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

4. Scheme of Examinations
   The scheme of Examinations is given separately.

5. 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).

6. 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

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

Enroll 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, IChE

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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.
19. 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.

20. 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.

21. 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.

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<td>90 to 100 marks</td>
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<td>60 to 69 marks</td>
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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.

22. 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) 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.

23. 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.

24. 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-1
Diploma Programmes Eligible for the B.E (Lateral Entry) Programmes offered in FEAT (from 2017-2018)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Branches of Study</th>
<th>Eligible Diploma Programme (FT / PT / SW)</th>
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</table>
| 1.      | Civil Engineering | i. Civil Engineering  
ii. Civil Engineering(Architecture)  
iii. Environmental Engineering and Pollution Control(Full Time) |
|         | Civil and Structural Engineering | iv. Architectural Assistantship  
v. Civil Engineering (Rural Tech.)  
vi. Civil and Rural Engineering |
| 2.      | 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 |
| 3.      | Mechanical Engineering (Manufacturing Engineering) | xiv. Foundry Technology  
xv. Refrigeration and Air Conditioning  
xvi. Agricultural Engineering  
xvii. Agricultural Technology  
xviii. Marine Engineering  
xix. Mechanical Engineering(Production)  
x. Mechanical Engineering(Tool &Die)  
xx. Mechanical Engineering (Foundry)  
xxi. Mechanical Engineering(R & A.C.)  
xxii. Electronics(Robotics)  
xxiii. Mining Engineering  
xxiv. Agricultural Engineering and Farm  
xxv. Equipment Technology |
| 4.      | Electrical and Electronics Engineering | i. Electrical and Electronics Engineering  
ii. Electronics and Communication Engg. |
iv. Electronics Engineering(Instrumentation)  
v. Instrument Technology  
vi. Instrumentation and Control Engineering  
vii. Electrical Engineering (Instruments and Control)  
ix. Instrumentation Technology  
x. Electronics (Robotics)  
xi. Mechatronics Engineering |
<table>
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<tr>
<th>Sl. No.</th>
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<th>Eligible Diploma Programme (FT / PT / SW)</th>
</tr>
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| 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  
| 9.     | Information Technology | iv. Information Technology  
|        |                   | v. Computer Engineering  
|        |                   | vi. Computer Networking  
|        |                   | viii. Mechatronics Engineering  |

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

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**  
Proposed Curriculum for B.E. (Electronics and Communication Engineering)  
(2016-2017 Onwards)

### Data Summary

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


L-Lecture; T-Tutorial; P-Practical.

Exam-End Semester Examination; CA-Continuous Assessment

**THIRD SEMESTER**
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L – Lecture;  T – Tutorial;  P – Practical;  D – Drawing
Exam – End Semester Examination;  CA – Continuous Assessment.

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**ES – ENGINEERING SCIENCE**

1) Basic Electronics Engineering
2) Engineering Mechanics  
3) Solid Mechanics  
4) Construction Engineering Materials  
5) Construction Engineering  
6) Thermodynamics  
7) Material Science  
8) Fluid Mechanics and Hydraulic Machinery  
9) Particle Mechanics and Mechanical Operations  
10) Material Technology  
11) Basic Electrical Engineering  
12) Computer Programming Lab  
13) Engineering Workshop  
14) Engineering Graphics  
15) Building Drawing Lab  
16) Computer Practical – I (Building Drawing)  
17) Machine Drawing  
18) Electrical and Electronics Lab  
19) Hydraulics Lab  
20) Particle Mechanics and Mechanical Operations Laboratory  
21) Basic Electronics Engineering Lab  

**PE – PROFESSIONAL ELECTIVES**  
1) Data Structures and C++  
2) Java Programming  
3) Control Systems  
4) Digital Image Processing  
5) VLSI Design  
6) Fiber Optic Communication  
7) Radar and Navigational Aids  
8) Satellite Communication  
9) Wireless Communication  
10) Information Theory and Coding  
11) DSP Processor Architecture and Programming  
12) Mobile Adhoc Networks
13) Modern Communication Systems
14) Telecommunication Switching and Networks
15) Wavelets and Applications
16) Data Communication
17) Multimedia Compression Technology
18) Embedded Systems
19) Biomedical Signal Processing
20) Electronic Measurements and Instrumentations

**PE - LAB – PROFESSIONAL ELECTIVE LAB**

1) Data Structures and C++ Lab
2) Java Programming Lab
3) Data Communication and Networks Lab
4) VLSI Lab
5) Wireless Communication Lab
6) Networks and Lines Lab
7) Analog Integrated circuits Lab
8) Image Processing Lab

**OE – OPEN ELECTIVES**

1) Soft Computing Techniques
2) Quantitative Management Techniques
3) Network and Information Security
4) Cloud Computing
5) Biology for Engineers
6) Disaster Management
7) Entrepreneurship
8) National Service Scheme
9) Human Rights
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.
Format of memos.

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.


2) Single word substitution.

3) Concord.

4) Tag Questions.

5) Active voice and passive voice.

**TEXT BOOKS**


**REFERENCE BOOKS**


**COURSE OUTCOMES**

1) Understand the role of speaking in English and its contribution to their success.

2) Help the students increase the lingual power and word power, and frame suitable structures to use appropriately in different contexts.

3) Initiate the students to adopt different strategies for personal and professional writing.

4) Train the students use diversified rhetorical functions of technical English.

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<th>00BS102</th>
<th>ENGINEERING MATHEMATICS – I</th>
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**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


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


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

REFERENCE BOOKS

COURSE OUTCOMES
1) This course equips students to have knowledge and understanding in matrices, differential calculus, multiple integrals and Laplace transforms.
2) Students will be able to solve problems related to above fields in engineering applications.
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


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


Unit–IV : Crystal Physics


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**


**REFERENCE BOOKS**


**COURSE OUTCOMES**

1) The Engineering students can gain the basic knowledge in the field of optics, sound, nuclear physics and crystalline materials etc.

2) It will be useful to apply in engineering applications.

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<th>00BS104</th>
<th>APPLIED CHEMISTRY – I</th>
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**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 CO₂, O₂ 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**


**Unit–III : Fuels and Combustion**


**Unit–IV : Engineering Materials – I**


**Unit–V : Analytical Technique and Surface Chemistry**

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


**TEXT BOOKS**


**REFERENCE BOOKS**


COURSE OUTCOMES
At the end of the course, the student will be able to
1) Understand and develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2) Understand and apply the concepts of electrochemistry including electroplating.
3) Understand the properties, sources of fuel and the concept of combustion
4) Gain the knowledge about types of lubricants, uses & their mechanisms and to understand the binding process of adhesives, and its application in building and construction.
5) Separate and purify various organic and inorganic compounds using different chromatographic techniques.
6) Understand the concept of surface chemistry and its applications.

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<tr>
<th>00SP105</th>
<th>COMPUTER PROGRAMMING LABORATORY</th>
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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
Special Features – Dimensioning – Angular, Diameter and Radius – Hatching – Patterns – Slides – Attributes – Configuring – Plotting– Exercises in AUTOCAD (2D Drawings only)

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) Understand the concepts of C programming.
2) Apply the syntax of conditional and looping statements for writing C programs
3) Use the features of AUTOCAD for 2D drawing
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

This course

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.

SECOND SEMESTER

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 \( \nabla \).
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

REFERENCE BOOKS

COURSE OUTCOMES
1. This course equips students to have knowledge and understanding in ordinary differential equations, vector calculus and complex variables.
2. Students will be able to solve problems related to above fields in engineering applications.

<table>
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<tr>
<th>00BS202</th>
<th>APPLIED PHYSICS – II</th>
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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


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


Unit–III : Nano Materials


Unit–IV : Quantum Mechanics


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


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) The student will have the theoretical knowledge in this field of laser, dielectrics, Nano technique, energy physics etc.
2) It will be very useful to the students to apply in different field of engineering.

<table>
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<tr>
<th>00BS203</th>
<th>APPLIED CHEMISTRY - II</th>
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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
Unit–II : Phase Rule

Unit–III : Corrosion and Prevention

Unit–IV : Energy Storage Devices

Unit–V : Engineering Materials II

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of the course, the student will be able to
1) Understand the synthesis and applications of various types of polymers and moulding processes.
2) Understand the concept of phase rule and its applications, which is applicable in alloy preparation.
3) Understand the concept of corrosion and to apply the knowledge in the protection of different metals from corrosion.

4) Gain the knowledge about various energy storage devices, especially solar energy.

5) Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution.

6) Gain knowledge on classification, synthesis and applications of abrasives and refractories.

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<tr>
<th>00ES204</th>
<th>BASIC ENGINEERING (CIVIL)</th>
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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.


Unit–III


TEXT BOOKS


REFERENCE BOOKS

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.

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.
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.

TEXT BOOKS

REFERENCE BOOKS

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.

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<th>00ES204</th>
<th>BASIC ENGINEERING (MECHANICAL)</th>
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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
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.


**TEXT BOOKS**


**REFERENCE BOOKS**


**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.

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<th>00HS205</th>
<th>COMMUNICATION SKILLS AND LANGUAGE LABORATORY</th>
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**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.
3) Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
8) 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) Help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT, etc.
2) Train the students to use language effectively to face interviews, group discussions, and public speaking.
3) Initiate the students into greater use of the computer in resume preparation, report writing, format-making, etc.

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<td>00BP206</td>
<td>APPLIED PHYSICS LABORATORY</td>
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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.
12) Band gap determination of a Semiconductor.
COURSE OUTCOMES

This course
1) To determine resistivity of a given steel and brass wire.
2) To find the velocity of ultrasonic waves in a liquid.
3) To measure the thickness of a thin materials.
4) To determine the band gap of a given semiconductor.
5) Diffraction patterns can be formed by light passing through a series of fine lines.
6) Applications of opto electronic devices.

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<th>00BP207</th>
<th>APPLIED CHEMISTRY LABORATORY</th>
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COURSE OBJECTIVES

- To appreciate the practical significance of acidimetry, alkalimetry and permanganometry.
- To analye 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
- Gain knowledge in the quantitative chemical analysis of water quality related parameters, acid-base, red-ox and iodometry titrations.
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 through 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

REFERENCE BOOKS
COURSE OUTCOMES

Upon completion of this course, the students will be able to:
1) Construct, read, and understand the Title and Revision Block.
2) Usage of common drafting tools to construct engineering drawings enhances.
3) Apply dimensions on engineering drawing.
4) Ability of converting sketches to engineered drawings will increase.
5) Developing cognitive and psychomotor skills, visualize images and their dimensions.
6) Develop good communication skills and team work.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision
To provide innovative, creative and technically compliant Electronic and Communication Engineers for industry and society through excellence in Technical Education and Research.

