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.

Branches of Study in B.E.

<table>
<thead>
<tr>
<th>BRANCH</th>
<th>Course</th>
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<tbody>
<tr>
<td>I</td>
<td>Civil Engineering</td>
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<td>II</td>
<td>Civil and Structural Engineering</td>
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<tr>
<td>III</td>
<td>Mechanical Engineering</td>
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<tr>
<td>IV</td>
<td>Mechanical Engineering (Manufacturing)</td>
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<td>V</td>
<td>Electrical and Electronics Engineering</td>
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<td>VI</td>
<td>Electronics and Instrumentation Engineering</td>
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<td>VII</td>
<td>Chemical Engineering</td>
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<tr>
<td>VIII</td>
<td>Computer Science and Engineering</td>
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<td>IX</td>
<td>Information Technology</td>
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<tr>
<td>X</td>
<td>Electronics and Communication Engineering</td>
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</tbody>
</table>

Courses of study

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

Scheme of Examinations

The scheme of Examinations is given separately.
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).

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, IICHE

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.

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.

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.

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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 resultspassing 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.
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.

**Awarding degree**

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

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

- For First Class, the student must earn a minimum of 176 credits within five years (135 credits within four years for lateral entry students) from the time of admission and obtain a CGPA of 6.75 or above for all the subjects from I Semester to VIII Semester (III Semester to VIII Semester for lateral entry students).

- For Second Class, the student must earn a minimum of 176 credits within eight years (135 credits within seven years for lateral entry students) from the time of admission.

**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.

**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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<tbody>
<tr>
<td>1.</td>
<td>Civil Engineering</td>
<td>i. Civil Engineering</td>
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<td>ii. Civil Engineering(Architecture)</td>
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<td>iii. Environmental Engineering and Pollution Control(Full Time)</td>
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<td>iv. Architectural Assistantship</td>
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<td>v. Civil Engineering (Rural Tech.)</td>
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<td>vi. Civil and Rural Engineering</td>
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<td>2.</td>
<td>Civil and Structural Engineering</td>
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<td></td>
<td></td>
<td>i. Civil Engineering</td>
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<td>ii. Civil Engineering(Architecture)</td>
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<td>iii. Environmental Engineering and Pollution Control(Full Time)</td>
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<td>iv. Architectural Assistantship</td>
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<td>v. Civil Engineering (Rural Tech.)</td>
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<td>vi. Civil and Rural Engineering</td>
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<td>3.</td>
<td>Mechanical Engineering</td>
<td>i. Mechanical Engineering</td>
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<td>ii. Mechanical and Rural Engineering</td>
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<td>Mechanical Engineering</td>
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<td>Sl.No.</td>
<td>Branches of Study</td>
<td>Eligible Diploma Programme (FT / PT / SW)</td>
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<td></td>
<td>(Manufacturing Engineering)</td>
<td>iii. Mechanical Design and Drafting</td>
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<td>iv. Production Engineering</td>
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<td>v. Production Technology</td>
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<td>vi. Automobile Engineering</td>
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<td>vii. Automobile Technology</td>
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<td>viii. Metallurgy</td>
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<td>ix. Mechatronics Engineering</td>
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<td>x. Machine Tool Maintenance and Repairs</td>
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<td>xi. Tool and Die making</td>
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<td>xii. Tool Engineering</td>
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<td>xiii. Tool Design</td>
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<td>xiv. Foundry Technology</td>
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<td>xv. Refrigeration and Air Conditioning</td>
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<td>xvi. Agricultural Engineering</td>
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<td>xviii. Marine Engineering</td>
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<td>xix. Mechanical Engineering (Production)</td>
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<td>xxi. Mechanical Engineering (Foundry)</td>
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<td>xxii. Mechanical Engineering (R &amp; A.C.)</td>
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<td>xxiii. Electronics (Robotics)</td>
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<td>xxiv. Mining Engineering</td>
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<td>xxv. Agricultural Engineering and Farm</td>
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<td>xxvi. Equipment Technology</td>
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<td>5.</td>
<td>Electrical and Electronics Engineering</td>
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<td>ii. Electronics and Communication Engg.</td>
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<td>iv. Electronics Engineering (Instrumentation)</td>
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<td>vi. Instrumentation and Control Engineering</td>
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<td>vii. Electrical Engineering (Instruments and Control)</td>
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<td>ix. Instrumentation Technology</td>
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<td>iii. Environmental Engineering and Pollution Control</td>
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<td>iv. Leather Technology (Footwear)</td>
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<td>v. Leather Technology</td>
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<td>v. Chemical Technology</td>
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<td>x. Textile Technology</td>
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<td>xiii. Pulp &amp; Paper Technology</td>
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<td>Electronics and Communication Engineering</td>
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FT - Full Time; PT - Part Time; SW - Sandwich.

COURSES AND CREDITS - SUMMARY

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<th>PC</th>
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* - No of Credits  ** - No of Courses

DETAILS OF COURSE CODE
### DEPARTMENT OF INFORMATION TECHNOLOGY

**Curriculum for B.E. (Information Technology)**

#### (2016-2017 Onwards)

**FIRST SEMESTER**

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

- **L** - Lecture; **T** - Tutorial; **P** - Practical; **D** - Drawing
- **Exam** - End Semester Examination; **CA** - Continuous Assessment

---

### Code (First Two digits) | Details
---|---
00 | Common course for the faculty
01 | Civil Engg. Course
02 | Civil and Structural Engg. Course
03 | Mechanical Engg. Course
04 | Mechanical Engg. (Manufacturing) Course
05 | Electrical and Electronics Engg. Course
06 | Electronics and Instrumentation Engg. Course
07 | Chemical Engg. Course
08 | Computer Science and Engg. Course
09 | Information Technology Course
10 | Electronics and Communication Engg. Course
**XX** | Code of the programme concerned (01 to 10)

### Code (3rd and 4th Digits) | Details
---|---
HS | Humanities Theory
HP | Humanities Practical
BS | Basic Science Theory
BP | Basic Science Practical
ES | Engineering Science Theory
SP | Engineering Science Practical
PC | Professional Core Theory
CP | Professional Core Practical
PE | Professional Elective Theory
EP | Professional Elective Practical
ST | Seminar / Industrial Training
OE | Open Elective Theory
PV | Project and Viva-voce
## SECOND SEMESTER

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


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

## THIRD SEMESTER

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**Total** |     |     |     | 24 | 9  | 630 | 270 | 900  | 25      |

### SIXTH SEMESTER

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**Total** |     |     |     | 24 | 9  | 630 | 270 | 900  | 24      |

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

### SEVENTH SEMESTER

<table>
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<th>Sl. No.</th>
<th>Category</th>
<th>Course Code</th>
<th>Course</th>
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**Total** | 20 | 6 | 1 | 555 | 245 | 800 | 20 |
EIGHTH SEMESTER

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<th>Sl. No.</th>
<th>Category</th>
<th>Course Code</th>
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SYLLABUS
FIRST SEMESTER

00HS101 TECHNICAL ENGLISH

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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.

