual machine and execute a sample program.
13. Show the virtual machine migration based on the certain condition from one node to the other.
14. Find procedure to install storage controller and interact with it. Find procedure to set up the one node Hadoop cluster.
15. Mount the one node Hadoop cluster using FUSE.
16. Write a program to use the API's of Hadoop to interact with it.
17. Write a word count program to demonstrate the use of Map and Reduce tasks.

COURSE OUTCOMES

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

1. Apply the Concepts of grid and cloud environment.
2. Construct various web services/Applications in grid framework.
3. Design the virtual machines of different configuration.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	1	-	-	1	-	-	-	-	-	3	-	-
CO3	2	3	2	2	1	-	-	-	-	-	-	-	-	-	2

09PExxx	NATURAL LANGUAGE PROCESSING LAB	L	T	P
		0	0	3

COURSE OBJECTIVES

- To familiarize fundamental concepts in the area of natural language processing and finite state automata.
- To implement parsing techniques and to inculcate the skills on language modeling.
- To acquire knowledge to develop natural language based real world applications.

LIST OF EXERCISES

1. Write a program to construct FSA for the given word or statement.
2. Write a program to convert into a Regular Expression for the any given word.
3. Write a program to parse a sentence or any string into distinct words.
4. Write a program to count the number of given words using N–gram in a sentence.
5. Write a program to get the number of occurrences of each word in a String.
6. Write a program to implement morphological operations.
7. Write a program to implement finite state transducers.
8. Write a program to perform Simple Expression Evaluator.
9. Write a program to implement Syntactic Level Analysis.
10. Write a program to implement Semantic Analysis.
11. Write a program to implement top down parsing with Context Free Grammar.
12. Write a program to implement bottom up parsing with Context Free Grammar.
13. Write a program to implement Earley algorithm.
14. Write a program to implement Lexical semantics.

COURSE OUTCOMES

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

1. Understand approaches to syntax and semantics in NLP and Finite state automata.
2. Apply parsing techniques using context free grammar.
3. Demonstrate an ability to listen and answer the viva questions related to programming skills needed for solving real-world problems using Information Technology

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	-	-	-	-	-	3	3	-
CO2	3	3	2	-	1	-	-	-	-	-	-	-	3	3	2
CO3	2	2	-	-	-	-	-	-	-	2	-	2	3	3	2

OPEN ELECTIVES

09OExxx	ENTERPRISE RESOURCE PLANNING	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To know the basics of ERP and to understand the key implementation issues of ERP
- To know the business Modules of ERP
- To be aware of some popular products in the area of ERP
- To appreciate the current and future trends in ERP

Unit–I

ERP: Enterprise-An Overview – Basic ERP Concepts – Risks of ERP – Benefits of ERP – ERP and Related Technologies – Business Intelligence(BI) – Business Process Reengineering (BPR) – Data Warehousing – Data Mining – OLAP – SCM.

Unit–II

Implementation Challenges – Implementation Strategies – ERP Implementation Lifecycle-Implementation Methodologies – Vendors and Consultants – Contracts with Vendors – Consultants and Employees – Project Management and Monitoring – Post Implementation Activities.

Unit–III

Business Modules of an ERP Package-Finance, Manufacturing – Human Resources – Plant Maintenance-Materials Management – Quality Management – Marketing – Sales and Distribution.

Unit–IV

ERP Market Place and Market Place Dynamics – SAP AG – PeopleSoft – JD Edwards – Oracle Corporation – QAD Inc – QAD Analytics – QAD Open Technology – SSA Global – Lawson Software-Epicor – Intuitive-ERP UNIT s.

Unit–V

Turbo Charge the ERP System – Limitations of ERP Systems – Enterprise Application Integration (EAI) – ERP and E-Business – ERP, Internet and WWW – ERP and Total Quality Management – Future Directions and Trends in ERP.

TEXT BOOKS

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2008.
2. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007.

REFERENCES

1. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2012.
2. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI, New Delhi, 2003.
3. K.Ganesh, Sanjay Mohapatra, S.P.Anbu udayasankar, P.Sivakumar, "Enterprise Resource Planning: Fundamentals of Design and Implementation", Springer, 2014.

COURSE OUTCOMES:

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

1. Design and develop ERP implementation cycle.
2. Acquire awareness of core and extended modules of ERP.
3. Understand implementation challenges and strategies of ERP systems.
4. Design implementation strategies for ERP project and perform monitoring port implementation using appropriate methods and techniques.
5. Investigate the future directions and trends in ERP.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	3	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	3	-	-	2	-	-	-	-	-	-	-	-	2	-	-
CO4	1	-	3	2	-	-	-	-	-	-	-	-	-	3	-
CO5	-	2	-	3	-	-	-	-	-	-	-	-	2	-	-

09OExxx	**E- COMMERCE**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To teach the components and applications of e-commerce infrastructure
- To impart knowledge on e-commerce and web
- To provide an understanding of the design and types of Electronic Payment Systems and EDI
- To explain the concepts of Internal Information Systems, Digital Library and Digital Documents

- To educate the students on On-Demand Education and Software Agents

Unit–I

E-Commerce Infrastructure: E-Commerce framework – Media Convergence-Anatomy of E-Commerce Applications – Consumer and Organization Applications – Market forces influencing the I–way – Components of the I–way – Network Access Equipment – Distribution Networks – Issues – Internet Terminology – NSFNET – Research and Education network – Internet Governance.

Unit–II

E-Commerce and Web: Architecture frame work for E- Commerce-WWW as the architecture-Hypertext publishing – Technology and Security on Web – Consumer Oriented Applications – Mercantile Process Model – Mercantile Models from the perspective of Consumer and merchants.

Unit–III

Electronic Payment Systems and EDI: Types of Electronic payment systems – Digital token based system – Smart cards – Credit card based system – Risk factors – Designing Electronic payment systems. EDI – EDI Applications in business – Legal, Security and Privacy issues – Standardization in EDI – EDI software implementation – EDI envelope-VANs – Internet based EDI.

Unit–IV

Inter organizational E-Commerce and Marketing: Internal Information Systems – Macro forces and Internal Commerce-Work–flow automation – Customization – SCM – Corporate Digital Library: Dimensions, Making a business case, Types of Digital Documents – Advertising on Internet – Charting the online marketing process – Market Research.

Unit–V

On–Demand Education and Software Agents: Computer based Education and Training – Technological Components – Digital Copyrights and E-Commerce-History of software agents – Characteristics and Properties of Agents – Technology behind the Agents – Telescript Agent Language-Safe-Tcl – Software Agents in action – SGML.

TEXT BOOKS

1. Ravi Kalakota, Andrew B. Whinston, “Frontiers of Electronic Commerce”, Paperback – Addison–Wesley Publishing Company, 1996.
2. Kenneth C. Laudon, “E-Commerce: Business, Technology”, Society– 2016 Edition 10.