Mission
- To provide quality education in the field of Electronics and Communication Engineering through periodically updated curriculum, effective teaching-learning process, best laboratory facilities and collaborative ventures with the industries.
- To inculcate innovative skills, research aptitude, team-work, ethical practices among students so as to meet expectations of the industry as well as society.
- To provide students with hands on training on latest technology with supporting software.
- To facilitate effective interactions among faculty and students, and foster networking with alumni, industries and other reputed institutions.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

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<th>S.No.</th>
<th>PEO</th>
<th>Objective</th>
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<tr>
<td>PEO 1</td>
<td>To prepare students to excel in undergraduate Programme and to succeed in industry / technical profession through quality education.</td>
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<td>PEO 2</td>
<td>To provide students with solid foundation in mathematics, basic science and engineering fundamentals necessary to analyze, formulate and solve problems in the field of Electronics and Communication engineering.</td>
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<td>PEO 3</td>
<td>To inculcate a strong flavor of project activities among the students and impart them with good scientific and engineering knowledge including proficiency in hardware languages, use of latest software tools, so as to analyze, design and create novel products and provide solutions to real life problems.</td>
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<td>PEO 4</td>
<td>To impart the professional and ethical attitude, effective communication and presentation skills, teamwork skills, multidisciplinary approach, and an ability to integrate engineering issues to broader social contexts to students.</td>
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<td>PEO 5</td>
<td>To provide student with an academic environment aware of excellence, outstanding leadership, written ethical codes and guidelines with moral values, and the life-long learning needed for a successful professional career.</td>
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PROGRAMME OUTCOMES (PO)

After successful completion of B.E. (Electronics and Communication Engineering) degree Programme, the graduates will be able to

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<th>S.No.</th>
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<tr>
<td>PO 1</td>
<td>Apply the knowledge of mathematics, basic science and engineering fundamentals in finding solutions to complex problems in the field of Electronics and Communication Engineering.</td>
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<tr>
<td>PO 2</td>
<td>Analyze a problem, identify and formulate the computing requirements appropriate to its solution.</td>
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<tr>
<td>PO 3</td>
<td>Capable of designing a system, component or process that meets specific needs with appropriate considerations for health, safety, societal and Environmental Issues.</td>
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<td>PO 4</td>
<td>Design and Conduct experiments as well as to analyze and interpret data.</td>
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<td>PO 5</td>
<td>Use latest simulation tools, current techniques, software and hardware skills for analyzing and obtaining solutions to Engineering Problems.</td>
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<td>PO 6</td>
<td>Possess adequate knowledge required for sustainable development, keeping in view of environmental impacts and contemporary issues.</td>
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<td>PO 7</td>
<td>Acquire strong ethical and professional responsibilities, adherence to quality and abide rules and regulations of eminent organizations or industries.</td>
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<td>PO 8</td>
<td>Competent to articulate their ideas with excellent communication skills and preparation of technical reports and capability of working productively as individuals, team members or leaders in any multidisciplinary environment.</td>
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<td>PO 9</td>
<td>Succeed in competitive examinations like Engineering Services, GATE and other Public Service Commission Exams.</td>
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Mapping of PO with PEO

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<tr>
<th>Programme Outcomes</th>
<th>Programme Educational Objectives</th>
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THIRD SEMESTER

| 00HS301 | ENVIRONMENTAL STUDIES | L | T | P |
COURSE OBJECTIVES

- To realize the importance of environment for engineering students.
- To understand the basis of ecosystems
- To make aware the student about global environmental problems and natural disasters.
- To give the ideas about advance technologies of Engineering that will useful to protect environment.

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


Unit–IV

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.


Unit-V

Field Work
Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain - Visit to a local polluted site-Urban/Rural/Industrial/Agricultural - Study of common plants, insects, birds -Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

TEXT BOOKS
2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R).

REFERENCE BOOKS
2) Clark, R.S., Marine Pollution, Claderson Press Oxford (TB)
4) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
5) Down to Earth, Centre for Science and Environment (R).
7) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).

(M) Magazine (R) Reference (TB) Textbook

COURSE OUTCOMES
At the end students can able to
1) Understand the importance of environment.
2) Analyze the importance of environment in engineering.
3) Apply their own ideas and demonstrate advanced technologies that will be useful to protect environment.
4) Employ awareness among the society about environmental problems and natural disasters.
5) Practice according to the present and future environmental issues.

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00BS302 ENGINEERING MATHEMATICS III L T P
COURSE OBJECTIVES

- To learn partial and differential equations, Fourier series, Boundary value problems.
- To learn the transforms such as Sine, Cosine, Fourier transform and Z transforms
- To gain Knowledge of the method to find the solution of difference Method.

Unit–I : Partial Differential Equations


Unit–II : Fourier Series


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


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

At the end of the course the students will be able to acquire knowledge on
1) Partial differential Equations and Fourier series.
2) Fourier Transform and Z-transforms.
3) Solving boundary value problems.
Mapping with Programme Outcomes (POs)

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00ES303 ENGINEERING MECHANICS

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COURSE OBJECTIVES

- To introduce the fundamentals of forces and their effects of structural bodies with specific properties.
- To understand the definitions of particle, body forces and their equilibrium conditions.
- To understand and predict the forces and its related motions.

**Unit–I : Static of Particles**


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

**Unit–II : Equilibrium of Rigid Bodies**


**Unit–III : Geometrical Properties of Surface Sand Solids**

Centroid and Centre of Gravity – Determination of Centroid of Section of Different Geometry Center of Gravity of A Body – Area Moment of Inertia – Parallel Axis Theorem - Perpendicular Axis Theorem - Determination of Moment of Inertias – of Rectangular, Triangular, Circular and Semi Circular Moment of Inertias of Structural Steel Section of Standard and Composite Section.


**Unit–IV : Dynamics of Particles**


Unit–V : Friction and Elements of Rigid Body Dynamics
Rolling Resistance – Translation and Rotation of Rigid Bodies - Velocity and Acceleration General Plan Motion of Simple Rigid Bodies Such as Cylinder, Desk/Wheel and Sphere.

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of course the students will be able to
1) Explain the forces and related laws mechanics in static and dynamic conditions.
2) Analysis of force and its motions on particle’s, rigid bodies and structures.
3) Solve the moments of inertia of any section and masses for the structural members.

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| 10ES304         | BASIC ELECTRONICS ENGINEERING | L | T | P |
COURSE OBJECTIVES

- To gain a basic knowledge on Active and passive components.
- To learn the principles of diodes and transistors suitable for various applications.
- To gain a basic knowledge on optoelectronic devices.
- To learn the concepts of analog devices.

Unit–I : Semiconductor and PN Junction Diodes


Unit–II : Bipolar Junction Transistor


Unit–III : Junction Field Effect Transistors


Unit–IV : Biasing of BJT and FET


Unit–V : Display Devices and Special Diodes

Photo Emissivity and Photo-Conductivity-Construction and Characteristics of: LCD AND LED - Photoconductive Cell - Photo Voltaic Cell - Photo Diode - Solar Cell - Photo Transistors - Plasma Display - Numeric Displays - Opto Couplers - LASER

**TEXT BOOKS**


**REFERENCE BOOKS**


**COURSE OUTCOMES**

Upon completion of this course the students will have

1) Knowledge on theory of basic semiconductor devices and its applications.
2) Ability to design biasing circuits for BJTs and JFETs.
3) Basic knowledge on optoelectronic devices and special diodes.
4) Knowledge on principles and applications of display devices.

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Mapping with Programme Outcomes (POs)
COURSE OBJECTIVES

- To introduce the analysis procedures for DC and AC circuits.
- To impart knowledge on analyzing circuits using Network Theorems.
- To understand the concepts of Resonance, Transients and to develop problem solving skills in allied circuits.
- To understand characterization of two port networks using different parameters.

Unit–I : DC and AC Circuits


Unit–II : Network Theorems

Superposition Theorem – Thevenin’s and Norton’s Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem - Compensation theorem - Tellegen’s theorem- Millman’s theorem.

Unit–III : Resonance and Coupled Circuits

Series, Parallel Resonance – Resonant Frequency –Variation of Impedance with Frequency – Bandwidth – Q-Factor.


Unit–IV : Network Transients


Unit–V : Network Parameters and Topology

Z, Y, ABCD and Hybrid Parameters for Two Port Networks – Interconversion of Network Parameters – Condition for Reciprocity and Symmetry – Interconnection of Two Port Networks – Network Topology – Definition – Graph – Tree – Basic Cut Set and Tie Set Matrices for Planar Networks.

TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES
After successful completion of course the students will have
1) Acquired Knowledge on passive circuit elements, sources and analysis of Networks.
2) Acquired knowledge on how to apply network theorems in solving circuits.
3) Understand the concepts of Resonance and transients in the circuits.
4) Understand different networks parameters to characterize two port networks.

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10PC306 ELECTROMAGNETIC FIELDS

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<th>COURSE OBJECTIVES</th>
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<tr>
<td>• To introduce the different types of Coordinate systems.</td>
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<tr>
<td>• To encapsulate the students with Electric and Magnetic field terminologies.</td>
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<td>• To make the students comprehend the various applications of Gauss law.</td>
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<td>• To elucidate the different method of determining magnetic field occurring in a solenoid, toroid etc.</td>
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<td>• To familiarize the various propagation techniques of waves and their polarization phenomenon.</td>
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Unit–I : Electrostatic Fields

Unit–II : Electric Fields
Unit–III : Conductors and Dielectrics


Unit–IV : Magnetic Fields


Unit–V : Electromagnetic Waves


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of course students will be
1) Familiar with vector analysis of electromagnetic fields.
2) Able to understand Vector electrostatic principles.
3) Correlate the various Concepts of electromagnetic fields.
4) Imparted knowledge related to various Terminologies of Electric and Magnetic Fields, important laws governing EM wave, Maxwell’s Equation.
5) Design components for various applications using the above techniques
COURSE OBJECTIVES

To verify the characteristics and applications of various semiconductor devices.

LIST OF EXPERIMENTS

1) Study of colour codes and soldering practice
2) Characteristics of junction diode, Zener diode
3) Zener diode as voltage regulators.
4) Half wave and full wave rectifiers without filter
5) Half wave and full wave rectifiers with filter
6) Simulate the wave shaping circuit using MultiSim
7) Transistor biasing circuits
8) Study of characteristics of transistor using MultiSim
9) Characteristics of FET
10) Characteristics of UJT
11) Characteristics of SCR
12) Characteristics of LDR and Photo Transistor.