- Listening process.
- Types of listening.
- Barriers to listening.
- Characteristics of good listeners.
- 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.

- Interview Techniques.
- Group discussion.
Making presentation and Discussing on the presentation.
Sample interviews.
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.
Poster making.
Letter writing (formal and E-mail).
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.

Single word substitution.
Concord.
Tag Questions.
Active voice and passive voice.

**Text Book**


**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.
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.

<table>
<thead>
<tr>
<th>00BS103</th>
<th>APPLIED PHYSICS – I</th>
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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 Ultrasonics – production – magnetostriction and piezo electric methods – Detection of Ultrasonic waves (Acoustics grating) – Applications.

Unit–III : Optics

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

**Unit-V : Nuclear Physics**


**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.

<table>
<thead>
<tr>
<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


Unit–II : Electrochemistry


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.

<table>
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<tr>
<th>00SP105</th>
<th>COMPUTER PROGRAMMING LAB</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

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.

<table>
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<tr>
<th>00SP106</th>
<th>ENGINEERING WORKSHOP</th>
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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
- Use basic tools of fitting, carpentry and sheet metal fabrication.
- Experience in the fabrication of simple carpentry joints.
- Develop skill to make simple fitting joints.
- Train to make simple shapes of sheet material.
- Distinguish hand forging and drop forging operation.
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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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
Introduction to Nanomaterials – properties – Types of nanomaterials – synthesis of nanomaterials – Top-down approaches – Mechanical grinding, Lithography –

Unit–IV : Quantum Mechanics

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

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

Unit–V : Energy Physics


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

TEXT BOOKS

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.
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.

<table>
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COURSE OBJECTIVES

- PO1: To impart the basic principles of generation of electrical energy.
- PO2: To explain the operation of electrical machines and various measuring instruments.
- PO3: To understand the basic concepts of circuit analysis.
- PO4: 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.

Communication systems-Microwave, Satellite, Fibreoptic and ISDN (block diagram description only).

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
After the completion of the course, the student should be able to
1) CO1: Provide comprehensive idea about simple circuit analysis, working principles of machines and common measuring instruments
2) CO2: Analyze the behavior of any dc and ac circuits
3) CO3: Characterize semiconductor devices that include diodes, BJT and digital functions.
4) CO4: Understand fundamental principles of communication systems.

<table>
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<tr>
<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.

<table>
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<tr>
<th>00HS205</th>
<th>COMMUNICATION SKILLS AND LANGUAGE LAB</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
  - Reading comprehension
  - Listening comprehension
  - Vocabulary exercises
  - Phonetics
  - Role Play in dialogues
  - Auto Speak

REFERENCES
1) Globarena Package for communicative English
2) Cambridge Advanced Learner’s English Dictionary
3) Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
7) A text book of English Phonetics for Indian Students by T.Balasubramanian (Macmillan)
8) English Skills for Technical Students, WBSCTE with British Council, OL.

DISTRIBUTION AND WEIGHTAGE OF MARKS

   English Language Laboratory Practical Paper:

   The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

   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

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.

Train the students to use language effectively to face interviews, group discussions, and public speaking.

Initiate the students into greater use of the computer in resume preparation, report writing, format-making, etc.

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<th>00BP206</th>
<th>APPLIED PHYSICS LAB</th>
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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
6) Rigidity Modulus of the material of a wire.
7) Field along the axis of a coil– Determination of horizontal earth magnetic flux density.
8) Air wedgE– Determination of thickness of a given thin wire and paper.
9) Viscosity – Determination of co-efficient of Viscosity of a less viscous liquid by Capillary flow method
10) Uniform bending– Determination of Young’s modulus of the given scale or beam.
11) Spectrometer – Determination of wavelength of the prominent spectral lines using Grating.
13) 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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**COURSE OBJECTIVES**

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

**LIST OF EXPERIMENTS**

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

**COURSE OUTCOMES**

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

1) 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


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

MISSION
• To partner with the University community to understand the information technology needs of faculty, staff and students
• To develop dynamic IT professionals with globally competitive learning experience by providing high class education
• To involve graduates in understanding need based Research activities and disseminate the knowledge to develop entrepreneur skills

B.E. (IT) – PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

<table>
<thead>
<tr>
<th>Program Educational Objective 1 (PEO1)</th>
<th>To offer students with core competence in mathematical, scientific and basic engineering rudiments necessary to prepare, analyze and solve hardware/software engineering problems and/or also to pursue advanced study or research.</th>
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<tr>
<td>Program Educational Objective 2 (PEO2)</td>
<td>To educate students with good scope of knowledge in core areas of IT and related engineering so as to comprehend engineering trade-offs, analyze, design, and synthesize data and technical concepts to create novel products and solutions for the real life problems.</td>
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</table>
### Program Educational Objective 3 (PEO3)