REFERENCES

1. Dave Chaffey, "E-Business and E-Commerce Management: Strategy, Implementation and Practice", 2013.
2. Tharam Dillon, Elizabeth Chang, "E-Commerce: Fundamentals and Applications", Wiley publication 2007.
3. David Whiteley, "E-Commerce: Strategy, Technologies and Applications", Tata McHill 2001.

COURSE OUTCOMES

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

1. Ability to identify the business relationships between the organizations and their customers
2. Identify and analyze the construction and working principles of E-Commerce.
3. Develop and implement the Electronic Payment Systems and EDI.
4. Implement the digital library and marketing of the internal organizations.
5. Understand the suitable Computer based Education and Training.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	-	-	-	-	-	-	-	2	-	3	-	-
CO2	3	2	2	1	-	-	-	-	-	-	1	-	-	-	-
CO3	3	2	2	1	-	-	-	-	-	-	1	-	1	-	-
CO4	3	1	2	1	-	-	-	-	-	-	1	-	1	-	-
CO5	3	2	2	1	-	-	-	-	-	-	1	-	1	-	-

09OExxx	**BIOINFORMATICS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To study the fundamentals of Bio informatics technologies
- To learn principles of modern bio–informatics and to apply basic predictive methods those are common use in the field.
- To study the tools and databases applied in the field.

Unit–I

Introduction: Need for Bioinformatics technologies –Overview of Bioinformatics technologies Structural bioinformatics –Data format and processing–Secondary resources and applications –Role of Structural bioinformatics –Biological Data Integration System.

Unit–II

Data warehousing and datamining in bioinformatics: Bioinformatics data –Data warehousing architecture –data quality –Biomedical data analysis – DNA data analysis – Protein data analysis –Machine learning –Neural network architecture and applications in bioinformatics.

Unit–III

Modeling for bioinformatics: Hidden markov modeling for biological data analysis –Sequence identification –Sequence classification–multiple alignment generation – Comparative modeling –Protein modeling – genomic modeling –Probabilistic modeling – Bayesian networks –Boolean networks–Molecular modeling –Computer programs for molecular modeling.

Unit–IV

Pattern matching and visualization: Gene regulation –motif recognition –motif detection –strategies for motif etection –Visualization –Fractal analysis –DNA walk models–one dimension –two dimension –higher dimension –Game representation of Biological sequences –DNA, Protein, Amino acid sequences.

Unit–V

Microarray analysis: Microarray technology for genome expression study –image analysis for data extraction –preprocessing –segmentation –gridding –spot extraction – normalization, filtering –cluster analysis –gene network analysis –Compared Evaluation of Scientific Data Management Systems –Cost Matrix –Evaluation model –Benchmark – Tradeoffs.

TEXT BOOKS

1. Yi–Ping Phoebe Chen (Ed), “BioInformatics Technologies”, First Indian Reprint, Springer Verlag, 2007.
2. Arthur M. Lesk, “Introduction to bioinformatics”, First Edition, Oxford University Press, 2002.

REFERENCES

1. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.
2. Arthur M Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005.

3. Dan E. Krane, Michael L. Raymer, "Fundamental Concepts of Bioinformatics", First Edition, 2002.

COURSE OUTCOMES:

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

1. Understand the working principles of biological data integration systems and the role of structural bioinformatics.
2. Analyze the data warehousing architecture and measure the quality of data.
3. Apply machine learning techniques for protein and DNA data analysis.
4. Utilize pattern matching and modern data visualization tools and techniques for fractal analysis.
5. Apply micro array technology for genomic expression study.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	3	-	2	-	-	-	-	-	-	-	-	-	3	-
CO3	-	2	-	-	3	-	-	-	-	-	-	-	-	3	-
CO4	1	2	-	-	3	-	-	-	-	-	-	-	-	3	-
CO5	-	2	-	-	3	-	-	-	-	-	-	-	-	-	3

09OExxx	**SUPPLY CHAIN MANAGEMENT**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the importance of major decisions in supply chain management
- To present the vision of supply chain management and their role in enterprise competitiveness
- To appreciate the current trends in SCM

Unit–I

Supply Chain – Fundamentals –Evolution– Role in Economy – Importance-Decision Phases – Supplier– Manufacturer–Customer chain – Enablers/ Drivers of Supply Chain Performance –Supply chain strategy – Supply Chain Performance Measures.

Unit–II

Outsourcing – Make Vs buy – Identifying core processes – Market Vs Hierarchy – Make Vs buy continuum – Sourcing strategy: Portfolio Approach – Reconfiguration of the Supply Base –Impact of the internet on Sourcing Strategy.

Unit–III

Distribution Network Design – Role-Factors Influencing Distribution Network Design – Design Option for a Distribution Network – E-Business and the Distribution Network – Network Design in Supply Chain – Role-Factors Influencing Network Design Decisions – Framework for Network Design Decisions – Impact of uncertainty on Network Design.

Unit–IV

Demand Forecasting in a Supply Chain – The Role of Forecasting in a Supply Chain – Characteristics – Components – Risk Management in Forecasting – Managing Economies of Scale in a Supply Chain – RolE-Economies of Scale to Exploit Fixed Costs – Estimating Cycle Inventory– Managing supply chain cycle inventory – Uncertainty in the supply chain.

Unit–V

Supply Chain Integration – Building partnership and trust in SC Value of Information: Bullwhip Effect – Effective forecasting – Coordinating the supply chain – SC Restructuring – SC Mapping – SC process restructuring, Postpone the point of differentiation – IT in Supply Chain – Agile Supply Chains –Reverse Supply chain – Agro Supply Chains.

TEXT BOOKS

1. Janat Shah, “Supply Chain Management – Text and Cases”, Pearson Education, 2009.
2. Sunil Chopra and Peter Meindl, “Supply Chain Management–Strategy Planning and Operation”, PHI Learning / Pearson Education, 2007.

REFERENCES

1. Ballou Ronald H, “Business Logistics and Supply Chain Management”, Pearson Education, 5th Edition, 2007.
2. David Simchi–Levi, Philip Kaminsky, Edith Simchi–Levi, “Designing and Managing the Supply Chain: Concepts, Strategies, and Cases”, Tata McGraw–Hill, 2005.
3. Altekar Rahul V, “Supply Chain Management–Concept and Cases”, PHI, 2005.
4. Shapiro Jeremy F, “Modeling the Supply Chain”, Thomson Learning, Second Edition, 2006.

5. Joel D. Wisner, G. Keong Leong, Keah–Choon Tan, “Principles of Supply Chain Management– A Balanced Approach”, South–Western, Cengage Learning, 2008.