COURSE OUTCOMES

At the end of course students will
1) Understand the practical characteristics of Diodes, BJT and JFET.
2) Apply principles and characteristics of semiconductor devices in designing simple application circuits.
COURSE OBJECTIVES
1) To verify basic laws on circuits and verify various network theorems.
2) To understand Resonance concepts in AC circuits.
3) To compute parameters for single and cascaded two-port Network.

LIST OF EXPERIMENTS
1) Verification of Ohm’s Law
2) Verification of Kirchoff’s Current Law
3) Verification of Kirchoff’s Voltage Law
4) Verification of Superposition Theorem
5) Verification of Thevinin’s and Norton’s Theorem
6) Verification of Maximum Power Transfer Theorem
7) Verification of Reciprocity Theorem
8) Study of AC circuits.
9) Study of Resonance Circuits
10) Computation of Network Parameters for Symmetric Network
11) Computation of Network Parameters for Asymmetric Network
12) Network Parameters for Cascaded Network.

COURSE OUTCOMES
At the end of course students will
1) Understand how to analyze circuits using Network theorems.
2) Acquire knowledge on resonance concepts in AC circuits.
3) Model networks using Network Parameters.

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Mapping with Programme Outcomes (POs)

FOURTH SEMESTER
10BS401 PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS

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<td>To expose the students to probability, random process, and statistical methods designed</td>
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<td>To contribute them to the process of making scientific judgments in the face of uncertainly and variation.</td>
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<td>To develop the skill of the students in numerical mathematics - using method of finite difference interpolation, finding numerical solution of ordinary and partial differential equation.</td>
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Unit–I : Probability and Random Variables

Unit–II : Random Processes

Unit–III : Test of Significance

Unit–IV : Interpolation
Gregory Newton Forward and Back Word Interpolation Formula; Sterling’s Central Difference Formula; Lagrange’s Interpolation Formula for Unequal Interval, Inverse Interpolation Numerical Differentiation; Using Newton Forward and Back Word Interpolation Formula, Numerical Integration; Trapezoidal Rule; Simpson’s One Third and Three Eight Rule.

Unit–V : Solution of Algebraic and Transcendental and Ordinary Differential Equations
Solution of Algebraic and Transcendental Equations; Bolzano’s Bisection Method; Regulation - Falsi Method; Newton – Raphson Method; Solution of Simultaneous Algebraic Equation; Gauss Elimination Method; Crout’s Method; Gauss – Seidel Iteration Method; Solution of Ordinary Differential Equations; Taylor Series Method; Runge – Kutta Fourth order Method Miline’s- Predictor Corrector Method.

TEXT BOOKS

REFERENCE BOOKS
COURSE OUTCOMES

At the end of the course, the students would

1) Acquire skills in handling situations involving random variables, random process and solve problems for engineers in using numerical methods.

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COURSE OBJECTIVES

- To impart fundamental understanding of how the various properties of materials drawn from different length scales of electronic and molecular structures that can be used in designing electronic devices.
- To gain vast knowledge of various conducting, superconducting, semiconducting, magnetic, dielectric, optical, smart and nano composite materials.

Unit–I : Conducting Materials


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


Unit–IV : Optical Materials


Unit–V : New Engineering Materials


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of the course, the students would
1) Acquire knowledge of a wide variety of materials.
2) Analysis of suitability of materials for various applications in designing products useful for the society.
3) Gain knowledge of new engineering materials such as nano and optical materials.

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COURSE OBJECTIVES
- To gain knowledge about the basic electronic circuits
- To acquire an in-depth knowledge of low frequency and high frequency analysis of BJT and FET amplifiers
- To design large signal amplifiers and tuned amplifiers
- To design feedback amplifiers and oscillators
- To design the wave shaping circuits
Unit–I : Small Signal Low Frequency Models


Unit–II : High Frequency Models


Unit–III : Feedback Amplifiers and Oscillators


Unit–IV : Large Signal and Tuned Amplifiers


Unit–V : Multivibrators


TEXT BOOKS

REFERENCE BOOKS


**COURSE OUTCOMES**

At the end of this course the students will

1) Analyze amplifiers at low and high frequencies
2) Understand the working of different types of feedback amplifiers & oscillators.
3) Able to analyze and design large signal and tuned amplifiers.
4) Analyze and design of wave shaping circuits.

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**COURSE OBJECTIVES**

- To introduce Number systems and arithmetic operations on binary numbers.
- To introduce basic postulates of Boolean algebra, Boolean functions and methods to simplify Boolean expressions.
- To acquire knowledge on design and analysis of combinational circuits.
- To understand the realization of combination circuits using PLDs
- To outline the procedures for analysis and design of synchronous and asynchronous sequential circuits.
- To introduce different logic families, semiconductor memories and related technology.

**Unit–I : Introduction**


**Unit–II : Combinational Logic and PLDs**

Design procedure-Half adder - Full adder-Half subtractor- Full subtractor-Parallel binary adder-Parallel adder/subtractor- BCD adder-Binary multiplier-Code convertors-Magnitude comparator-Parity generator and checker-Decoders-Encoders-Priority encoder-Multiplexer and Demultiplexer-Implementation of
combinational logic using Multiplexer-Programmable Logic Devices-PROM-PLA-PAL-Implementation of combination logic using PLDs.

**Unit–III : Synchronous Sequential Logic**


**Unit–IV : Asynchronous Sequential Logic**


**Unit–V : Digital Logic Families and Semiconductor Memories**

Characteristics of digital IC-logic families: RTL and DTL-TTL-ECL-MOS-CMOS-Comparison of various logic families-Semiconductor memories-ROM and RAM organization- Basic Memory cell - Memory decoding-Memory expansion-Static and Dynamic RAM.

**TEXT BOOKS**


**REFERENCE BOOKS**


**COURSE OUTCOMES**

Upon completion of the course the students will be able to

1) Explain number system and Boolean postulates and Realize Boolean functions with minimum number of logics.

2) Design and analyze combinational circuits and Implement combinational logic in PLDs.

3) Design and implement synchronous and asynchronous sequential circuits

4) Describe various logic families in digital IC.

5) Understand semiconductor memories and related technology.
Mapping with Programme Outcomes (POs)

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COURSE OBJECTIVES

- To introduce basic concepts of transmission lines
- To learn the characteristics of low and radio frequency lines
- To study various impedance matching devices
- To learn Smith chart and its applications in transmission line problems
- To design passive filters attenuators, and equalizers
- To study waveguide theories.

Unit–I : Transmission Line Theory


Unit–II : Line at Radio Frequencies

Parameters of open wire line and co-axial lines at radio frequencies – line constants at zero dissipation – voltage and current on dissipation less line - Standing waves – standing wave ratio - input impedances of a dissipation less line – input impedance of open and short circuit lines – eighth wave line (λ/8) – quarter wave line (λ/4) - Impedance matching – half wave line (λ/2) - Single and double stub matching –smith chart and its applications.

Unit–III : Transmission Line Measurements and Filters

Unit–IV : Attenuators and Equalizers


Unit–V : Waveguides


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

Upon completion of the course the students will be able to
1) Understand the fundamentals of transmission lines
2) Understand loading concepts in cables
3) Explain the need for impedance matching in radio frequency lines
4) Analyze and design various network elements(filters, attenuators and equalizers)
5) Explain propagation of EM waves in rectangular and circular waveguides

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COURSE OBJECTIVES

The aim of the course is for

- Understanding the fundamental characteristics of signals and systems.
- Understanding signals and systems in terms of both the time and transform domains,
- Development of the mathematical skills to solve problems involving convolution, filtering, modulation and sampling.

Unit–I : Introduction to Signals and Systems


Unit–II : Fourier Analysis


Unit–III : Continuous Time LTI Systems


Unit–IV : DTFT and Z Transform


Unit–V : Discrete Time LTI Systems


TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to understand
1) Representation and classification of both Continuous Time (CT) and Discrete Time (DT) signals and systems.
2) Spectral analysis of periodic and aperiodic signals using Fourier series and Transforms.
3) Analysis and characterization of the LTI-CT system through Laplace Transform.
4) Analysis and characterization of the LTI-DT system through Z transform.

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COURSE OBJECTIVES
- To Design BJT and FET amplifiers and to study their frequency characteristics.
- To design Oscillators using discrete components and using MultiSim software.

LIST OF EXPERIMENTS
1) Frequency response of BJT amplifier
2) Frequency response of FET amplifier
3) Design and analysis of Differential Amplifiers.
4) Design and analysis of feedback amplifier
5) Design of RC phase shift oscillator
6) Design of Class B power amplifier
7) Design of Single tuned amplifiers.
8) Design of a stable Multivibrator using transistors
9) Design of Schmitt trigger
10) Design and Simulation of Bistable multivibrator using Multi Sim
11) Design and Simulation of Complementary Symmetry push pull amplifier using Multi Sim
12) Design and Simulation of Hartley oscillator using Multi Sim
13) Design and Simulation of Colpitt’s oscillator using Multi Sim.

COURSE OUTCOMES
At the end of course students will
1) Design Oscillators and amplifiers using discrete components.
2) Able to use Multi Sim software for design and analysis of electronic circuits.

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COURSE OBJECTIVES
- To Design Combinational and sequential Digital circuits.

LIST OF EXPERIMENTS
1) Study of Logic Gates.
2) Design of Unit–Adders and Subtractors,
3) Design and Implementation of Binary Four-bit parallel adder.
4) Design of Code Convertors.
5) Design of Multiplexer and Demultiplexer.
6) Design of encoders and Decoders.
7) Study of Flip Flops
8) Construction of Shift Register
9) Design of Modulo Counters.
10) Design of Non Sequential Counter
11) Frequency Divider using IC7490
12) Design of Sequence Generator and Detector
13) Study of Fault Diagnosis in Combinational Circuits.

COURSE OUTCOMES
Upon successful completion of this course, the students will be able to
1) Design simple combinational logic circuits using gates and verify their functionalities.
2) Understand the characteristics of flip-flops and apply the design Procedures to design basic sequential circuits.
Mapping with Programme Outcomes (POs)

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**FIFTH SEMESTER**

**10PC501 ANALOG COMMUNICATION SYSTEMS**

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**COURSE OBJECTIVES**

- To give a brief knowledge in random process and sources of noise in Communication Systems
- To expose the concepts of basic communication in analog domain and Amplitude modulation/demodulation
- To familiarize the Angle modulation/ demodulation
- To know the working knowledge of the fundamental pulse modulation

**Unit–I : Introduction to Random Process and Noise Theory**


**Unit–II : Amplitude Modulation**


**Unit–III : Angle Modulation**


**Unit–IV : Transmitters and Receivers**

AM transmitter – low level transmitter, high level transmitter – AM Receivers – TRF receivers, Superheterodyne receivers– Noise in AM systems.
FM transmitter - Direct and Indirect Method of Frequency Modulation – FM
Superheterodyne Receiver–Effect of Noise in Angle Modulated Systems – Threshold
Effect in FM system - Threshold Improvement - Pre-emphasis and De-emphasis
Circuits – Frequency Modulation with Feedback(FMFB).