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

### Program Educational Objective 4 (PEO4)

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

### PROGRAM OUTCOMES (POs)

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<tr>
<th>PO</th>
<th>Description</th>
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<td>PO1</td>
<td>Capability to apply knowledge of mathematics, Science, Engineering fundamentals and core IT skills to the solution of complex engineering problems.</td>
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<td>PO2</td>
<td>Identify, articulate, research literature and analyze complex engineering problems in IT.</td>
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<tr>
<td>PO3</td>
<td>Design and develop software solutions for complex problems in data engineering, distributed systems and information systems.</td>
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<td>PO4</td>
<td>Use research based knowledge and methodologies in the design and conduct of experiments, organization, analyze and interpretation of data to identify patterns, produce meaningful conclusion and recommendation for complex problems.</td>
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<td>PO5</td>
<td>Create, select and apply appropriate techniques, resources and modern engineering and IT tools to complex engineering problems.</td>
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<td>PO6</td>
<td>Apply reasoning informed by the contextual knowledge to societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</td>
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<td>PO7</td>
<td>Understand the impact if the professional engineering solution in societal and environmental context and demonstrate the knowledge and need for sustainable development.</td>
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<td>PO8</td>
<td>Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice in managing information technology.</td>
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<td>PO9</td>
<td>Function effectively as an individual and as a member or leader in diverse teams to deliver reports and projects.</td>
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<td>PO10</td>
<td>Communicate effectively in complex engineering activities. Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological changes.</td>
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### Mapping Programme Educational Objectives (PEOs) with Programme Outcomes (POs)

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#### PE-PROFESSIONAL ELECTIVES

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

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

OE-OPEN ELECTIVES

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

THIRD SEMESTER

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<tr>
<th>00HS301</th>
<th>ENVIRONMENTAL STUDIES</th>
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COURSE OBJECTIVES

- To make the students conversant with basic principles of natural resources, forest resources, ecosystem and bio-diversity.
- To get knowledge about pollution and its control.

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


Unit–V


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

REFERENCE BOOKS
4) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
5) Down to Earth, Centre for Science and Environment.
7) Hawkins R.E., Encyclopaedia of Indian Natural History, Bombay Natural History Society, Bombay.
**COURSE OUTCOMES**

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

- To conversant with basic principles of natural resources, forest resources
- To conversant with basic principles of ecosystem and bio-diversity
- To identify the causes of pollution and its control measures

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<th>00BS302</th>
<th>ENGINEERING MATHEMATICS – III</th>
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**COURSE OBJECTIVES**

- To learn, partial 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 equations.

**Unit–I**


**Unit–II**


**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**


**Unit–V**

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Solve partial differential equations and Fourier series problems.
2) Understand Fourier transform and Z-transforms.
3) Solve boundary value problems.

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<th>00ES303</th>
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COURSE OBJECTIVES
• To introduce the fundamentals of forces and their effects with their governing laws.
• To understand the definitions of particle, body forces and their equilibrium conditions.
• To understand and predict the forces and its related motions.

Unit–I

Unit–II
Unit–III


Unit–IV


Unit–V


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

TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Explain the forces and its related laws of mechanics in static and dynamic conditions.
2) Analyse the forces and its motions on particles, rigid bodies and structures.
3) Solve the moment of inertia of any sections and masses for the structural members.

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COURSE OBJECTIVES

- To understand the fundamentals of semiconductor devices, transistors and amplifiers
- To introduce the laws of Boolean algebra and solve problems in combinational logic
- To explain sequential logic and memory circuits and systems

Unit–I


Unit–II


Unit–III

Unit–IV


Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Acquire knowledge of diodes, rectifiers and transistors.
2) Understand the operation of amplifiers and oscillators.
3) Implement Boolean expressions using gates.
4) Design counters using flip flops.

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</table>
COURSE OBJECTIVES

- To study the architecture of 8085/8086 microprocessor and other processor.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To study about communication and bus interfacing.
- To study the architecture of 8051 microcontroller.

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES
At the end of this course, the students will be able to
1) Design the programs on 8086 microprocessor.
2) Analyze the Input/output circuits.
3) Identify Memory Interfacing circuits.
4) Implement 8051 microcontroller based system.

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<th>DATA STRUCTURES AND ALGORITHMS</th>
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COURSE OBJECTIVES
- To understand Abstract Data Types (ADT).
- To know the applications of lists and Stacks.
- To understand the various types of Balanced Trees with its working procedures.
- To learn about Hashing, Separate chaining, open addressing, rehashing and extendible hashing.

Unit–I

Unit–II

Unit–III
Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

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

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PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10 are the Programme Outcomes.
09SP307  BASIC ELECTRONICS ENGINEERING LAB  

L T P
0 0 3

COURSE OBJECTIVES

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

LIST OF EXPERIMENTS

1) Characteristics of Semiconductor Diodes.
2) Characteristics of Zener Diode.
3) Characteristics of Bipolar Junction Transistor (BJT).
4) Estimation of Ripple factor and efficiency in a full wave rectifier with and without filter.
5) Verification of logic gates using integrated chips.
6) Simplification of Boolean expressions using Karnaugh Map.
7) Verification of Digital Multiplexer and De0Multiplexer.
8) Design and Simulation of 3–bit Synchronous Counter using electronic work bench software.

COURSE OUTCOMES

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

1) Students will be able to explain basic circuit concepts and responses.
2) The student can explain the concept at capacitance, inductance and the concepts at terminal devices.
3) Familiarize with working principles, assembly and applications of IC.

09CP308  MICROPROCESSOR LAB

L T P
0 0 3

COURSE OBJECTIVES

- The students will be able to understand the microprocessor programs and its applications.
- The students will be able to understand the architecture of 8085 and 8086 microprocessor.
- To study and understand the assembly language programming using 8085 microprocessor.
- The students will be equipped with microprocessor interfacing and its applications.
LIST OF EXERCISES
1) Study of 8085 and study of 8086 microprocessor.
2) 8–bit Arithmetic Operation.
3) 16–bit Arithmetic Operation.
4) Find the number of even and odd number in a block of data.
5) Fibonacci series
6) Hexadecimal to binary conversion.
7) Matrix Addition.
8) Sorting an array of number.
9) Searching a string
10) Digital clock
11) Square wave generation using 8253IC.
12) Stepper motor interface using 8255IC.
13) Data transfer using USART.
14) Keyboard status
15) Message display 8279IC.
16) Simulation of traffic light control signal.

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Familiarize with assembly language programming.
2) Design circuits for various applications using interfaces.
3) An in–depth knowledge of applying concepts on real time applications.