COURSE OUTCOMES:

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

1. Understand the role of supply chain economy and perform analysis on the drivers of supply chain performance.
2. Design supply chain strategies and measure its performance.
3. Identify core processes of SCM and investigate the impact of the internet on the SCM.
4. Forecast the demand in SCM and Conduct investigation to manage risks in forecasting.
5. Coordinate restructure and utilize modern it tools in supply chain.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	3	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	3
CO4	2	2	-	-	3	-	-	-	-	-	-	-	-	3	-
CO5	2	1	-	-	3	-	-	-	-	-	-	-	3	-	-

09OExxx	**CYBER FORENSICS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the fundamental concepts of Computer Forensics.
- To familiarize the methods and technologies used to capture and analyze Forensics Data
- To investigate the electronic evidence and threats including military, terrorist, rogues and private companies
- To study about information warfare and the measures taken to reduce the crime
- To study the tools and tactics associated with Cyber Forensics

Unit–I

Introduction: Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Computer Forensics Systems – Vendor and Computer Forensics Services.

Unit–II

Computer forensics evidence and capture: Data Recovery – Evidence Collection and Data Seizure-Duplication and Preservation of Digital Evidence-Computer Image Verification and Authentication.

Unit–III

Computer forensic analysis: Discover of Electronic Evidence-Identification of Data – Reconstructing Past Events – Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies.

Unit–IV

Information warfare: Arsenal – Surveillance Tools – Hackers and Theft of Components – Contemporary Computer Crime-Identity Theft and Identity Fraud – Organized Crime &Terrorism – Avenues Prosecution and Government Efforts – Applying the First Amendment to Computer Related Crime-The Fourth Amendment and other Legal Issues.

Unit–V

Computer forensic cases: Developing Forensic Capabilities – Searching and Seizing Computer Related Evidence –Processing Evidence and Report Preparation – Future Issues.

TEXT BOOKS

1. John R. Vacca, “Computer Forensics: Computer Crime Scene Investigation”, Cengage Learning, 2nd Edition, 2005. (CHAPTERS 1 – 18). (UNIT I – IV)
2. Marjie T Britz, “Computer Forensics and Cyber Crime: An Introduction”, Pearson Education, 2nd Edition, 2008. (CHAPTERS 3 – 13). (UNIT IV – V)

REFERENCES

1. Marie-Helen Maras, “Computer Forensics: Cybercriminals, Laws, and Evidence”, Jones & Bartlett Learning; 2nd Edition, 2014.
2. Chad Steel, “Windows Forensics”, Wiley, 1st Edition, 2006.
3. Majid Yar, “Cybercrime and Society”, SAGE Publications Ltd, Hardcover, 2nd Edition, 2013.
4. Robert M Slade, “Software Forensics: Collecting Evidence from the Scene of a Digital Crime”, Tata McGraw Hill, Paperback, 1st Edition, 2004.

COURSE OUTCOMES:

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

1. Understand the fundamental concepts and technologies related to computer forensics
2. Identify the methodologies related to forensics data capture and evidence processes
3. Classify the Threats and Tactics in Cyber Security and Computer Forensic Investigations
4. Understand the legal issues involved in computer related crime
5. Examine the techniques used in processing digital evidence and report preparation

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	1	-	-	-	-	-	-	2	-	3	-
CO2	2	2	1	-	1	-	-	-	-	-	-	-	-	3	-
CO3	-	2	-	-	-	1	-	-	-	-	-	-	-	3	-
CO4	-	1	-	-	1	2	-	-	-	-	-	-	-	3	-
CO5	2	2	-	-	1	-	-	-	-	-	-	2	-	3	-

09OExxx	**SYSTEM MODELING AND SIMULATION**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the basic system concept and definitions of system.
- To understand the system concept and apply functional modeling method to model the activities of a static system.
- To understand the behavior of a dynamic system and create an analogous model for a dynamic system.
- To understand simulate the operation of a dynamic system and make improvement according to the simulation results.

Unit–I

Introduction – Simulation Terminologies– Application areas – Model Classification – Types of Simulation – Steps in a Simulation study– Concepts in Discrete Event Simulation – Monte Carlo Simulation – Simulation Examples.

Unit–II

Statistical Models – Concepts – Discrete Distribution– Continuous Distribution – Poisson Process– Empirical Distributions– Queueing Models – Characteristics– Notation – Queueing Systems – Markovian Models– Properties of random numbers– Generation of Pseudo Random numbers– Techniques for generating random numbers–Testing random number generators– Generating Random–Variates– Inverse Transform technique Acceptance- Rejection technique-Composition and Convolution Method.

Unit–III

Input Modeling – Data collection – Assessing sample independence-Hypothesizing distribution family with data – Parameter Estimation – Goodness–of–fit tests – Selecting input models in absence of data– Output analysis for a Single system – Terminating Simulations – Steady state simulations.

Unit–IV

Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

Unit–V

Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques – Development of Simulation models – Simulation Project Management.

TEXT BOOKS

1. Banks J and John Carson, “Discrete Event System Simulation”, Pearson Education, 2010.
2. Geoffrey Gordon, “System Simulation”, Second Edition, PHI, 2006.

REFERENCES

1. Kelton, WD, Sadowski, R, Zupick, Simulation with Arena, McGraw–Hill, 2014.
2. Frank L. Severance, “System Modeling and Simulation”, Wiley, 2001.
3. Averill M. Law and W.DavidKelton, “Simulation Modeling and Analysis, Third Edition, McGraw Hill, 2006.
4. Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, Wiley, 1998.
5. Altiok, T, Melamed, B, Simulation Modeling and Analysis with Arena, Academic Press, 2007.

COURSE OUTCOMES:

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

1. Acquiring knowledge of Simulation Terminologies and Classification
2. Familiarizing the idea of Mathematical Models
3. Familiarizing of Simulation Data
4. Gaining experience skills on Verification and Validation of Simulation Models
5. Familiarizing on Simulation Tools and Simulation Project Management

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	2	-	3	-	-	-	-	-	-	-	-	3	-
CO2	1	-	3	-	3	-	-	-	-	-	-	-	-	3	-
CO3	3	-	3	-	3	-	-	-	-	-	-	-	-	3	-
CO4	2	2	1	-	3	-	-	-	-	-	-	-	-	3	-
CO5	2	2	1	-	3	-	-	-	-	-	-	-	-	3	-

09OExxx	DATA ANALYTICS	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To introduce fundamental techniques and tools required for data analytics.
- To learn basic tools for statistical analysis, R, and key methods used in machine Learning
- To learn the architecture of Hadoop and develop MapReduce programs for parallel processing using Hadoop.
- To introduce various techniques for documentation and data visualization.
- To analyze real world data using the data analytics tools and techniques learnt so far.