Unit–V : Analog Pulse Modulation

Sampling of Band Limited Low Pass Signals-Pulse Amplitude Modulation-
Generation and Detection-Time Division Multiplexing-Pulse Time Modulation-
Generation and Detection of PTM Signals-cross talk in PTM-Bandwidth of PTM
signals-performance of pulse modulation systems.

TEXT BOOKS
Education 2006.

REFERENCE BOOKS
4) H.P. Hsu, Schaum Outline Series - “Analog and Digital Communications”, 2nd
Hill, 2009.

COURSE OUTCOMES
At the end of the course, the students will be able to
1) Discuss principles of different analog modulation Techniques
2) Analyze and Design AM and FM modulation and Demodulation circuits.
3) Analyze the noise performance of AM and FM systems
4) Describe various pulse modulation techniques.

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10PC502 ANALOG INTEGRATED CIRCUITS | L | T | P
COURSE OBJECTIVES

The student is expected to have the knowledge about

- Working of operational amplifiers and various applications of op-amp such as Multivibrators, Oscillators and filters.
- The theory of ADC and DAC and the concepts of waveform generation and some special Function ICs.
- Micro fabrication techniques of optical integrated circuits and optical wave guides, opto electronic integrated circuits.

Unit–I : Introduction to Linear IC’s


Unit–II : Applications of Op – Amp


Unit–III : Active Filters & Oscillators


Unit–IV : Comparators and Converters

Basic Comparator: Comparator characteristics - Zero Crossing Detector – Schmitt Trigger – high speed and precision type comparators - window Detector – Voltage to Frequency converter - Frequency to Voltage converter - D/A converters - A/D Converters - Clippers and Clampers – positive and negative clippers – small-signal and half-wave rectifier – positive and negative clampers - Peak Detector – sample and hold circuit.

Unit–V : Waveform Generators and other Linear IC’s


TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
Upon completion of the course the students will
1) Gain knowledge of IC fabrication
2) Have an in depth knowledge of applications of op – amps
3) Design different types of active filters and oscillators
4) Acquire knowledge about comparators and converters
5) Generate Sinusoidal and non-sinusoidal waveforms using op – amp circuits.
6) Analyse special function ICs like 555 Timer.

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COURSE OBJECTIVES
The student should be made to:
- Study the Architecture of 8085 and 8086 microprocessor.
- Learn the detail aspects of I/O and Memory Interfacing circuits.
- Study the Architecture of 8051 microcontroller.
- Study about 8051 micro controller interfacing with various applications
- Do Assembly language programming in clear perspective

Unit–I : 8085 Microprocessor
Unit–II : 8086 Microprocessor

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–III : Peripheral Devices


Unit–IV : 8051 Architecture


Unit–V : Microcontroller Interfacing


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Understand the architecture of 8085 and 8086 microprocessor.
2) Acquire knowledge on Peripheral Devices.
3) Understand the architecture of 8051 microcontroller based systems.
4) Able to write simple programs on Programming of 8085 and 8086 microprocessor and 8051 microcontrollers.
5) Understand the Interfacing of 8051 microcontroller for various applications.
### 10PC504 DIGITAL SIGNAL PROCESSING

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#### COURSE OBJECTIVES
- To study DFT and its computation
- To study the design structures of digital filters and Z-transform
- To study the design of Digital IIR filters
- To study the design of Digital FIR filters
- To study the fundamentals of digital signal processors.

#### Unit–I: Discrete Fourier Transform

#### Unit–II: Design of Digital IIR Filters

#### Unit–III: Design of Digital FIR Filters
Structure of FIR filters - Linear Phase FIR digital Filters – Minimizing design criteria (Fourier design technique) – Filter design using Windowing technique (Rectangular, Hamming, Hanning Window) – Kaisar Window.

#### Unit–IV: Digital Filter Structures
Unit–V : Digital Signal Processors


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
The students will be able to understand the
1) Computation procedures for DFT using FFT algorithms
2) Analysis and design of FIR and IIR filters
3) Finite word length effects in filter design
4) DSP Processor Architecture and Programming.

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Mapping with Programme Outcomes (POs)

10CP507 COMMUNICATION LAB

- To investigate various analog modulation and demodulation circuits.
- To study and verify sampling theorem.
- To understand various pulse modulation techniques.
- To experimentally study characteristics of filter circuits.
LIST OF EXPERIMENTS
1) Amplitude Modulation and Demodulation.
2) DSB-SC Modulation and Demodulation.
3) SSB-SC Modulation and Demodulation.
4) Frequency Modulation and Demodulation.
5) Pre-emphasis and De-emphasis circuits.
6) Verification of Sampling Theorem.
7) Generation and Detection of PAM, PWM and PPM signals.
8) Frequency Division Multiplexing.
9) Design of Active filters (LPF, HPF) using Op-amp.
10) Design of Active filters (BPF, BEF) using Op-amp
11) Study of PLL.
12) Study of Receiver characteristics.

COURSE OUTCOMES
Upon successful completion of this course, the students will be able to
1) Demonstrate various analog modulation and demodulation circuits.
2) Construct filter circuits for Receivers and able to analyze Receiver characteristics.
3) Demonstrate Various Pulse modulation and Demodulation circuits.
4) Understand sampling process and multiplexing concepts.

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COURSE OBJECTIVES
- To study programming concepts of microprocessors and controllers using assembly language program.
- To study various peripheral IC interfacing and programming.

LIST OF EXPERIMENTS
1) Simple programs for sorting given set of numbers in ascending and descending order.
2) Arithmetic operations using 8085 Microprocessor.
3) Arithmetic operations using 8086 Microprocessor.
4) Study of Programmable Peripheral Interface 8255.
5) Study of Programmable Timer 8253.
6) Study of Serial Data Transfer Using 8251 USART.
7) Study of Programmable Interrupt Controller 8259.
8) Waveform generation using two channel 8-bit DAC0800.
9) Interfacing 0809ADC to 8085 Processor.
10) Interfacing of Stepper Motor to 8085 Processor.
11) Study of 8051 microcontroller and interfacing Seven Segment LED Display
12) Study of 8097 microcontroller and interfacing DAC and ADC in 8097 microcontroller.
14) Code Conversion Programs using 8051 Controller.

**COURSE OUTCOMES**

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

1) Understand the instruction sets of microprocessors and controllers to write assembly code for Data handling and arithmetic and logic operations.

2) Interface and Program various peripheral ICs.

3) Able to program microprocessor and Micro controllers for Real time applications.

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**SIXTH SEMESTER**

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**COURSE OBJECTIVES**

- To detail about different means of base band digital transmission.
- To familiarize the students about the types of digital band pass transmission.
- To provide basic knowledge about the use of various channel coding techniques.
- To illustrate the concepts of synchronization and Equalization techniques.
- To understand spread spectrum techniques

**Unit–I : Baseband Transmission and Reception**


**Unit–II : Inter symbol Interference and Equalization**

Characterization – Eye Pattern – Equalization Filter Types – Preset and Adaptive Equalization – Filter Update Rate

Unit-III : Band pass Signalling
- Digital Band Pass Modulation Techniques - ASK, FSK, PSK, DPSK, QPSK, QAM

Unit-IV : Channel Coding
- Linear Block Codes, Error Detection And Correcting Capability - Cyclic Codes – Convolution Codes, Maximum Likelihood Decoding, Viterbi Decoding.

Unit-V : Spread Spectrum Techniques

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of the course students will be able to
1) Explain different means of base band and band pass digital transmission.
2) Apply various channel coding techniques for data transmission.
3) Illustrate the concepts of synchronization and Equalization techniques.
4) Understand spread spectrum techniques.

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COURSE OBJECTIVES

- To introduce the base platform of antenna design.
- To familiarize the students with antenna terminologies.
- To make the students comprehend the design of various antenna arrays.
- To encapsulate the key topics of standard antennas, special types of antennas.
- To elucidate the various propagation techniques of waves.
- To teach the students the various antenna measurement techniques.

Unit–I : Antenna Fundamentals


Unit–II : Linear and Array Antennas


Unit–III : Special Purpose Antennas


Unit–IV : Propagation


Unit–V : Measurements


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
Upon completion of these course, the students
1) Shall gain knowledge related to the engineering aspects of antennas, understand the various antenna terminologies and mathematics of analyzing the same
2) Have potentiality to design various antenna arrays by means of improved problem analysis skills
3) Are familiar with different types of antennas right from wired type to Microwave antennas
4) Could understand the propagating mechanism of EM waves
5) Shall know the various measurements one should carry out to ensure the proper working of the designed antennas.

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10CP607 DIGITAL COMMUNICATION LAB

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COURSE OBJECTIVES
- To experimentally study various baseband and bandpass digital modulations.
- To understand data coding and error control coding techniques.
- To use MATLAB software in simulation and performance analysis of digital modulation techniques.

LIST OF EXPERIMENTS
1) Pulse Code modulation and demodulation.
2) Delta modulation and demodulation.
3) Adaptive Delta modulation.
4) Compingding.
5) Sigma delta modulation and demodulation.
6) Time division multiplexing and Demultiplexing.
7) Data coding and decoding techniques for Return to Zero format and Multilevel Binary Format.
8) Data coding and decoding techniques for Phase Encoded Format.
9) ASK, FSK, PSK modulation and demodulation.
10) QPSK modulation and demodulation.
11) Synchronization techniques in PCM.
12) DPSK modulation and demodulation using MATLAB.
13) QAM modulation and demodulation using MATLAB.
14) Performance Analysis of ASK, FSK, PSK modulation schemes.
15) Error control coding techniques using MATLAB.

COURSE OUTCOMES

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

1) Demonstrate various digital base band and pass band modulation techniques.
2) Verify data coding and error control coding techniques.
3) Understand various synchronization techniques used in digital communication.
4) Use MATLAB software for the analysis and implementation of digital modulation techniques.

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COURSE OBJECTIVES
- To realize arithmetic, logical, data transfer and convolution operations on DSP processors using assembly code.
- To Design digital filters using DSP processors.
- To Develop simple algorithms for signal processing and test them using MATLAB.
- To analyze and design LTI-Digital systems using MATLAB.