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FOURTH SEMESTER

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COURSE OBJECTIVES
• Discrete Mathematics is designed to study various finite structures of Mathematics which are essential to develop the various concepts of Computer Science.
• The rise of the digital computer over the second half of the twentieth century has coincided with a growth of interest in these fields.
• Discrete Mathematics has now become a major area of Mathematics in its own right.
Unit–I  

Unit–II  

Unit–III  

Unit–IV  

Unit–V  
Graph Theory: Graphs – Special simple graphs – Matrix representation of graphs – Path cycles and connectives – Eulerian and Hamiltonian graphs – Shortest path algorithms.

TEXT BOOKS  

REFERENCE BOOKS  

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

• Acquire the basic concepts in Mathematical Logic and theory of inferences.
• Understand the concepts of Set theory, Relations and equivalence classes with matrix representation.
• Familiarize Lattice theory, Boolean algebra and Group theory
• Design coding and encoding group codes concept.
• Understand the basic concepts of Graph theory, Eulerian and Hamiltonian graphs
**COURSE OBJECTIVES**

- This subject enables the students to gain a vast knowledge about various conducting, semi conducting, magnetic, dielectric and optical materials.

**Unit–I**


**Unit–II**


**Unit–III**


**Unit–IV**


**Unit–V**


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
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 get a clear understanding of object-oriented concepts.
- To understand the basics of C++, objects and classes, Inheritance, Polymorphism.
- To understand the basics of I/O and file management, and advance topics including templates, exceptions and Standard Template Library.

Unit-I
Introduction: Traditional Versus Object Orientation Approach – Benefits and applications of OOP– Characteristics of Object Oriented Programming Languages:

Unit II


Unit III


Unit IV


Unit V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES

At the end of this course, the students will be able to
1) Student should be able to analyze and design a computer program based on Object Oriented Principles.
2) Students will be able to solve a real world problems based on Object Oriented Principles.
3) Gain the basic knowledge on Object Oriented concepts.
4) Ability to develop applications using Object Oriented Programming Concepts.
5) Ability to implement features of object oriented programming to solve real world problems.

Mapping with Programme Outcomes

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09PC404 COMPUTER ARCHITECTURE

COURSE OBJECTIVES

- To understand the basic structure and operation of digital computer.
- To study the basic processing concepts and bus organization.
- To study the two types of control UNIT techniques and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

Unit–I

Functional UNIT s – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware-Software interface-Instruction set architecture-Addressing modes – RISC – CISC – ALU design – Fixed point and floating point operations.
Unit–II

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

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand the functional UNITs of a computer, bus structures and addressing modes.
2) Learn about single bus, multiple bus organization.
3) Design and analyze the pipelining concepts.
4) Analyze RAM, ROM, cache memory and virtual memory concepts.
5) Evaluate the various I/O interfaces.
Mapping with Programme Outcomes

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COURSE OBJECTIVES

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

Unit–I


Unit–II


Unit–III

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

Unit–IV

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

Unit-V

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

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Demonstrate the knowledge and understanding of basic concepts in analogue and digital communication systems.
2) Understand the practical implementation and limitations of modulation techniques.
3) Design and assess the basic communication systems.
4) Utilize the fundamental principles for signal analysis.
5) Design and test the analog and digital modems.

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COURSE OBJECTIVES

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

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V

TEXT BOOKS

REFERENCE BOOKS

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

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COURSE OBJECTIVES
The student should be made to:
- Be familiarized with good programming design methods, particularly Top-Down design.
- Getting exposure in implementing the different data structures using C++.
- Appreciate recursive algorithms.
LIST OF EXERCISES

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

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COURSE OBJECTIVES

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

LIST OF EXERCISES

1) Implementation of queries for student database
2) Data Definition Language— with constraint and without constraint
3) Data Manipulation Language— Insert, Delete, Update, Select and truncate
4) Transaction Control Statement— Commit, Save point, Roll back
5) Data Control Statement— Grant, Revoke
6) Data Projection Statement – Multi column, alias name, arithmetic operations, distinct records, concatenation, where clause

7) Data Selection Statement – Between, and, not in, like, relational operators and logical operators

8) Aggregate functions – count, maximum, minimum, sum, average, order by, group by, having

9) Joint queries – inner join, outer join, selfjoin, Cartesian join, or cross join

10) Sub queries – in, not in, some, any, all, exist, not exist

11) Set operations – union, union all, intersect, minus

12) Database objects – synonym, sequences, views and index

13) Cursor

14) Functions and procedures

15) Trigger

16) Exceptions

17) Packages

18) Factorial of a number

19) Checking whether a number is prime or not

20) Fibonacci series

21) Reverse the string

22) Swapping of numbers

23) Odd or even number

24) Duplication of records

FIFTH SEMESTER

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COURSE OBJECTIVES

- Understand various computing models like Finite State Machine, Pushdown Automata and Turing Machine.
- Be aware of decidability and un-decidability of various problems.
- Learn types of grammars.

Unit–I

Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Design Finite state Machine, Pushdown Automata and Turing Machine.
2) Explain the decidability or undecidability of various problems.
3) Explain the concept of different types of grammars.
### Mapping with Programme Outcomes

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### COURSE OBJECTIVES

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks.
- Be exposed to the required functionality at each layer.
- Learn the flow control and congestion control algorithms.

#### Unit–I

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

#### Unit–III

#### Unit–IV

#### Unit–V

### TEXT BOOKS
REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
- Identify the components required to build different types of networks.
- Choose the required functionality at each layer for given application.
- Identify solution for each functionality at each layer.
- Trace the flow of information from one node to another node in the network.

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COURSE OBJECTIVES
- To develop, design and implement two dimensional and three dimensional graphical structures.
- To provide knowledge about transformations and clipping techniques.
- To acquire knowledge in OpenGL programming.
- To understand various aspects of multimedia.
- To learn the concept of sound, images and videos.

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 be able to

1) Design 2D and 3D graphical structures.
2) Apply 2D and 3D transformations.
3) Implement clipping techniques.
4) Create graphical structures using OpenGL.
5) Gain knowledge of multimedia systems.

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COURSE OBJECTIVES

- To introduce students with basic concepts of operating system its function and services.
- To teach the features of operating system and the fundamental theory associated with process, memory and file management component of operating systems.
- To provide the knowledge about UNIX operating system.