Unit–I

Introduction: Data science process – roles, stages in data science project – State of the practice in analytics – Role of data scientists – Key roles for successful analytic project – Main phases of life cycle-Working with data from files – Exploring data – Managing data – Cleaning and sampling for modeling and validation – Challenges of conventional systems – Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools. Introduction to Big Data Platform – Big Data and its importance, Five Vs. Drivers for Big data, Big data analytics, Big data applications.

Unit–II

R Programming: R basics – Reading and getting data into R – Ordered and unordered factors – Arrays and matrices – Lists and data frames – Reading data from files – Probability distributions – Statistical models in R – Manipulating objects – Data distribution – Simple programs using R.

Unit–III

Map Reduce: Introduction – Distributed file system – Algorithms using map reduce, Matrix–Vector Multiplication by Map Reduce-Hadoop – Understanding the Map Reduce architecture-Writing Hadoop MapReduce Programs – Loading data into HDFS – Executing the Map phase-Shuffling and sorting – Reducing phase execution.

Unit–IV

Data Analysis Techniques: Linear and logistic regression modeling – Naïve Baye's classifier – Support vector machine-Neural networks – Principal component analysis – Linear Discriminant Analysis – Decision Trees – Fuzzy logic – Clustering Techniques : Hierarchical, agglomerative, K– Means – Associative Rule Mining.

Case Studies: Social Network Analysis – Text analysis –Marketing analysis.

Unit–V

Data Visualization: Documentation and deployment – Producing effective presentations – Introduction to graphical analysis – plot() function – Displaying multivariate data – Matrix plots – Multiple plots in one window – Exporting graph – Using graphics parameters – Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications.

TEXT BOOKS

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
2. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.

REFERENCES

1. Mark Gardener, “Beginning R – The Statistical Pr ogramming Language”, John Wiley & Sons, Inc., 2012.
2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, 2015.
3. David Hand, Heiki Mannila, Padhria Smyth, “Principles of Data Mining”, PHI 2013.
4. Nathan Yau, “Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics”, Wiley, 2011.
5. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “Practical Data Science Cookbook”, Packt Publishing Ltd., 2014.
6. V.K. Jain, “Big Data and Hadoop”, Khanna Publishing House.
7. V.K. Jain, “Data Science and Analytics”, Khanna Publishing House.

COURSE OUTCOMES:

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

1. Understand the importance and fundamental concepts of data analytics.
2. Use R programming language to develop data analytics based applications.
3. Develop Map Reduce modules on Hadoop framework.
4. Apply various machine learning techniques to process data and convert hypotheses and data into actionable predictions.
5. Document and transfer the results, and effectively communicate the findings using visualization techniques.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	3	3	3	3	-	-	-	-	-	-	-	-	3	-
CO3	3	3	3	3	3	-	-	-	-	-	-	-	-	-	3
CO4	1	3	3	3	3	2	2	-	-	-	-	-	-	-	3
CO5	1	3	3	3	3	2	2	-	-	-	-	-	-	-	3

09OExxx	SOCIAL NETWORK ANALYTICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the concept of semantic web and related applications
- To learn knowledge representation using ontology
- To understand human behavior in social web and related communities
- To learn visualization of social networks

Unit–I

Introduction – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web–based networks – Applications of Social Network Analysis

Unit–II

Ontology–based knowledge Representation –Resource Description Framework – Web Ontology Language–Modeling and aggregating social network data: State–of–the–art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships – Aggregating and reasoning with social network data – Advanced representations.

Unit–III

Extracting evolution of Web Community from a Series of Web Archive–Detecting communities in social networks – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for

detecting communities social network infrastructures and communities – Decentralized online social networks

Unit–IV

Understanding and predicting human behaviour for social communities – User data management – Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness – Privacy in online social networks – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

Unit–V

Graph theory – Centrality – Clustering –Node–Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix–based representations – Matrix and Node–Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare–Collaboration networks – Co–Citation networks.

TEXT BOOKS

1. Borko Furht, "Handbook of Social Network Technologies and Applications", Springer, 1st Edition, 2010.
2. Peter Mika, "Social Networks and the Semantic Web", Springer, First Edition, 2007.

REFERENCES

1. Guandong Xu, Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", Springer, First Edition, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé –Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

COURSE OUTCOMES

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

1. Know basic notation and terminology used in network science
2. Work on the internals components of the social network
3. Model and visualize the social network
4. Understand the behaviour of the users in the social network

5. Predict the possible next outcome of the social network

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	2	1	1	1	1	2	1	1	2	2	2
CO2	3	3	2	2	2	1	1	1	1	1	1	1	2	1	1
CO3	3	2	2	2	2	1	1	1	1	2	1	1	2	2	2
CO4	2	2	2	2	2	1	1	1	1	2	1	2	2	2	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1

09OExxx	**SOFT COMPUTING TECHNIQUES**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- Learn the various soft computing frameworks
- Be familiar with the design of various Neural Networks
- Be exposed to Fuzzy Logic
- Learn Genetic programming and Hybrid Systems.

Unit–I

Artificial neural network: Introduction, characteristics– learning methods – taxonomy – Evolution of neural networks– basic models – important technologies – Applications. Fuzzy logic: Introduction – Crisp sets– Fuzzy sets – Crisp relations and Fuzzy relations: Cartesian product of relation – Classical relation, Fuzzy relations, Tolerance and Equivalence relations, Non-iterative fuzzy sets. Genetic algorithm– Introduction – Biological background – Traditional optimization and Search techniques – Genetic basic concepts.

Unit–II

ANS and BPN: Network inputs and outputs – Feedback interconnections and network stability – Feed forward networks – Adaptive networks – Supervised and Unsupervised learning – Back Propagation Network – Approach – Operation – Generalized Delta RulE-Update of output – Layer weights – Updates of hidden layer weights – Training data – Network sizing – Weights and Learning Parameters – BPN Applications – Data compression.

Unit–III

Membership functions: Features, Fuzzification, methods of membership value assignments– Defuzzification: Lambda cuts – Methods – Fuzzy arithmetic and fuzzy measures: Fuzzy arithmetic – Extension principle-Fuzzy measures – Measures of fuzziness –Fuzzy integrals – Fuzzy rule base and approximate reasoning : Truth values and tables, Fuzzy propositions, formation of rules– Decomposition of rules, Aggregation of fuzzy rules, Fuzzy reasoning–Fuzzy inference systems-Overview of fuzzy expert system–Fuzzy decision making.

Unit–IV

Genetic algorithm : Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

Unit–V

Neuro–fuzzy hybrid systems – Genetic Neuro Hybrid systems – Genetic fuzzy hybrid and Fuzzy genetic hybrid systems – Simplified fuzzy ARTMAP – Applications: A fusion approach of Multispectral images with SAR, Optimization of Traveling Salesman Problem using Genetic Algorithm approach, Soft computing based hybrid fuzzy controllers.