LIST OF EXPERIMENTS
1) Perform the given Arithmetic Operations and Data Transfer using TMS320C50
2) Obtain the Linear and Circular Convolution using TMS320C50
3) Design of II R and FIR filter using TMS320C50
4) Waveform Generation Using TMS320C50
5) Perform the arithmetic and logical operations using TMS320C5416 and TMS320F6713.
6) Generation and Simple Operations of Signals Using MATLAB
7) Determine the Impulse Response and Step Response of a Causal LTI System
8) Frequency Response of First Order and Second Order System using MATLAB
9) Obtain the Convolution and Correlation of the given sequence using MATLAB
10) Design of IIR Filters using MATLAB
11) Design of FIR using Windowing Techniques using MATLAB
12) Simple Operations on Images using MATLAB.

COURSE OUTCOMES
Upon completion of this course, the students will be able to
1) Experiment concepts of Digital Signal processing and its applications using MATLAB.
2) Understand programming concepts of TMS320C50, TMS320C5416 and TMS320F6713 processors.
3) Develop digital filters using MATLAB and DSP processors.

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SEVENTH SEMESTER

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COURSE OBJECTIVES
- To understand the moral and ethical dimensions in engineering
- To take balanced decisions.

Unit–I

Unit–II

Unit–III
Unit-IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Understand the relationship between the Engineer and the Society

2) Learn the importance of codes in engineering practice

3) Acquire knowledge on the legal, moral and ethical aspects in Engineering

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COURSE OBJECTIVES

- To impart the essential knowledge to the students to learn about the Microwave generators working with different kinds of Microwave Components.
- To enhance the students proficiency about microwave solid state devices and deriving scattering matrix.
- To provide sufficient Information about Noise analysis in Microwave Engineering.
- To accomplish a thorough idea about direct and indirect Microwave parameter measurements.

Unit–I : Microwave Linear Beam Tubes


Unit–II : Microwave Crossed-Field Tube and Solid State Devices


Unit–III : Microwave Devices


Unit–IV : S Parameter


Unit–V : Microwave Measurements and Noise Analysis


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES
At the end of the course, the student will able to
1) Understand the working principles of Microwave Solid and Non solid state devices.
2) Analysis of the characteristics and behavior of Microwave Networks and components.
3) Measurement concepts in Microwave Engineering.

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COURSE OBJECTIVES
• To Study the characteristics of microwave sources and microwave components.
• To Study the radiation characteristics of Horn and parabolic antennas.
• To study microwave measurements.

LIST OF EXPERIMENTS
1) Study of Microwave Components
2) VI Characteristics and Frequency Response of Gunn Oscillator
3) Mode Characteristics of Reflex Klystron Oscillator
4) Measurement of Attenuation, VSWR, Wave Length and Operating Frequency using Microwave Test bench
5) Characteristics of E, H and Magic Tee Plane using Microwave Test bench
6) Characteristics of Circulator using Reflex Klystron Oscillator
7) Measurement of Radiation Characteristics of Horn.
8) Measurement of Radiation Characteristics of Parabolic antenna
9) Characteristics of Directional Coupler 3dB and 20dB using Microwave Test bench
10) Measurement of Unknown Impedance of Pyramidal Antenna using Gunn oscillator
11) Measurement of Dielectric Constant for the given solid using Microwave Test bench.

COURSE OUTCOMES
At the end of the course students will be able to
1) Demonstrate characteristics of Microwave sources and components.
2) Analyze radiation pattern for Microwave antennas.
3) Measure Unknown impedance, Microwave power, attenuation and VSWR using appropriate bench setup.

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**PROFESSIONAL ELECTIVES**

**PE – PROFESSIONAL ELECTIVES**

1) Data Structures and C++
2) Java Programming
3) Control Systems
4) Digital Image Processing
5) VLSI Design
6) Fiber Optic Communication
7) Radar and Navigational Aids
8) Satellite Communication
9) Wireless Communication
10) Information Theory and Coding
11) DSP Processor Architecture and Programming
12) Mobile Adhoc Networks
13) Modern Communication Systems
14) Telecommunication Switching and Networks
15) Wavelets and Applications
16) Data Communication
17) Multimedia Compression Technology
18) Embedded Systems
19) Biomedical Signal Processing
20) Electronic Measurements and Instrumentations.

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COURSE OBJECTIVES

- To learn the methodical way of solving complex problems
- To understand the different methods of organizing large amounts of data
- To efficiently implement graphical programs
- To learn and develop skills in C++ programming

Unit–I : Linear Data Structures

Introduction to data structures, Primitive and non-primitive data structures, Arrays in C -types, Structures in C, Stack-implementation, operations, Queues-operations-Lists-Linked list-types, Applications.

Unit–II : Non Linear Data Structures

Tree - Binary tree-representation - Tree traversal techniques- Graph-representation, traversal-Sorting- Selection Sorting, Insertion sorting, Merge sorting, Radix sorting, Searching -techniques - Hashing.

Unit–III : Object Oriented Programming

Object Oriented Programming concepts- Objects- classes – methods and message passing, encapsulation, abstraction, inheritance, polymorphism and dynamic binding-characteristics of OOPS-benefits of object orientation. Introduction to C++ and data types-Operators in C++

Unit–IV : Objects and Classes

Objects and class -defining a class –defining member functions-Private and public member function-accessing class members, creating objects, object as function arguments- Array fundamentals - array within a class - array of objects. Constructors and destructors- Function overloading - Inline function - Virtual function.

Unit–V : File and Graphics Operations

Operator overloading – overloading unary, binary and relational operators-type conversion, Inheritance- derived class and base class-visibility mode-public, private and protected-various forms of inheritance. C++ graphics - text mode graphics functions- graphics mode graphics functions- colors -drawing shapes- Address and pointers-Files and streams.

TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES

1) Understand basic data structures such as arrays, linked lists, stacks and queues in C.
2) Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data in C and C++.
3) Able to use object oriented programming language like C++ and associated libraries to develop object oriented programs.
4) Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

Mapping with Programme Outcomes(POs)

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COURSE OBJECTIVES

- To understand the concepts of object-oriented, event driven, and concurrent Programming paradigms and develop skills in using these paradigms using Java.

Unit–I : Introduction to OOP’S


Unit–II : Java Program Structure


Unit–III : Objects, Classes and Graphics


Unit–IV : Java Event Handling


Unit–V : Java Database Connectivity and Web Applications

Introduction to JDBC-JDBC Drivers and Architecture, CURD Operation Using JDBC, Connecting to Non-Conventional Databases. Web Application Basics -
Architecture and challenges of Web Application, Introduction to Servlet- Servlet Life Cycle.

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
Upon completion of the course the students will be able to
1) Understand the format and use of objects.
2) Understand basic input/output methods and their use.
3) Understand object inheritance and its use.
4) Understand development of JAVA applets vs. JAVA application

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COURSE OBJECTIVES
- Modeling of translational and rotational system, block diagram reduction techniques and Signal flow graph for obtaining transfer function.
- Transient analysis of various standard inputs for first order and second order system.
- Frequency response analysis and frequency domain specification by bode plot and polar plot.
- Stability analysis by Routh-Hurwitz criterion and Nyquist stability criterion.
- Analysis of sampled data control system using Z-transform.
- State space analysis (writing state equation for physical, phase, canonical variables.)
- Concept of controllability and observability

Unit-I: System Modelling
Introduction to Control System -Basic Elements in Control Systems - Open Loop and Closed Loop Systems - Differential Equation Representation of Physical

Unit–II : Time Domain Analysis


Unit–III : Frequency Domain Analysis


Unit–IV : Digital Control Systems


Unit–V : State Space Analysis


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

After completion of the subject, students able to get a knowledge in various aspects of

1) Mathematical models for such electrical and mechanical systems.
2) Equivalent state space model for given system.
3) Time and Frequency domain analysis with response to test inputs

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### COURSE OBJECTIVES

To impart knowledge on digital image fundamentals and image transformers, image enhancement, image restoration, image encoding and image segmentation. The student should be made to

- Learn digital image fundamentals.
- Be exposed to simple image processing techniques.
- Be familiar with image compression and segmentation techniques.
- Learn to represent image in form of features.

### Unit–I : Image Transforms


### Unit–II : Image Enhancement


### Unit–III : Image Restoration and Segmentation


### Unit–IV : Wavelets and Image Compression


### Unit–V : Image Representation and Recognition

Boundary representation – Chain Code – Polygonal Approximation, Signature, Boundary segments – Boundary Description – Shape Number – Fourier Descriptor, Moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition Based on Matching.

### TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
Upon successful completion of this course, students will be able to
1) Understand digital image fundamentals.
2) Apply image enhancement and restoration techniques.
3) Use image compression and segmentation Techniques.
4) Represent features of images.

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COURSE OBJECTIVES
The course intends to provide an understanding of VLSI Design process and to bring both system and circuit view on design together.
- To study the Characteristics of MOS, CMOS transistors.
- To learn transistor level CMOS logic design.
- To understand NMOS and CMOS fabrication process, design rules.
- It offers a profound understanding of principle of operation of various Analog circuits.
- To impart knowledge about designing digital circuits like adders and multipliers.
- To study programming technologies and architectures of FPGAs, CPLDs.
- To understand the concepts of modeling a digital system using VHDL.

Unit-I: VLSI Design Concepts
Unit–II : VLSI Fabrication Techniques


Unit–III : Analog VLSI


Unit–IV : Digital VLSI

Logic Design: Switch Logic and Gate Logic - Dynamic CMOS Logic - Structured Design Examples: Simple Combinational Logic and Clocked Sequential Design.


Unit–V : Programmable ASICS AND VHDL


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

Upon completion of the course the students will be able to
1) Describe a VLSI Design flow for any complex digital system
2) Explain the fabrication steps in manufacturing NMOS and CMOS transistors.
3) Design CMOS circuit to realize specific logic functions and draw their symbolic layouts
4) Analyze various sub-circuits used in analog IC
5) Design and analyze digital circuits like multipliers, adders
6) Describe architecture and programming technologies of FPGA and CPLD.
7) Model a simple digital system using VHDL

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COURSE OBJECTIVES

- To impart wide knowledge on optic fiber structure-wave guiding properties, materials and fabrication metals, signal degradation
- To facilitate the knowledge about optical fiber sources and transmission techniques
- To enrich the idea of optical fiber communication systems, transmitter section, medium- the optical fiber, receiver section.
- To analyze system based on important parameters for characterizing optical fiber, optical source, detector and amplifier,
- To explore the fundamentals and advances in lasers, LEDs, photodiodes, advanced optoelectronics.
Unit–I : Optical Communication Systems

Block diagram - Advantages - Comparison with other systems optical Fibers: Structures and wave guiding fundamentals. Basic optical laws and definitions. Optical fiber modes and configurations. Fiber types, rays and modes, Mode theory for circular waveguides. Maxwell's equation, Wave equations for step index fiber and graded index, modes in step index and graded index fibers.