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand the role of operating system.
2) Compare the various algorithms and comment about performances of various algorithms used for management of memory, CPU scheduling, file handling and I/O operations.
3) Apply various concept related with deadlock to solve problem related with resources allocation, after checking system in safe state or not.
4) To appreciate role of process synchronization towards increasing throughput of system.

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09CP507 COMPUTER GRAPHICS AND MULTIMEDIA LAB

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

LIST OF EXERCISES
1) Implementation of Bresenham's Algorithm – Line and Circle.
2) Implementation of Bresenham's Algorithm – Ellipse.
3) Implementation of Line, Circle and Ellipse attributes.
4) Two Dimensional transformations – Translation, Rotation, Scaling, Reflection, Shear.
5) Cohen Sutherland 2D line clipping and Windowing.
6) Sutherland – Hodgeman Polygon clipping Algorithm.
7) Three dimensional transformations – Translation, Rotation, Scaling.
8) Drawing three dimensional objects and Scenes.
9) Line DDA, chain of diamonds, chessboard.
10) Generating Fractal images

**GIMP**
1) Creating Logos.
2) Simple Text Animation.

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

**Windows Movie Maker**
1) Applying effect to Video.
2) Creating Titles in Video.

**Swish**
1) Text Effects.
2) PrE-Loader.

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

**Photo Impact**
1) Text Effects.
2) Image Slicing.

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**COURSE OBJECTIVES**

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

**LIST OF EXERCISES**

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

SIXTH SEMESTER

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COURSE OBJECTIVES

- To be familiar with the concepts of data warehouse and data mining,
- To be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

Unit–I

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

Unit–II


Unit–III


Unit–IV

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

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Apply data mining techniques and methods to large data sets.
2) Use data mining tools
3) Compare and contrast the various classifiers.

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COURSE OBJECTIVES
- To study the basic components of DSP systems.
- To study DFT and its computation.
- To study the design techniques for digital filters (IIR & FIR).
- To study the finite word length effects and applications in signal processing.

Unit–I
Basic Elements of Digital Signal Processing Systems – Classification of Signals – The concept of frequency in Continuous time and Discrete time domain – DiscretE-

Unit II

Unit III

Unit IV

Unit V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
• Design both analog and digital filters.
• Design DSP processors.
• Do the projects in Signal processing, Image processing and Speech Processing.
Mapping with Programme Outcomes

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**09CP607  DATA WAREHOUSING AND DATA MINING LAB**

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**COURSE OBJECTIVES**

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

**LIST OF EXERCISES**

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

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

LIST OF EXERCISES

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

SEVENTH SEMESTER

COURSE OBJECTIVES

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

Unit–I

Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
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.
Mapping with Programme Outcomes

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**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**


**Unit–II**


**Unit–III**

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

**Unit–IV**


**Unit–V**

TEXT BOOKS

REFERENCE BOOKS
6) OWASP top ten security vulnerabilities: http://xml.coverpages.org/OWASPTopTen.pdf

COURSE OUTCOMES
1) Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
2) Analyze the possible security attacks in complex real time systems and their effective countermeasures.
3) Identify the security issues in the network and resolve it.
4) Evaluate security mechanisms using rigorous approaches, including theoretical derivation, modeling, and simulations.
5) Formulate research problems in the computer security field.

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COURSE OBJECTIVES

The student should be made to:

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

LIST OF EXERCISES

1) Implement the following substitution & transposition techniques:
   a. Caesar Cipher
   b. Playfair Cipher
   c. Hill Cipher
   d. Vigenere Cipher
   e. Rail fencE-row & Column Transformation

2) Implement the following algorithms
   a. DES
   b. RSA Algorithm
   c. DiffieE-Hellman
   d. MD5
   e. SHA-1

3) Implement the SIGNATURE SCHEME-Digital Signature Standard

4) Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).

5) Setup a honey pot and monitor the honeypot on network (KF Sensor)

6) Installation of rootkits and study about the variety of options

7) Perform wireless audit on an access point or a router and decrypt WEP and WPA.( Net Stumbler)

8) Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

COURSE OBJECTIVES

- To encourage the students to study advanced engineering developments.
- To prepare and present technical reports.
- To encourage the students to use various teaching aids such as over head projectors, power point presentation and demonstrative models.
METHOD OF EVALUATIONS

- During the seminar each student is expected to prepare and present the topic on the relevant engineering project topics for duration of about 8 to 10 minutes.
- In a session of 3 periods per week, 15 students are expected to present the seminar.
- Each student is expected to present at least twice during the semester and the student is evaluated based on that.
- At the end of the semester, he/she can submit a report on his/her topic of seminar and marks are given based on the reports.
- A faculty guide is to be allotted and he/she will guide and monitor the progress of the student and maintain attendance also.
- Evaluation is 100% Internal.

EIGHTH SEMESTER

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COURSE OBJECTIVES

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
- To train the students in preparing project reports and to face reviews and viva voce examination.

COURSE OUTCOMES

1) On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
2) Carrying out any experimental works on concrete and steel or any other construction material to know the behavior and properties
3) Understand the modelling, analysis and design concepts by taking up a structure.

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### COURSE OBJECTIVES

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

### Unit I

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

### Unit II


### Unit III


### Unit IV

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

### Unit V


### TEXT BOOKS


### REFERENCE BOOKS


COURSE OUTCOMES
At the end of this course, the students will be able to
1) Design static web page using HTML.
2) Develop server–side web page using Java applets and Swings.
3) Acquire engineering knowledge on server–side web page using Servlets.
4) Develop individual and team work based server–side web page using JSP.
5) Perform client–side project management using Java Script.

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

Unit–I

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


Unit–IV


Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Apply prerequisite basic programming concepts to Perl
2) Write, compile, and run Perl programs, Analyze the effects of using Perl structures that implement decisions, loops, and store arrays and use these structures in a well–designed, OOP program
3) Create Perl programs that make use of various directories and use several files linked together

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COURSE OBJECTIVES

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, recursion and function calls.
- To learn how to use basic data structures such as List, Dictionary and be able to manipulate text files and images.
- To understand the process and will acquire skills necessary to effectively attempt.
- Programming problem and implement it with a specific programming language-Python.