TEXT BOOKS

1. J.S.R. Jang, C.T. Sun and E. Mizutani, “Neuro–Fuzzy and Soft Computing”, PHI/Pearson Education 2004.
2. S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", Wiley India Pvt. Ltd., 2011.

REFERENCES

1. S. Rajasekaran and G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications", Prentice-Hall of India Pvt. Ltd., 2006.
2. David E. Goldberg, “Genetic Algorithm in Search, Optimization and Machine Learning” Pearson Education India, 2013.
3. James A. Freeman, David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Education India, 1991.
4. George J. Klir, Ute St. Clair, Bo Yuan, “Fuzzy Set Theory: Foundations and Applications” Prentice Hall, 1997.
5. Simon Haykin, “Neural Networks Comprehensive Foundation” Second Edition, Pearson Education, 2005.

COURSE OUTCOMES:

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

1. Apply the concepts of neural network and fuzzy logic in traditional optimization and search techniques
2. Train the types of networks in various applications
3. Analyze the concepts of fuzzy logic systems
4. Apply genetic algorithm in various applications
5. Apply the optimization techniques in various fields

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO2	-	2	2	2	2	-	-	-	-	-	-	-	-	-	2
CO3	3	-	2	2	2	-	-	-	-	-	-	-	2	-	-
CO4	-	-	3	3	3	-	-	-	1	-	2	2	-	-	3
CO5	3	-	3	3	3	1	-	-	3	1	2	2	-	-	3

09OExxx	**KNOWLEDGE MANAGEMENT**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the basic concepts of knowledge management.
- To explain the knowledge management system life cycle.
- To facilitate knowledge capturing.
- To demonstrate about codification of knowledge.
- To illustrate about knowledge transfer and sharing.

Unit–I

Knowledge Management: KM Myths – KM Life Cycle-Understanding Knowledge-Knowledge, intelligence –Experience-Common Sense-Cognition and KM – Types of Knowledge-Expert Knowledge-Human Thinking and Learning.

Unit–II

Knowledge Management System Life Cycle : Challenges in Building KM Systems – Conventional vs KM System Life Cycle (KMSLS)– Knowledge Creation and

Knowledge Architecture - Nonaka's Model of Knowledge Creation and Transformation– Knowledge Architecture.

Unit–III

Capturing Knowledge: Evaluating the Expert – Developing a Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge-Knowledge Capturing Techniques – Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid–Concept Mapping – Black boarding.

Unit–IV

Knowledge Codification: Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer's Skill Set – System Testing and Deployment – Knowledge Testing –Approaches to Logical Testing – User Acceptance Testing – KM System Deployment Issues – User Training – Post Implementation.

Unit–V

Knowledge Transfer And Sharing: Transfer Methods – Role of the Internet – Knowledge Transfer in E-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence-Decision Making Architecture-Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

TEXT BOOKS

1. Elias. M. Award & Hassan M. Ghaziri, "Knowledge Management" , Pearson Education, Second Edition, 2008.
2. Stuart Barnes, "Knowledge Management Systems – Theory and Practice", Cengage Learning, 2002.

REFERENCES

1. Guus Schreiber, Hans Akkermans, AnjoA njewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Universities Press, Second Edition, 2001.
2. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbooks on Information Systems, Vol. 1 and 2, 2003.
3. Irma Becerra Fernandez, Rajiv Sabherwal, "Knowledge Management: Systems and Processes", Routledge, Second Edition, 2015.

COURSE OUTCOMES:

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

1. Understand about knowledge management system
2. Build knowledge management systems and architecture
3. Develop systems for capturing knowledge

4. Implement knowledge codification, testing and deployment
5. Implement knowledge transfer and sharing in E-world using KM tools and protocols

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	-	2	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO5	3	3	3	3	2	-	-	-	-	-	-	-	-	3	-

09OExxx	**PROJECT MANAGEMENT**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the basics of software project management.
- To facilitate assessment analysis of projects.
- To illustrate about project scheduling.
- To enable the students to learn about managing software project contracts.
- To expose about organizational behavior.

Unit–I

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

Unit–II

Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

Unit–III

Objectives – Project Schedule-Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

Unit–IV

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value-Priortizing Monitoring – Getting Project Back To Target –

Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

Unit–V

Introduction – Understanding Behaviour – Organizational Behaviour: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TEXT BOOKS

1. Bob Hughes, Mike Cotterell, Rajib Mall "Software Project Management", Fifth Edition, Tata McGraw Hill, 2011.
2. Gopalaswamy Ramesh, "Managing Global Software Projects", Tata McGraw Hill, New Delhi, 2006.

REFERENCES

1. Pankaj Jalote, "Software Project Management in Practice", Pearson Education, reprinted 2009.
2. Walker Royce, "Software Project Management", Pearson Education, 2002.
3. Kelkar SA, "Software Project Management", PHI Learning, New Delhi, 2013.

COURSE OUTCOMES:

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

1. Understand the basic concepts and issues of software project management
2. Apply project assessment, cost benefit analysis, risk evaluation
3. Implement and schedule the software projects and create project plans
4. Develop framework for monitoring and managing projects
5. Manage people and groups by understanding behavior, providing leadership etc

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	3	3	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	3	-	3	-
CO4	2	2	2	2	-	-	-	-	-	-	-	3	-	3	-
CO5	-	-	-	-	-	2	-	2	3	3	-	-	-	-	3

09OExxx	PRODUCT DESIGN	L	T	P	C
		4	0	0	3

COURSE OBJECTIVES

- To introduce the fundamentals of product design.
- To familiarize the students about how to identify customer needs and product specifications
- To train in product development and design.
- To guide the students in estimating product costs.
- To train in product quality control and reliability procedures.

Unit–I

Introduction: Significance of product design– challenges of product design– product design and development process–sequential engineering design method– the challenges of product development– Identifying opportunities evaluate and prioritize projects– allocation of resources.

Unit–II

Identifying customer needs and product Specifications: Competitor and customer – behavior analysis– understanding customer–involve customer in development and managing requirements–Interpret raw data in terms of customers need–organize needs in hierarchy – establish the relative importance of needs–Establish target specifications– setting final specifications .

Unit–III

Product Development: Detailed design– Analysis and modeling– Best practices for detailed design– Design analysis–Prototypes in Detailed Design–Test and Evaluation– Design review, prototyping–simulation and testing–manufacturing–strategies–planning and methodologies.

Unit–IV

Costs for product Development**:** Sources of funds for development cost – product costs– Estimating product costs– kinds of cost procedures– value Engineering– Cost reduction.