Unit–II : Signal Degradation in Optical Fibers

Fiber Materials And Fabrication Methods - Outside Vapour Phase Oxidation, Vapour Phase Axial Deposition, Modified Chemical Vapour Deposition - Double Crucible Method, Mechanical Properties, Fiber Optic Cables - Attenuation, Signal distortion, Pulse broadening, Mode-coupling.

Unit–III : Optical Sources


Unit–IV : Photo Detectors


Unit–V : Optical Fiber Transmission Links


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Explain the fundamentals, advantages and advances in optical communication system
2) Acquire a detailed understanding of types, basic properties and transmission characteristics of optical fibers
3) Discuss the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.

4) Understand configuration and architecture of advanced optical communication, advanced system techniques and nonlinear optical effects and their applications.

5) Gain the knowledge of knowledge of working and analysis of optical amplifiers and important devices / components at the transmitters (sources like Semiconductor lasers / LEDs, modulators etc) and the receivers (optical detectors etc.) of the optical communication system and their uses.

6) Analyze the transmission links and its associated parameters on system performance.

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### 10PEXX RADAR AND NAVIGATIONAL AIDS

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### COURSE OBJECTIVES

- To impart the essential knowledge to the students in the area of Radar and Navigational aids.
- To provide knowledge of about RADAR equation and conquer the knowledge of calculating object distance.
- The students are expected to acquire knowledge about concepts different types of Radar, such as CW, FMCW, MTI Radar, Tracking radar.
- To provide sufficient knowledge about radar clutters & Different Navigational systems.

#### Unit—I: Basic Concepts and Radar Equations

Introduction to Radar, Basic Radar Block Diagram and Operation, Simple Form of Radar Equation - Bi- Static Radar Equation, Radar Frequencies, Applications of Radar, Merits and De- Merits of Radar.


#### Unit—II: Doppler and MTI Radar

Doppler Effect – Simple CW Doppler Radar Block Diagram and Operation, Basis Principles and Operation of Frequency Modulated CW Radar (FMCW).

MTI Radar Block Diagram – Delay Line Cancellers – Multiple or Staggered Pulse Repetition Frequency - Digital MTI Processing, Pulse Doppler Radar.
Unit–III : Tracking Radar

Tracking Radar and its Types - Sequential Lobing - Block Diagram of Conical-Scan Tracking Radar. Monopulse Tracking Radar – Amplitude Comparison Monopulse Tracking – Phase Comparison Monopulse Tracking.

Unit–IV : Radar Clutter and Basic Navigational Radar System

Introduction to Radar Clutter – Types – Surface Clutter Radar Equations, Angel Echoes.


Unit–V : Advanced Navigational System


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) Understand the concept of Radar working principles.
2) Different types of Radar and Analytical design.
3) Learn about the different types of Navigational system.

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COURSE OBJECTIVES

- To impart wide knowledge on satellite fundamental.
- To familiarize the functioning of different types of satellite Link Design.
- To illustrate the concepts of various Assess techniques.
- To familiarize the Laser’s in satellite communication and satellite services.
Unit–I : Satellite Fundamentals

Unit–II : Satellite Link Design
Basic Transmission Theory - Satellite Uplink and Down Link - Analysis And Design - Link Budget - Performance Impairments - System Noise - Inter Modulation Interference - Propagation Characteristics And Frequency Considerations - System Reliability - Design of Life Time - Earth Station Design.

Unit–III : Access Techniques

Unit–IV : Lasers in Satellite Communication

Unit–V : Satellite Services

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) Basics of satellite communication have been discussed.
2) The basic multiple access techniques related to satellite communication have been analyzed.
3) Link design concept is used to understand about the modulations and noises.
4) Usage of laser and its importance have been analyzed.
5) Applications of the satellite services have been proposed.
Mapping with Programme Outcomes (POs)

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10PEXX WIRELESS COMMUNICATION

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COURSE OBJECTIVES
- To acquire knowledge of Wireless channels and parameters
- To impart knowledge on mobile communication and cellular system architecture
- To understand various Modulation Techniques used in wireless communication.
- To create exposure to multipath mitigation techniques and wireless standards

Unit-I: Wireless Channels

Unit-II: Fundamentals of Cellular Communication

Unit-III: Modulation Techniques

Unit-IV: Multipath Mitigation Techniques
Equalization – Adaptive Equalization, Linear and Non - Linear equalization, Zero forcing and LMS Algorithms, Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception.

Unit-V: Mobile Communication Systems
Overview of AMPS - DECT - CT2 - PACS - PHS - International Mobile Telecommunication 2000 - GSM Architecture - USSD - GPRS - EDGE - IS95, CDMA 2000 - WCDMA - UMTS - HSPDA - Bluetooth -WiFi - WIMAX - Introduction to LTE.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of the course student will
1) Characterize Wireless Channels.
2) Explain the basic concepts of Cellular Systems.
3) Design and Implement various Modulation schemes for fading channels.
4) Compare Multipath Mitigation techniques and analyze their performance.
5) Acquire knowledge on Various Wireless Standards.

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10PEXX INFORMATION THEORY AND CODING
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COURSE OBJECTIVES
The students are expected to have the knowledge on
- Information theory and channel capacity
- Detection of signals and channels noise
- Source coding
- Error control codes
- Stochastic process

Unit–I : Information Theory
Information – Measure of Information - Information Rate – Power Spectral Density - Entropy - Entropy of Symbols – Joint and Conditional Entropies - Basic Relationship Among Different Entropies - Mutual Information, Redundancy and
Efficiency - Continuous and Discrete Communication Channels - Discrete Memory
Less Channels - Channel Representations – BSC, BEC – Channel Capacity.

Unit–II : Detection of Signals and Channels with Noise

Hypothesis Testing - Baye's Criterion - Minimum Error Probability Criterion,
Neyman Pearson Criterion, Minmax Criterion - Maximum Likelihood Detector -
Wiener Filter - Continuous and Discrete Channels with Noise - Shannon Hartley
Theorem and Its Implications.

Unit–III : Source Coding

Purpose of Encoding and Decoding - Uniquely Decipherable Codes - Code
Efficiency and Redundancy - Shannon’s First and Second Fundamental Theorem -

Unit–IV : Error Control Codes

Introduction - Types of Errors - Methods of Controlling Errors - Error Detection and
Correction Linear Block Codes - Hamming Codes - Binary Cyclic Codes - Syndrome
Calculation - BCH Codes - Burst Error Correcting Codes - Convolutional Codes.

Unit–V : Stochastic Processes

Classification - Stationary Processes - Ergodic Processes - Independent
Increment Processes - Markov Processes - Counting Processes - Narrow Band
Processes - Stochastic Processes for Analysis of Physical Phenomena, Brownian
Motion - Normal (Gaussian) Minor - Leri Poisson, Bernoulli and Short Noise
Processes - Auto Correction Function.

TEXT BOOKS
1) K. Sam Shanmugam, “Digital and Analog communication systems”, John


REFERENCE BOOKS
McGraw Hill.


COURSE OUTCOMES

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

1) Measure the Information and use it for effective coding.

2) Summarize how the channel capacity is computed for various channels.

3) Use various techniques involved in basic detection and estimation theory to
solve the problem.

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COURSE OBJECTIVES

- To give an exposure to the various fixed point and floating point DSP architectures
- To understand the techniques to interface sensors and I/O circuits
- To implement applications using these processors.

Unit–I : Fundamentals of Programmable DSP’s


Unit–II : TMS320C54X Processor


Unit–III : DSP56XXX Processor

Freescale DSP56XXX Architecture and Programming - Introduction, Core Architecture Overview, Data Arithmetic Logic Unit, Address Generation Unit, Program Control Unit, PLL and Clock Generator, Debugging Support, Instruction Cache, External Memory Interface, DMA Controller, Operating Modes and Memory Spaces, Instruction Set, Benchmark Programs.

Unit–IV : Filtering Using DSP56XXX


Unit–V : TMS320C6X Processor


TEXT BOOKS


REFERENCE BOOKS


4) Mohammed El-Sharkawy, Digital Signal Processing Applications With Motorola's DSP56002 Processor, Prentice Hall, 1997


**COURSE OUTCOMES**

At the end of the course student will be able to

1) Learn the architecture details of fixed point DSPs

2) Learn the architecture details of floating point DSPs

3) Infer about the control instructions, interrupts, pipeline operations, memory and buses.

4) Illustrate the features of on-chip peripheral devices and its interfacing with real time application devices

5) Learn to implement the signal processing algorithms and applications in DSPs

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**COURSE OBJECTIVES**

- Students will get an introduction to Ad Hoc wireless network
- To study the introduction of protocols
- To study the architecture of MANET
- Enable the students to know techniques involved to support mobility

**Unit-I : Introduction**

Introduction to Ad Hoc Networks – Definition, Characteristics Features, Applications of Ad Hoc Networks-Challenges and Advantages- Characteristics of
Wireless Channel-Ad Hoc Mobility Models- Entity and Group-IEEE Standards: 802.11a, 802.11b, 802.11g, 802.15.

**Unit–II : Routing Basics**


**Unit–III : Ad Hoc Network Protocols**


**Unit–IV : End -To - End Delivery and Security**


**Unit–V : Cross Layer Design and Quality of Service**


**TEXT BOOKS**


**REFERENCE BOOKS**


COURSE OUTCOMES

1) To conduct network model
2) To analyze the performance of routing protocol
3) To know the methods of cross layer design
4) To understand the concept of network simulation

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COURSE OBJECTIVES

- Students will get an introduction about ISDN and its protocol,
- Data link layer, ATM network concepts and its architecture, internet concepts and mobile communication systems

Unit-I: ISDN Overview


Unit-II: ISDN Data Link Layer


Unit-III: ATM Network Concepts and Architecture


Unit-IV: Internet Concepts

The Net and its Features Main Internet Features, Email News Groups, Telnet, Gopher, Browsing In WWW. Control Modems: Speed/ Time Continuum, Communication Software Internet Finding Tools, Archie, Gopher Commands:

Unit–V : Mobile Communication Systems

GSM - IS95 - Network Aspects - Radio Aspects - Security Aspects - Low Speed Circuit Switched Data in Digital Cellular Networks - High Speed Circuit Switched Data in GSM - Packet Switched Data in Digital Cellular Networks - Data Services over DECT, CT2 and PACS - GPRS - CDMA 1x, CDMA 3X, CDMA 2000 and WCDMA.