Unit–I

Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS
2) Jennifer Campbell, Paul Gries, Jason montajo, Greg Wilson, “Practical Programming An Introduction To Computer Science Using Python” The Pragmatic Bookshelf, 2009

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Gain knowledge about the basic concepts of python programming.
2) Solve the basic design problems using object and classes.
3) Able to demonstrate systematic knowledge of backend and front end by developing an appropriate application.
4) Obtain the knowledge of DBM and SQL databases from python.

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### COURSE OBJECTIVES

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

#### Unit–I


#### Unit–II


#### Unit–III


#### Unit–IV


#### Unit–V


### TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Student should be able to analyze and design an Information coding system.
2) Students will be able to solve a discrete symmetric channel.
3) Gain the basic knowledge on Error Control Coding and Convolutional codes
4) Ability to develop applications using Text, Audio and Speech source codes
5) Develop skill to implement the image and video source codes

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09PExxx

COURSE OBJECTIVES

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

Unit–I

87


Unit–II


Unit–III


Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


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

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09PExxx LINEAR INTEGRATED CIRCUITS

COURSE OBJECTIVES
The student should be made to:
- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and Non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.

Unit–I
Unit–II

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

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS
1) OP–AMP and Linear IC’s By Ramakant A. Gayakwad, Prentice Hall
2) Digital Integrated Electronics, By Taub and Schilling, McGraw Hill
3) Integrated Electronics, By Millman J. and Halkias C.C., McGraw Hill.
4) Op–Amp and Linear IC’s, By Caughlier and Driscoll, PHI

COURSE OUTCOMES
At the end of the course, the student should be able to:
1) Understand the characteristics of Op Amp.
2) Understand the applications ICs in the processing of analog signals.
3) Analyze and design high frequency amplifier using Op Amp.
4) Analyze and design the electronic circuits using linear integrated circuit
5) Analyze and design the Voltage Regulators using ICs’.
| Mapping with Programme Outcomes |
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| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
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| 09PExxx | SOFTWARE ENGINEERING |
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**COURSE OBJECTIVES**

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

**Unit-I**


**Unit-II**


**Unit-III**

Unit–IV


Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Comprehend the basic elements of Software Project Models.
2) Visualize the significance of the different kind of Software Testing methods.
3) Ability to analyze the strategies in Software Designing.
4) Understand the significance of Software Reengineering.
5) Perform SQA process in Software projects.

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PO: Programme Outcomes
CO: Course Outcomes
✓: Indicates the mapping of the Course Outcome with the Programme Outcome
COURSE OBJECTIVES

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

Unit–I

Unit–II

Unit–III

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

Unit–V
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Acquiring Knowledge on fundamental of distributed objects using Microsoft’s COM/DCOM architecture.
2) Gaining experienced skills on Distributed Objects.
3) Familiarizing the peer to peer services and file system.

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09PExxx | SERVICE ORIENTED ARCHITECTURE | L | T | P |
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COURSE OBJECTIVES
The student should be made to:
- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

Unit–I
Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Build applications based on XML.
2) Develop web services using technology elements.
3) Build SOA – based applications for intra–enterprise and inter–enterprise applications

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COURSE OBJECTIVES

- To learn the fundamental concepts of MATLAB.
- To introduce basic concepts like acquiring, storing and processing of images.
- To provide details about enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest.
- To understand the applications of Image Processing.

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V


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

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) To understand the basic image enhancement techniques in spatial & frequency domains.
2) To understand the basic multi-resolution techniques and segmentation methods.
3) To apply this concepts for image handling in various fields.

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

Unit—I

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

Unit–III


Unit–IV

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

Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Organizational and individual decision–making.
2) Key concepts and current practices of business intelligence.
3) The individual, organizational and societal impacts of bi systems.
4) Analytical techniques used in business intelligence systems.
5) Integration of business intelligence into decision–making processes.
COURSE OBJECTIVES

The student should be made to:

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

Unit–I


Unit–II


Unit–III

Unit–IV


Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Have a good understanding of how to develop a software system in a team with other developers
2) Able to develop web-enabled software using common software components such as Spring and Hibernate.
3) Have a basic understanding of Scripting languages and how to develop modern web enabled applications.
4) Have a basic understanding of mobile app development using native applications.

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COURSE OBJECTIVES

- To understand objects, classes and inheritance.
- To understand utilization of software objects to build software projects.
- To use UML in requirements elicitation and designing.
- To develop applications using UML.

Unit–I


Unit–II


Unit–III

Object Oriented analysis: Use Case Driven Object Oriented Analysis Object Oriented Analysis: Classification Noun Phrase Approach – Common Class Patterns Approach – Object Relationship analysis.

Unit–IV


Unit–V

Applications: Data Acquisition: Weather Monitoring Station – Frameworks: Foundation Class library – Client/Server Computing: Inventory Tracking.

TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES

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

1) Analyze the Systems Development Life Cycle.
2) Identify the basic software requirements UML Modeling.
3) Express software design with UML diagrams.
4) Develop applications using UML.

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COURSE OBJECTIVES

- View some of the major tasks of the system software of a computer system, focusing on internal working of the hardware and software interface of a typical system.
- Identify and understand the design, function and implementation of assemblers, linkers, loaders, macro processors and system software tools.
- Understand the theory and practice of compiler implementation and to learn context free grammars, compiler parsing techniques, construction of syntax trees, symbol tables, intermediate representations and actual code generation.

Unit–I


Unit–II

Unit–III

Compiler – Lexical Analysis: Phases of Compiler – Compiler Construction Tools –
Lexical Analysis: Role of a Lexical analyzer – input buffering – specification and
recognition of tokens – Finite Automata – Designing a lexical analyzer generator –
Pattern matching based on NFA.

Unit–IV

Compiler– Syntax Analysis, Syntax–Directed Translation: Role of Parser – Top–
down parsing – recursive descent and predictive parsers (LL) – Bottom–Up parsing –
Operator precedence parsing – LR, SLR and LALR parsers – parser generators –

Unit–V

Compiler – Code Generation, Optimization: Intermediate languages – graphical
representations – DAGs – Three address code–types of three address statements –
syntax directed translation into three address code–implementation of three address
statements – Code Optimization: Machine dependent and machine independent code
generation – Sources of optimization – Code Generation – Semantic stacks –
evaluation of expressions – control structures and procedure calls.