Unit–V

Quality Control and reliability: Quality control procedure-Inspection and test equipment–statistical quality control–manufacturing reliability– probability of tool reliability–reliability operations–developing a quality–control and reliability programme**.**

TEXT BOOKS

1. Karl Ulrich, Steven Eppinger, “Product Design and Development”, Tata McGraw Hill, 6th Edition, 2015
2. Alex Milton, Paul Rodgers, “Product Design”, Laurence King Publishing, 2011

REFERENCES

1. Niebel B.W and Draper A.B., "Product design and process Engineering", McGraw Hill Book Company, New York, 1974.
2. Stephen C. Armstrong, "Engineering and product development management – the holistic Approach", Cambridge University press, 2005.
3. Zaidi. A., "SPC Concepts–Methodologies and Tools", Prentice Hall of India Pvt Ltd.,
4. Kevin Otto, "Product design", Pearson Education Limited, 2007.

COURSE OUTCOMES:

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

1. Understand the various aspects of product design including significance, challenges, process methods
2. Analyze product specifications, competitor and customer behavior analysis, setting final specifications
3. Develop knowledge about detail design prototyping simulation and testing
4. Analyze product cost, cost reduction, Value Engineering
5. Implement quality control and reliability procedures

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	2	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	2	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-	-	3	-

09OExxx	**ORGANIZATIONAL BEHAVIOUR AND MANAGEMENT**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To introduce the students to the need and importance of organizational behaviour.
- To enable the students to understand individual behaviour, personality types and attitudes.
- To introduce the students about group behaviour and group decision making.
- To demonstrate about leadership, styles and power.
- To expose the students about organization culture, climate and development.

Unit–I

Organizational Behavior: Introduction – Definition, Need and Importance of Organizational Behavior – Nature and Scope-Framework of Organizational Behavior models. Management: Introduction – Meaning and Nature of management – Management Systems and Processes – Tasks and Responsibilities of a Professional Manager – Managerial skills.

Unit–II

Individual Behavior: Personality – Types – Factors influencing personality theories. Learning: Types of learners – The learning process – Learning Theories – Organizational Behavior Modification – Misbehavior: Types – Management Intervention – Emotions: Emotional Labor – Emotional Intelligence-Theories – Attitudes: Characteristics – Components – Formation – Measurement – Values – Perceptions: Importance-Factors influencing Perception – Interpersonal Perception – Impression Management – Motivation: Importance-Types – Effects on Work Behavior.

Unit–III

Group Behavior: Organization Structure-Formation – Groups in Organizations – Influence-Group Dynamics – Group Decision making Techniques – Team Building – Interpersonal Relations – Communication – Control – Conflict Management – Nature of Conflict – Types of Conflict.

Unit–IV

Leadership and Power: Leadership – Meaning – Importance Traits – Leadership Styles – Behavioral and Contingency Theories – Leaders vs. Managers – Sources of Power – Power Centers – Organization Politics.

Unit–V

Dynamics of Organizational Behavior: Organizational Culture and Climate-Factors affecting Organizational Climate – Importance - Job Satisfaction: Determinants – Measurements – Influence on Behavior – Organizational Change: Importance-Stability Vs. Change - Proactive vs. Reaction Change-the Change Process – Resistance to Change-Managing Change-Stress: Work Stressors – Prevention and Management of Stress – Balancing Work and Life. Organizational Development: Characterizes – Objectives – Developing Gender sensitive Workspace.

TEXT BOOKS

1. Stephen P. Robbins, “Organizational Behavior”, Prentice Hall of India, Eleventh Edition, 2008.
2. Fred Luthans, “Organizational Behavior”, McGraw Hill, Eleventh Edition, 2001.

REFERENCES

1. Udai Pareek, "Understanding Organizational Behavior", Oxford Higher Education, Third Edition, 2011.
2. Mc Shane & von Glinov, "Organizational Behavior", Tata McGraw Hill, Fourth Edition, 2007.
3. Nelson, Quick, Khandelwal, "ORGB – An Innovative Approach to Learning and Teaching", Cengage learning, Second Edition, 2012.
4. Jerald Greenberg, "Behavior in Organization", PHI Learning, Tenth Edition, 2011.

COURSE OUTCOMES:

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

1. Understand the framework of organizational behaviour models
2. Identify the factors influencing personality theories learning process, emotions and attitudes.
3. Understand about team building and interpersonal skills
4. Develop leadership traits and styles
5. Develop job satisfaction, manage work stress, balancing work and life.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	-	-	-	2	-	2	2	2	2	-	-	-	2
CO2	-	-	-	-	-	2	-	2	2	3	-	2	-	-	2
CO3	-	-	-	-	-	2	-	2	2	3	-	2	-	-	3
CO4	-	-	-	-	-	2	-	2	2	3	-	2	-	-	3
CO5	-	-	-	-	-	2	-	2	2	2	-	2	-	-	2

09OExxx	**BIOLOGY FOR ENGINEERS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- The course acts as a bridge between engineering and biology to provide basic understanding of biological mechanisms of living systems from engineering perspective.
- It will illustrate the many possible means to utilize living things' relevance to engineering principles.

- With substantial knowledge and continuing interest will make a student into a specialist in the technical diversity.

Unit–I : Requirements of Biological Systems

Biological UNITs Need Water; Biological UNITs Need the Right Amount of Oxygen; Biological UNITs Need Food and Nutrients; Biological UNITs Become Ill in the Presence of Wastes; Biological UNITs Need Heat Sources and Sinks.

Unit–II : Behaviour of Biological Systems

Biological UNITs Adapt to Their Environments; Biological UNITs Modify Their Environments; Adaptations Require Extra Energy and Resources; Biological UNITs, If Possible, Move to Friendlier Environments; Biological UNITs Evolve under Environmental Pressures.

Unit–III : Response to Stress by Biological Systems

Crowding of Biological UNITs Produces Stress; Biological UNITs Are Affected by Chemical Stresses; Biological UNITs Respond to Mechanical Stresses; Optimization Is Used to Save Energy and Nutrient Resources; Biological UNITs Alter Themselves to Protect against Harsh Environments.

Unit–IV : Existence of Biological Systems

Biological UNITs Cooperate with Other Biological UNITs; Biological UNITs Compete with Other Biological UNITs; Biological UNITs Reproduce; Biological UNITs Coordinate Activities through Communication; Biological UNITs Maintain Stability with Exquisite Control; Biological Units Go through Natural Cycles; Biological UNITs Need Emotional Satisfaction and Intellectual Stimulation; Biological UNITs Die.

Unit–V : Scaling Factors and Biological Engineering Solutions

Allometric Relationships from Evolutionary Pressure; Dimensional Analysis; Golden Ratio; Fractal Scaling within an Organism; Self–Similarity for Tissues and Organs; Self–Similarity in Populations; Systems Approach; Relationships between Engineering and Biology; The Completed Design.