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course the students will have a wide knowledge on
1) ISDN and its protocol,
2) Data link layer, ATM network concepts and its architecture
3) Internet concepts and mobile communication systems

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<tr>
<th>C0EXXX</th>
<th>TELECOMMUNICATION SWITCHING AND NETWORKS</th>
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COURSE OBJECTIVES
- To introduce the concepts of Frequency and Time division multiplexing.
- To introduce digital multiplexing and digital hierarchy namely SONET / SDH
- To introduce the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch.
- To introduce the need for network synchronization and study synchronization issues. To outline network control and management issues.
- To study the enhanced local loop systems in digital environment. To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop.
• To introduce statistical modeling of telephone traffic. To study blocking system characteristics and queuing system characteristics.
• To characterize blocking probability holding service time distributions for in speech and data networks.

Unit–I : Multiplexing

Unit–II : Digital Switching
Switching Functions, Space Division Switching, Time Division Switching, two dimensional switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SS7 signaling.

Unit–III : Network Synchronization Control and Management

Unit–IV : Digital Subscriber Access

Unit–V : Traffic Analysis

TEXT BOOKS

REFERENCE BOOKS


COURSE OUTCOMES
At the end of the course, the student should be able to
1) To understand the concepts of Frequency and Time division multiplexing.
2) To analyze digital multiplexing and digital hierarchy namely SONET / SDH
3) To discuss the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch.
4) To explain the statistical modeling of telephone traffic, blocking system characteristics and queuing system characteristics.
5) To examine blocking probability holding service time distributions for in speech and data networks.

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COURSE OBJECTIVES
- To expose the students to the basics of wavelet theory and to illustrate the use of wavelet processing.

Unit–I : Fourier Analysis
Fourier basis & Fourier Transform – failure of Fourier Transform – Need for Time-Frequency Analysis – Heisenberg’s Uncertainty principle – Short time Fourier transform (STFT) - short comings of STFT- Need for Wavelets.

Unit–II : CWT and MRA
Wavelet basis – Continuous time Wavelet Transform (CWT) – need for scaling function – Multi-Resolution Analysis (MRA) – important wavelets: Haar, Mexican hat, Meyer, Shannon, Daubechies.

Unit–III : Introduction to Multirate Systems
Decimation and Interpolation in Time domain - Decimation and Interpolation in Frequency domain – Multi rate systems for a rational factor.

Unit–IV : Filter Banks and DWT

Unit–V : Special Topics (Only Introductory Level)
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
Students are able to
1) Understand about fourier transform and difference between fourier transform and wavelet transform.
2) Understand wavelet basis and characterize continuous and discrete wavelet transforms
3) Understand multi resolution analysis and identify various wavelets and evaluate their time-frequency resolution properties
4) Implement discrete wavelet transforms with multirate digital filters
5) Design certain classes of wavelets to specification and justify the basis of the Application of wavelet transforms to different fields.

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<td>To understand the concept of data communication and data coding techniques.</td>
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<td>To comprehend the use of different types of digital data interfaces and modems.</td>
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<td>To understand the concept of network architecture and protocols</td>
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<td>To understand the division of network functionalities into layers.</td>
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<td>To be familiar with the components required to build different types of networks.</td>
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<td>To be exposed to the required functionality at each layer</td>
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<td>To learn the flow control and congestion control algorithms</td>
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Unit–I : Basic Concepts

Unit-II : Digital Data Interfaces and Modems


Unit-III : Data Link Layer

Logical link control Functions: - Framing, Flow control, Error control: CRC, LLC protocols: - HDLC. Medium access layer:- Random access, Controlled access, Channelization, Data link layer: Design issues – Service primitives – Stop and Wait - Sliding window protocols –Go-back N- Selective repeat protocols.

Unit-IV : Network and Transport Layers


Unit–V : Session, Presentation and Application Layers


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) Have a good understanding of the data communication system and modes of transmission.
2) Have a basic knowledge of the use of digital data interfaces.
3) Have a working knowledge of network architecture and protocols.
4) Identify the components required to build different types of networks.
5) Choose the required functionality at each layer for given application.

6) Identify solution for each functionality at each layer.

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COURSE OBJECTIVES

- To have a complete understanding of error-control coding.
- To understand encoding and decoding of digital data streams.
- To introduce the generation of these codes and their decoding techniques.
- To have a detailed knowledge of compression and decompression techniques.
- To introduce the concepts of multimedia communication.

Unit–I : Introduction

Overview of information theory, redundancy - Taxonomy of compression techniques - Overview of source coding, source models, Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, scalar quantization, vector quantization, rate distortion theory, structure quantizers - Evaluation techniques-error analysis and methodologies.

Unit–II : Text Compression


Unit–III : Audio Compression

Audio compression techniques-frequency domain and filtering-basic subband coding-application to speech coding-G.722-application to audio coding-MPEG audio, progressive encoding for audio - Silence compression, Speech compression techniques - Vocoders.

Unit–IV : Image Compression


Unit–V : Video Compression

Video signal representation - Video compression techniques-MPEG, Motion estimation techniques- Overview of Wavelet based compression and DVI technology, Motion video compression - PLV performance - DVI real time compression.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
Upon Completion of the course, the students will be able to
1) Describe various multimedia components.
2) Describe compression and decompression techniques.
3) Apply the compression concepts in multimedia communication.

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COURSE OBJECTIVES
- To expose the students to the fundamentals of microprocessor architecture
- To introduce the advanced features in microprocessors and microcontrollers
- To enable the students to understand various microcontroller architectures

Unit–I : High Performance CISC Architecture – Pentium

Unit–II : High Performance RISC Architecture – ARM

Unit–III : ARM Application Development
Introduction to DSP on ARM –FIR filter – IIR filter – Discrete fourier transform – Exception handling – Interrupts – Interrupt handling schemes- Firmware and bootloader – Embedded Operating systems – Integrated Development Environment-

Unit IV: Motorola 68HC11 Microcontrollers
Instruction set addressing modes – operating modes- Interrupt system- RTC- Serial Communication Interface – A/D Converter PWM and UART.

Unit V: PIC Microcontroller

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
The student will be able to work with suitable microprocessor / microcontroller for a specific real world application.

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COURSE OBJECTIVES
- To understand the fundamentals of signal processing for various bio-signal analysis
- To apply common signal processing techniques for various biomedical signals.
To impart knowledge about filter characteristics and to design various filters
To provide an in-depth knowledge about the basic concepts of wavelet analysis
To apply various signal processing techniques in analyzing the various bio-signal
To study about the characteristics of non-stationary signals

Unit–I : Analysis of Biosignals
Automatic analysis and classification of ECG, P-wave detection, QRS complex
detection, Correlation analysis of ECG signals, Signal averaged ECG, Analysis of Heart Rate variability, Synchronized averaging of PCG envelopes, envelopogram, Analysis of PCG signal, Analysis of EMG signal- EEG signal characteristics – EEG analysis.

Unit–II : Spectral Analysis

Unit–III : Adaptive Signal Processing

Unit–IV : Wavelets for BSP
Introduction to wavelets, Time frequency representation, Discrete wavelet transform, pyramid algorithm, Comparison of Fourier transform and wavelet transform, Applications - wavelet de-noising- discontinuity detection- feature detection-wavelet packets -wavelet compression.

Unit–V : Advanced Topics in BSP
Analysis of non stationary signals - time variant system – Fixed segmentation - Short time Fourier transform, autocorrelation function method, Spectral error measure method, generalized likelihood ratio, Adaptive segmentation.

TEXT BOOKS

REFERENCE BOOKS


COURSE OUTCOMES

Upon Completion of the course, the students will be able to

1) Understand the fundamentals of signal processing for various bio-signal analysis

2) Apply common signal processing techniques for various biomedical signals.

3) Impart knowledge about filter characteristics and to design various filters

4) Provide an in-depth knowledge about the basic concepts of wavelet analysis

5) Apply various signal processing techniques in analyzing the various bio- signal

6) Study about the characteristics of non stationary signals

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COURSE OBJECTIVES

- To introduce students to monitor, analyze and control any physical system.
- To understand students how different types of meters work and their construction
- To provide a student a knowledge to design and create novel products and solutions for real life problems.
- To introduce students a knowledge to use modern tools necessary for electrical projects.

Unit–I : Basic Measurement Concepts

Measurement systems - Static and dynamic characteristics - units and standards of measurements - error - accuracy and precision, types, statistical analysis - moving coil, moving iron meters - multi-meters - Bridge measurements : Maxwell, Hay, Schering, Anderson and Wien bridge.

Unit–II : Basic Electronic Measurements

Electronic Multi-meters - Cathode ray oscilloscopes - block schematic - applications - special oscilloscopes: delayed time base oscilloscopes, analog and digital storage oscilloscope, sampling oscilloscope - Q meters - Vector meters - RF voltage and power measurements - True RMS meters.
Unit–III : Signal Generators and Analyzers


Unit–IV : Digital Instruments


Unit–V : Data Acquisition Systems and Fiber Optic Measurement

Elements of a digital data acquisition system - interfacing of transducers - multiplexing - data loggers - computer controlled instrumentation - IEEE 488 bus - fiber optic measurements for power and system loss - optical time domains reflectometer.

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
1) Measure various electrical parameters with accuracy, precision, resolution.
2) Use AC and DC bridges for relevant parameter measurement.
3) Select appropriate passive or active transducers for measurement of physical phenomenon.
4) Use Signal Generator, frequency counter, CRO and digital IC tester for appropriate measurement.
5) Test and troubleshoot electronic circuits using various measuring instruments.
Mapping with Programme Outcomes (POs)

Course Outcomes | Programme Outcomes
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CO2 | ✔ | | | | | | | | ✔
CO3 | ✔ | | | | | | | | |
CO4 | ✔ | | | | | | | | ✔
CO5 | ✔ | | | | | | | | ✔

PE - LAB – PROFESSIONAL ELECTIVE LAB

1. Data Structures and C++ Lab
2. VLSI Lab
3. Networks and Lines Lab
4. Analog Integrated circuits Lab

COURSE OBJECTIVES

- To understand various object oriented concepts through simple programs.
- To understand the implementation of different data structures using C++
- To study the application of different data structures for implementing solutions to practical problems.
- To understand searching and sorting algorithms.