TEXT BOOKS
1) Leland Beck, – “System SoftwarE-An Introduction to Systems Programming”,
2) A.V. Aho, R. Shethi and J. D. Ullman; “Compilers – Principles, Techniques and

REFERENCE BOOKS
1) D.M. Dhamdhere, "Systems Programming and Operating Systems", Tata
3) V. Raghavan, “Principles of Compiler Design”, Tata McGraw Hill Education

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand and design principles of assemblers, linkers and loaders.
2) Know the Phases of compilation.
3) Optimize code and study techniques of syntax directed translation.

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COURSE OBJECTIVES

- To impart knowledge on software testing, quality and Software Quality Assurance (SQA).
- To introduce the various software testing techniques and different levels of testing.
- To introduce the SQA standards and components of SQA system.
- To explain the components of quality plan for software projects.

Unit–I

Phases of Software project – Quality, Quality assurance and quality control – Testing, Verification and Validation – White box testing – Static testing – Structural testing – Black box testing – Definition, need for black box testing – Black box testing techniques – Requirements based testing, Positive and Negative testing, Boundary Value Analysis, Decision Tables, Equivalence Partitioning, Graph based Testing, Compatibility Testing, Domain Testing.

Unit–II

Integration testing – Integration testing as a type of testing – Integration testing as a phase of testing – Scenario testing – Defect bash – System and Acceptance testing – System testing overview – Need for System testing – Functional system testing – Non-functional testing – Acceptance testing.

Unit–III


Unit–IV


Unit–V

Development plan and quality plan objectives – Elements of the development plan – Elements of the quality plan – Development and quality plans for small projects and for internal projects – Integrating quality activities in the project life cycle–Classic and other software development methodologies – Factors affecting intensity of quality assurance activities in the development process – Verification, validation and qualification – A model for SQA defect removal effectiveness and cost.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Techniques and skills on use of modern software testing tools to support software testing projects.
2) Planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generating a test report.
3) Advanced software testing topics, such as object–oriented software testing methods, and component–based software testing issues, challenges, and solutions.

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09PExxx                        MOBILE COMMUNICATION       L  T  P
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COURSE OBJECTIVES
- To study the concepts of mobile communication.
- To study the concepts of mobile internet protocol and transport layer.
- To understand the concepts of mobile telecommunication system.
- To understand the concept of mobile ad–hoc networks.
- To study the concepts of mobile platforms and applications.

Unit–I
Introduction to wireless communication – Applications – Wireless transmission – Frequencies for radio transmission – signals – antennas – signal propagation – need

Unit–II

Unit–III
Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS
2) Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
8) Windows Phone Dev Center : http://developer.windowsphone.com
9) BlackBerry Developer : http://developer.blackberry.com/

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand the principles and concepts of mobile communication.
2) Describe the characteristics and design issues of ad–hoc networks.
3) Analyze and compare the multiplexing techniques.
COURSE OBJECTIVES

- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization of SM fibers, RI profile and cut–off wave length
- To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers
- To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration
- To learn fiber slicing and connectors, noise effects on system performance, operational principles of WDM and solutions

Unit–I

Unit–II

Unit–III
Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Comprehend the basic elements of optical fiber transmission link, fiber modes and structure configurations.
2) Visualize the significance of the different kind of losses, signal distortion in optical wave guides, signal degradation factors and dispersion management techniques in optical system performance.
3) Compare the various optical source materials, LED structures, quantum efficiency as well as structures and figure of merit of Laser diodes.
4) Analyze the fiber optic receiver operation and configuration.
5) Identify and integrate fiber optical components in variety of schemes and operational principles WDM.

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COURSE OBJECTIVES

- Understand the design issues in ad hoc and sensor networks.
- Learn the different types of MAC protocols.
- Be familiar with different types of ad hoc routing protocols.
- Learn the architecture and protocols of wireless sensor networks.

Unit–I

Unit–II

Unit–II

Unit–III

Unit–IV

TEXT BOOKS

REFERENCE BOOKS

**COURSE OUTCOMES**

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

1) Have an understanding of the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks.
2) Analyze the protocol design issues of ad hoc and sensor networks.
3) Understanding of the principles and characteristics of wireless sensor networks.
4) Have gained an understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.

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**COURSE OBJECTIVES**

- To introduce the students to the basic concepts and principles of various components of remote sensing.
- To provide an exposure to GIS and its practical applications.

**Unit–I**


**Unit–II**


**Unit–III**

Image Interpretation And Analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys –

Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Principles of Remote Sensing and GIS.

2) Analysis of RS and GIS data and interpreting the data for modeling applications.

3) Real time application of RS and GIS.

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COURSE OBJECTIVES

The student should be made to:

- Understand how Grid computing helps in solving large scale scientific problems
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing
- Learn how to program the grid and the cloud
- Understand the security issues in the grid and the cloud environment

Unit–I


Unit–II


Unit–III

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software-Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure–virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

Unit–IV


Unit–V

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure–Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Apply grid computing techniques to solve large scale scientific problems.
2) Apply the concept of virtualization.
3) Use the grid and cloud tool kits.

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09PExxx | NATURAL LANGUAGE PROCESSING | L | T | P |
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COURSE OBJECTIVES
- To familiarize the students with the basic concepts and various level of analysis involved in Natural Language Processing
- To gain knowledge on natural language generation and machine translation
- To acquire basic understanding on language modelling
Unit I

Unit II

Unit III

Unit IV

Unit V

TEXT BOOKS

REFERENCE BOOKS
COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand the mathematical and linguistic foundations underlying approaches in NLP.
2) Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammars.
3) Understand the semantic analysis and various methods of machine translation.
4) Design, implement, and analyze NLP algorithms.