TEXT BOOKS

1. Arthur T. Johnson, “Biology for Engineers”, CRC Press, 2010.

REFERENCE BOOKS

1. Aydin Tözeren, Stephen W. Byers, New Biology for Engineers and Computer Scientists, Pearson/Prentice Hall, 2004.
2. S. Thyaga Rajan, N. Selvamurugan, M. P. Rajesh, R. A. Nazeer, Richard W. Thilagaraj, S. Barathi, and M. K. Jaganathan, “Biology for Engineers,” Tata McGraw Hill, New Delhi, 2012.

COURSE OUTCOMES:

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

1. Introduce the Biological UNITs.
2. Analyze the Systems to Adapt their Environments.
3. Identify the basic Stress by Biological Systems.
4. Express Other Biological UNITs.
5. Develop Scaling Factors and Biological Engineering Solutions

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	2	-	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	2	-	-	1	-	-	-	-	-	3	-	-
CO3	3	3	3	2	1	-	2	-	1	-	-	-	3	-	-
CO4	3	-	2	1	-	1	-	-	-	-	-	-	1	-	-
CO5	-	2	1	3	-	1	-	1	-	-	-	-	-	1	-

02OEXXX	**DISASTER MANAGEMENT**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- This course helps in providing the basic concepts of disasters and also gives a thorough knowledge and experience to reduce disaster risks.
- To know about Earthquake and make risk analysis to save people from Earthquake.
- To learn about Tsunami and he remedial measures.
- To learn about cyclones and preventive measures
- To acquire knowledge about costal floods.

Unit–I

Introduction – Disaster– Characteristics and types of Disasters– Causes and effects of Disaster –Risk– Vulnerability – Preparedness– Disaster mitigation and disaster management– Classification of mitigation measures–Vulnerability Analysis– Observation and Perception of Vulnerability– Socio–Economic Factors of Vulnerability– Vulnerability in India– Disaster related policy goals of UNDP UNDRO and Govt. of India– Appraising disaster needs– Needs for technical expertise- Role of various

Agencies in Disaster Management and Development –Disaster risk reduction planning– Role of Developmental Planning for disaster Management

Unit–II

Earthquake-Cause of Earthquake- General characteristics– Measuring Earthquakes– Distribution pattern of Earthquakes in India– Earthquake prone areas– case studies of important Indian earthquakes – Forecasting techniques and risk analysis– Possible risk reduction measures– earthquake resistance buildings and re-engineering techniques in India.

Unit–III

Tsunamis– Causes of a Tsunami– General Characteristics– Tsunami warning system– Distribution pattern of Tsunami in India– Possible risk reduction measures– Integrated coastal zone management.

Landslides– Rock falls– Avalanches– Mud flows and glaciers– Landslides and rock falls– landslide hazard zonation– Instrumentation and monitoring– Techniques for reducing landslide hazards.

Unit–IV

Tropical cyclones– Structure of tropical cyclones– Nature of tropical cyclones– Cyclone experience in India and Tamilnadu– Preparedness– Tropical cyclones and their warning systemS- Tropical cyclone warning strategy in India special nature of the problem in the region– Classification– Protection of buildings from cyclones of India– Precautions during and before cyclones.

Unit–V

Coastal floods– Intensification of hazards due to human interference- Management– River and coastal floods– Temperature extremes and wild fires– Physiological hazards– Flood forecasting–mitigation– planning– management– flood prone areas the Indian scenario– Flood experience in India and Tamilnadu.

Environmental hazards– Typology– Assessment and response- Strategies –The scale of disaster–Vulnerability– Disaster trends– Paradigms towards a balanced view– Chemical hazards and toxicology–Biological hazards– Risk analysis– Other technological disasters.

TEXT BOOKS

1. David R. Godschalk (Editor), Timothy Beatiey, Philip Berke, David J. Browt:r, Edward J. Kaiser Charles C. Boh, R. Matthew Goebel, *Natural Hazard Mitigation:*

Recasting Disaster Policy and Planning Island Press; (January 1999), ISBN) 559636025.

2. Sinha, P.C. *Wind & Water Driven Disasters*, 1998, 250pp, Anmol Publications

REFERENCE BOOKS

1. Davide Wikersheimer *Windstorm Mitigation Manual for Light Frame Construction*, DIANE Publishing Co: (Paperback–May 1997).
2. Brown D *Redevelopment after the Storm: Hazard Mitigation Opportunities in the Post Disater Setting.* (Paperback – June 1985) Publisher: John Wiley & Sons ISBN:047191505X.
3. Sinha, P.C. *Technological Disasters*, 1997, 516 pp Anmol Publications Trivedi.

COURSE OUTCOMES

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

1. Understand the basic concepts of disasters
2. Apply new techniques to save people from earthquakes.
3. Implement methodologies to save from Tsunami.
4. Implement carious techniques to alert and save people from cyclones.
5. To understand about floods and preventive measures.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	2	-	-	3	2	-	-		1	-	-	-	3
CO2	2	2	1	1	-	2	2	-	-	-	-	-	-	2	2
CO3	2	3	3	2	1	2	1	1	-	-	-	-	-	2	1
CO4	2	2	3	2	1	3	2	1	-	-	-	-	-	2	2
CO5	2	2	3	1	1	1	2	1	-	-	-	-	-	2	1

00OEXXX	**ENTREPRENEURSHIP**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To study about characteristics and evolution of management.
- To explore the nature of planning, decision making, delegation of authority and staffing.
- To cultivate the leadership ,motivation and communication skills.

- To develop an entrepreneurship spirit.
- To initiate on the business plan from the prospective business through EDC.

Unit–I

Meaning – Characteristics of management – Nature of management – Process of management – Functional areas of management – Management and administration – Role of management – Level of management – Evolution of management.

Unit–II

Meaning – Nature of planning – Importance of planning – Types of planning – Steps in planning – Decision making – Meaning and definition of organizing – Steps in organizing – Nature of organization – Organization structure-Purpose of organization – Principles of organization – Delegation of authority – Nature and importance of staffing.

Unit–III

Meaning and nature of direction – Principles of directing – Leadership and leadership style-Motivation – Communication – Need and feedback in communication – Importance of communication – Channels of communication – Types of communication – Forms of communication.

Unit–IV

Evolution of concept of entrepreneur – Concept of entrepreneur – Characteristics of entrepreneur – Distinction between entrepreneur and manager – Technical entrepreneur – Charms of being an entrepreneur – Types of entrepreneur – Role of entrepreneurship in economic development – Barriers in entrepreneurship.

Unit–V

Meaning of project – Project classification – Project identification – Meaning and significance of project report – Contents of a project report – Formulation of project report – Planning commission guidelines – Identification of opportunity – Project feasibility study.