LIST OF EXPERIMENTS

1. Class and objects
2. Constructors
3. Adding two objects with overloaded constructors
4. Function Returning objects
5. Array of objects
6. operator overloading
7. Single Inheritance
8. Multilevel Inheritance
9. File Operations
10. Implementation of stack.
11. Implementation of queue.
12. Evaluation of postfix expression using stack
13. Implementation of single linked list
14. Implementation of Quick sort
15. Implementation of Binary Search tree.

COURSE OUTCOMES

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

1. Implement various object oriented concepts through simple programs.
2. Implement different data structures using C++
3) Apply the different data structures for implementing solutions to practical problems.

4) Demonstrate searching and sorting algorithms.

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COURSE OBJECTIVES
- To gain expertise in design, development and simulation of digital circuits with VHDL.
- To implement digital circuits on FPGA/CPLD devices.
- To analyse and implement basic circuits using Tanner tool.

LIST OF EXPERIMENTS
1) Study of Xilinx simulation and synthesis tool.
2) Design of Unit-adders and subtractors
3) Design and testing of parallel adder-subtractor.
4) Design and testing of BCD adder.
5) Design and testing of multiplexer and demultiplexer.
6) Design and testing of four bit magnitude comparator.
7) Design and testing of array multipliers.
8) Design and testing of flip-flops.
9) Design and testing of synchronous counters.
10) Design and testing of asynchronous counters.
11) Design and testing of scrambler and descrambler.

Experiments using TANNER tool
12) Functional verification of CMOS inverter.
13) Functional verification of CMOS universal logic gates.
14) Analysis of Differential amplifier.
15) Layout of CMOS inverter.

Tools
- Xilinx software, Tanner tool

COURSE OUTCOMES
Upon completion of the course the student will be able to
1) Develop a architecture of digital circuit for various applications
2) Develop VHDL model for digital circuits.
3) Implement digital circuits on FPGA/CPLD devices.
4) Develop layout of CMOS logic gates.

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**COURSE OBJECTIVES**

- To understand characteristics of symmetrical networks and transmission lines.
- To design passive filters and study its characteristics.
- To design attenuators and equalizers for given specification.

**LIST OF EXPERIMENTS**

1) Measurement of characteristic impedance and propagation constant for a symmetrical Network.
2) Determination of primary and secondary constants of a transmission line.
3) Determination of input impedance of a transmission line.
4) Design of Constant-K Low Pass filter.
7) Design of Constant-K Band Reject filter.
8) Design of M-derived Low pass filter.
9) Design of M-derived High pass filter.
10) Design of Composite Low pass filter.
11) Design of Attenuators.
12) Design of Equalizers.

**COURSE OUTCOMES**

Upon completion of the course the student will be able to

1) Understand the characteristics of Networks and transmission lines.
2) Design different types of passive filters for given specification.
3) Design attenuators and equalizers.
COURSE OBJECTIVES
- To experimentally study various applications of op-amp.
- To design of oscillators and amplifiers using Op-amp.
- To design and verify multivibrators using IC 555.
- To understand the principle of operation of ADC and DAC circuits.

LIST OF EXPERIMENTS
2) Design of Adders, Subtractors, Averaging amplifier
3) Design of Integrator and Differentiator using Op-amp.
4) Design of Log and Anti-log amplifiers.
5) Design and testing of Comparator, Zero crossing Detectors and Peak Detector using op-amps.
7) Design of Oscillators using op-amp.
8) Instrumentation amplifier using Op-amp.
9) Design of Astable and Mono stable Multivibrators using IC 555.
10) Voltage control oscillator using LM-565.
11) Design of Voltage regulators.
12) Study of ADC and DAC.

COURSE OUTCOMES
Upon completion of the course the student will be able to
1) Demonstrate the applications of Op-amps.
2) Design Amplifiers and Oscillators using Op-amp.
3) Design astable and mono stable multivibrators using IC 555 timer.
4) Understand principle of operation of DAC and ADC.

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OPEN ELECTIVES
1) Soft Computing Techniques
2) Quantitative Management Techniques
3) Network and Information Security
4) Cloud Computing
5) Biology for Engineers
6) Disaster Management
7) Entrepreneurship
8) National Service Scheme
9) Human Rights.

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COURSE OBJECTIVES

Upon completion of this course, the student should be able to get an idea on

- Artificial Intelligence, Various types of production systems, characteristics of production systems.
- Neural Networks, architecture, functions and various algorithms involved.
- Fuzzy Logic, Various fuzzy systems and their functions.
- Genetic algorithms, its applications.

Unit–I : Soft Computing and Artificial Intelligence


Unit–II : Neural Network


Unit–III : Perceptron and Counter Propagation Network


Unit–IV : Fuzzy Logic Controller


Unit–V : Genetic Algorithm, Hybrid Soft Computing Techniques and Applications


**TEXT BOOKS**

**REFERENCE BOOKS**
1) George J Klir, Bo Yuan, Fuzzy sets & Fuzzy Logic, Theory & Applications, PHI Publication.

**COURSE OUTCOMES**
At the end of the course the students can able to
1) Learn about soft computing techniques and their applications.
2) Analyze various neural network architecture.
3) Define the fuzzy systems.
4) Analyze the genetic algorithms and their applications.

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**COURSE OBJECTIVES**
- Understood the basic of the quantitative techniques.
- Learnt about the application of probability techniques in the decision making.
- Learnt the various inventory models and simulations in the resource planning and management.

**Unit–I : Introduction**
Development of Scientific Management - Application of Operations Research – Classification of Operation Research (OR) Models – Procedures to Obtain Optimum Solution – Scope of or Management Information Systems (MIS) - Classification of
MIS - Cost Volume And Profit (CVP) Analysis - Relationships - Various Approaches – Limitation Of CVP Analysis.

Unit–II : Probability Analysis

Unit–III : Inventory and Production Models

Unit–IV : Linear Programming

Unit–V : CPM - PERT Analysis
Introduction - Definition Of PERT - Network Replanning And Adjustment - CPM - Time Estimate - Crashing - Indirect And Utility Project Costs - PERT Cost Analysis - Project Budgeting - Control of Project Cost - Network Scheduling - Maximal Flow Problem – Limitation of PERT and CPM.

TEXT BOOKS

REFERENCE BOOKS
1) Samir Kumar Chakravarthy, “Theory and problems on Quantitative Techniques, Management Information system and Data processing” Central Educational Enterprises, 1989 (First Edition).

COURSE OUTCOMES
On the completion of the course, students should able to
1) Understand statistical inference in relation to international business decision-making.
2) Analyse output from both specialist and general office software.
3) Convey the results of quantitative analysis.
COURSE OBJECTIVES

- To understand the fundamentals of Cryptography
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To design security applications in the field of Information technology

Unit–I : Introduction


Unit–II : Symmetric Key Algorithms

Algorithms types and modes, Overview of Symmetric key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish, Advanced Encryption Standard (AES), Differential and linear cryptanalysis, hash functions.

Unit–III : Public Key Cryptosystems

Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Knapsack Algorithm, Elliptic curve cryptography, ElGamal, key management, Diffie Hellman key exchange and generation, Digital Signatures and authentication protocols-DSS.

Unit–IV : Security Practice and System Security


Unit–V : Wireless Network Security

Objectives, 3G Security Architecture, Authentication and Key Agreement in 3GPP, Confidentiality and Data Integrity.

**TEXT BOOKS**

**REFERENCE BOOKS**

**COURSE OUTCOMES**
Upon Completion of the course, the students will be able to
1) Implement basic security algorithms required by any computing system
2) Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
3) Analyze the possible security attacks in complex real time systems and their effective countermeasures
4) Analyze security threats related to wireless network.

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**COURSE OBJECTIVES**
- Gives the idea of evolution of cloud computing
- Provides knowledge about its services available today
- Helps to the design and development of simple cloud service.
- Focused on some key challenges and issues around cloud computing.

**Unit–I : Introduction**
Unit–II : Cloud Services
Types of Cloud Services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as Services. Service Providers - Google, Amazon, Microsoft Azure, IBM, Sales Force.

Unit–III : Collaborating Using Cloud Services

Unit–IV : Virtualization for Cloud
Need For Virtualization – Pros And Cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine Monitor – Virtual Machine Properties - Interpretation And Binary Translation, HLL VM - Hypervisors – Xen, KVM , Vmware, Virtual Box, Hyper-V.

Unit–V : Security, Standards and Applications

TEXT BOOKS

REFERENCE BOOKS
2) Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft cloud computing synopsis and recommendation, May 2011.

COURSE OUTCOMES
Upon Completion of the course, the students will be able to
1) Understand clearly about the introduction of cloud computing
2) Acquired knowledge about its services
3) Design and development of simple cloud service.
4) Implement Practical applications using cloud
5) Gain knowledge on some key challenges and issues around cloud computing

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**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 : Behavior 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**

REFERENCE BOOKS

COURSE OUTCOMES
• The ability to understand the information known about familiar living systems.
• The ability to anticipate the properties of an unfamiliar group of living things from knowledge about a familiar group.
• The ability to demonstrate the relevance of engineering to biological systems.
• The knowledge about the biological responses and it is scaling with respect to scientific principles that cannot be related back.
• The knowledge of biological principles and generalizations that can lead to useful products and processes.
• The ability to avoid or mitigate unintended consequences of dealing with any and all living system.

COURSE OBJECTIVES
This course helps in providing the basic concepts of disasters and also gives a thorough knowledge and experience to reduce disaster risks.

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.

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


REFERENCE BOOKS


COURSE OUTCOMES
1) Develop an understanding of the key concepts, definitions key perspectives of all Hazards Emergency Management.

2) Develop a basic under understanding of Prevention, Mitigation, Preparedness, Response and Recovery.

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COURSE OBJECTIVES
- Develop an entrepreneurship sprit.
- Help to identify business opportunities within an organization or independently.
- Initiate action on the business plan from the prospective business through EDC
Unit–I

Unit–II

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

TEXT BOOKS

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.

COURSE OUTCOMES
At the end of this course the student should have an understanding about entrepreneurship. The students should have knowledge about the principles of business Plan.

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<tr>
<th>00EEXXX</th>
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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

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.

REFERENCE BOOKS
2) Training Programme on National Programme Scheme, TISS.
3) Orientation Courses for N.S.S. Programme Officers, TISS.
4) Case material as Training Aid for Field Workers, Gurmeet Hans.
5) Social Service Opportunities in Hospitals, Kapil K. Krishan, TISS.
6) Social Problems in India, Ram Ahuja.
COURSE OBJECTIVES

At the end of this course the student is expected to understand what is human rights, how to obey the rights, what is the role of a human being in making a good society for the future generations.

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


3) Mausice Cranston, What is Human Rights.


5) Human Rights, A Selected Bibliography, USIS.


7) Devasia, V.V., Human Rights and Victimology.