TEXT BOOKS

1. Veerabhadrappahavinal, *Management and entrepreneurship*, New age International, New Delhi, 2008.
2. Peter F. Drucker; I*nnovation and entrepreneurship, B*utterworth – Heinemann, London, 1985.

REFERENCE BOOKS

1. **"***Creativity, innovation, entrepreneurship and enterprise in construction and development*", University of Reading, Alan Barrell – Entrepreneur in Residence Entrepreneur in Residence, University of Xiamen, Xiamen 2012.

2. "*Entrepreneurship Studies*", National University Commission (Nigerian University System), 2010.

COURSE OUTCOMES:

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

1. Understand the characteristics, functional areas and levels of management.
2. Plan projects, make decisions, draw organizational chart, delegate authority and recruit staff.
3. Lead by gaining knowledge about directing, leadership skills, motivation skills, communication techniques.
4. Become an entrepreneur by understanding the concept of entrepreneur and entrepreneurship.
5. Prepare project feasibility study and formulate report.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	-	-	-	1	-	1	2	-	-	-	-	-	2
CO2	-	-	-	-	-	1	-	-	2	3	-	1	-	-	2
CO3	-	-	-	-	-	1	-	-	3	3	-	3	-	-	2
CO4	-	-	-	-	-	3	3	3	3	3	3	-	-	-	3
CO5	-	-	-	-	-	3	3	3	3	3	3	-	-	-	3

00EXXX	**HUMAN RIGHTS**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand about historical and theoretical Human Rights.
- To acquire knowledge on Universal Declaration of Human Rights.
- To describe the U.N. Human Rights declaration.
- To instruct the International Human Rights in Domestic courts.
- To understand contemporary issues on Human Rights

Unit–I

Definition of Human Rights – Nature, Content, Legitimacy and Priority – Theories on Human.

Rights – Historical Development of Human Rights.

Unit–II

International Human Rights – Prescription and Enforcement upto World War II – Human Rights and the U .N .O. – Universal Declaration of Human Rights – International Covenant on Civil and Political Rights – International Convenant on Economic, Social and Cultural Rights and Optional Protocol.

Unit–III

Human Rights Declarations – U.N. Human Rights Declarations – U.N. Human Commissioner.

Unit–IV

Amnesty International – Human Rights and Helsinki Process – Regional Developments –European Human Rights System – African Human Rights System – International Human Rights in Domestic courts.

Unit–V

Contemporary Issues on Human Rights: Children's Rights – Women's Rights – Dalit's Rights – Bonded Labour and Wages – Refugees – Capital Punishment. Fundamental Rights in the Indian Constitution – Directive Principles of State Policy – Fundamental Duties – National Human Rights Commission.

TEXT BOOKS

1. Desai, A.R. Violation of Democratic Rights in India, Sage Publishers, 1986.
2. S. Hick, E. Halpin and E. Hoskins, Human Rights and the Internet, Springer Publishers, 2000.

REFERENCE BOOKS

1. International Bill of Human Rights, Amnesty International Publication, London, 1988.
2. Human Rights, Questions and Answers, UNESCO, 1982
3. Mausice Cranston– What is Human Rights
4. Timm. R.W. – Working for Justice and Human Rights.
5. Human Rights, A Selected Bibliography, USIS.
6. Cheous K (Ed) – Social Justice and Human Rights (Vols 1–7).
7. Devasia, V.V. – Human Rights and Victimology.

COURSE OUTCOMES:

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

1. Understand the role and history of human rights.
2. Realize the International covenant on Economic, Social and Cultural Rights.
3. Comprehend the United Nations Declaration towards Human Rights.

4. Learn the Human Right System in various Countries and its perspective in Domestic Courts.
5. Know the fundamental Rights of each and everyone and the Constitution of India.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	1	1	-	-	1	2	1	1	1	1	2	2
CO2	3	2	2	2	2	-	-	1	2	1	1	1	1	3	2
CO3	3	2	2	2	2	-	-	1	2	1	1	1	-	2	1
CO4	3	3	2	3	2	-	-	1	2	1	1	1	-	2	1
CO5	3	2	2	3	2	-	-	1	2	1	1	1	-	2	1

00OEXXX	**NATIONAL SERVICE SCHEME**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**3**

COURSE OBJECTIVES

- Understand the community in which they work and their relation
- Identify the needs and problems of the community and involve them in problem–solving
- Develop capacity to meet emergencies and natural disasters
- Practice national integration and social harmony and
- Utilize their knowledge in finding practical solutions to individual and community problems.

Unit–I : National Service Scheme

A) History and its Objectives

B) Organizational structure of N.S.S. at National, State, University and College Levels.

C) Advisory committee and their functions with special reference to college principal. Programme officer, N.S.S. group leader and N.S.S. volunteers in the implementation**.**

Unit–II : National Integration

A) Need of National integration

B) Various obstacles in the way of National Integration; such as caste, religion, language and provisional problems etc.

Unit–III : Special Programme

A) Legal awareness

B) Health awareness

C) First–aid

D) Career guidance

E) Leadership training – cum – Cultural Programme

F) Globalization and its Economic Social Political and Cultural impacts.

Unit–IV : Special Camping Programme

A) Nature and its objectives

B) Selection of camp site and physical arrangement

C) Organization of N.S.S. camp through various committees and discipline in the camp.

D) Activities to be undertaken during the N.S.S. camp.

E) Use of the mass media in the N.S.S. activities.

Unit–V : N.S.S. Regular Activities

A) Traffic regulation

B) Working with Police Commissioner's Office

C) Working with Corporation of Chennai

D) Working with Health Department

E) Blind assistance

F) Garments collection

G) Non-formal education

H) 'Environmental Education, Awareness and Training (EEAT)'

I) Blood donation

TEXT BOOKS

1. National Service Scheme Manual, Government of India, 2006.
2. Training Programme on National Programme scheme, TISS.

REFERENCE BOOKS

1. Orientation Courses for N.S.S. Programme officers, TISS.
2. Case material as Training Aid for field workers, Gurmeet Hans.
3. Social service opportunities in Hospitals, Kapilk. Krishan,TISS.
4. Social Problems in India, Ram Ahuja.

COURSE OUTCOMES:

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

1. Apply the services of National Service Scheme to the society
2. Classify the obstacles in National Integration
3. Develop leadership qualities.
4. Organize special camping programme.
5. Propose NSS regular activities through non-formal education

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Program Specific Outcomes (PSOs)															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	1	-	-	1	-	-	-	-	-	-	-	-	3
CO2	3	2	2	-	-	2	-	2	2	2	-	1	-	-	3
CO3	3	2	2	2	-	2	-	2	2	2	-	-	-	-	3
CO4	3	2	2	1	-	2	-	-	2	2	-	-	-	-	3
CO5	3	2	2	1	-	2	-	-	2	1	-	1	-	-	3

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