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PROFESSIONAL ELECTIVES LAB
09PExxx JAVA AND WEB DESIGN LAB

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<td>2) To design a webpage.</td>
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<td>3) To develop webpage using scripting.</td>
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LIST OF EXERCISES
1) A program to display total marks of five students.
2) A program to find a largest and smallest number in an array.
3) A program for menu based shopping.
4) A program to inherit three classes.
5) A program to create a package for book details.
6) A program for Exception handling.
7) A program for multithreading concept.
8) A program to create a text file.
9) To create a simple HTML page using different tags.
10) To create a webpage for the use of predefined functions.
11) To demonstrate exception handling in JavaScript.
12) To display an E-calendar using JavaScript.
13) To design a webpage to validate registration form.
14) To develop a webpage for cookies using ASP.
15) To create a simple servlet program to display the date.
16) To create a CD catalog using XML.

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**COURSE OBJECTIVES**

- To design and create effective reusable Perl script that could be run on UNIX, Linux and Windows OS.
- To understand the concept of Perl Programming features.
- Execute programs from Perl environment and process their result.

**LIST OF EXERCISES**

1) Perl program to display the text “hello world”.
2) Addition of two numbers with and without using Command line arguments.
3) Perl program to check a number for prime or not.
4) Perl program to check a number for Armstrong or not.
5) To find average of numbers using Function. (call by value and return argument).
6) Recursive function to find factorial of a number.
7) Perl program for Copying content of one file to another.
8) Adding and Removing Elements in an Array.
9) Perl script to send a plain message and attachment.
10) Perl code to implement a simple client–server program using Perl socket.
11) Passing Radio Button Data to CGI program.
12) Perl program to accept UNIX command from a HTML form and display the output of the command execute.
13) Perl program to accept the user name and display a greeting message randomly chosen from a list of 4 greeting messages.
14) Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
15) Write a Perl program to display a digital clock which displays the current time of the server.
16) Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
COURSE OBJECTIVES

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, array, recursion and function calls.
- To learn how to use basic mathematical problems are evaluated and be able to manipulate text files and file operations.
- To understand the process and will acquire skills necessary to effectively attempt a programming problem and implement it with a specific programming language-Python.

LIST OF EXERCISES

1) Python Program to check if a Number is Positive, Negative or Zero.
2) Python program to check prime numbers.
3) Python Program to check Armstrong Number.
4) Python Program to Solve Quadratic Equation.
5) Python Program to Transpose a Matrix.
6) Python Program to Find the Size (Resolution) of Image.
7) Python Program to Display the Multiplication Table using FOR loop.
8) Python Program to Find ASCII Value of Character.
9) Python Program to Convert Decimal to Binary, Octal and Hexadecimal.
10) Python Program to Swap Two Variables Using Function.
11) Python Program to Display Fibonacci Sequence Using Recursion.
12) Python Program to Shuffle Deck of Cards.
13) Python Program to Merge Mails.
14) Python Program to Find Hash of File.
15) Python Program to Root search.
16) Python Program to Solving initial value problem using 4th order Runge-Kutta method.
COURSE OBJECTIVES

- To understand basic concepts such as types, inheritance and interfaces and know how to use them
- To understand OO analysis and design and its difference from structured design
- To use the UML as a modeling and communication tools
- To understand what a software development process is and why it is important
- To utilize the step of the process to produce better software

LIST OF EXERCISES

1) Study of UML and Notation
2) Create a UML model for Online Purchase System
3) Create a UML model for Library Management System
4) Create a UML model for E-Ticketing
5) Create a UML model for Student Mark Analyzing System
6) Create a UML model for E-Mail Client System
7) Create a UML model for Course Registration System
8) Create a UML model for Online Banking System
9) Create a UML model for Online Aptitude Test System
10) Create a system to design Bank ATM Transactions and generate code by using MS-Access as back end and VB as the front end.
11) Create a system to design Employee Payroll System and generate code by using MS-Access as back end and VB as the front end.
12) Create a system to design Stock Maintenances in Hospital and generate code by using MS-Access as back end and VB as the front end.
13) Create a system to design Student Performances Analysis system and generate code by using MS-Access as back end and VB as the front end.
14) Create a system to design Airline Ticket Reservation System and generate code by using MS-Access as back end and VB as the front end.
15) Create a system to design Quiz System and generate code by using MS-Access as back end and VB as the front end.
### COURSE OBJECTIVES

- Design the different stages of a Compiler.
- Implement aspects of Networking and their applications.

### LIST OF EXERCISES

1. Implementation of Lexical Analyzer for IF Statement.
2. Implementation of Lexical Analyzer for Arithmetic Expression
3. Construction of NFA from Regular Expression
4. Construction of DFA from NFA
5. Implementation of Shift Reduce Parsing Algorithm
6. Implementation of Operator Precedence Parser
7. Implementation of Code Optimization Techniques
8. Implementation of Code Generator
10. (a) To Find the IP Address of Local Host
    (b) To Find the IP Address of Remote Host
11. Implementation of Echo Server and Client Using TCP Sockets
12. Implementation of Echo Server and Client Using UDP Sockets
13. Send and Receive Message between Client and Server Using TCP
14. Send And Receive Message between Client and Server Using UDP

### COURSE OBJECTIVES

- To provide the students with simple experiments to understand the basic aspects about the behavior of the testing techniques to detect the errors in the software
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tool

### LIST OF EXERCISES

1. Write a C program for matrix multiplication to understand the causes of failures
2. Write a C program for Binary Search – Path Testing
3. Write a C program to derive test cases based on boundary value analysis
4) Write a C program for cause effect graph to check whether defect is found in the program.
5) Write a C program to perform data flow testing for the given code and find out all d-use pairs.
6) Write a C program to demonstrate the working of the looping constructs.
7) Write and test a program to count number of check boxes on the page checked and unchecked count using selenium tool.
8) Write and test a program to provide total number of objects present available on the page using selenium tool.
9) Write and test a program to login a specific web page using selenium tool.
10) Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11) Write a Java script to develop a web page which calculates the GCD of 2 numbers using Selenium server.
12) Write and test a program to update 10 student records into table into Excel file using selenium tool.

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**COURSE OBJECTIVES**

- To understand the concept of geographical referencing, various types of maps.
- To test knowledge of students in geography, various geographical referencing and map types.

**LIST OF EXERCISES**

1) To Study Geography, concept of geographical referencing, Applications of GIS.
2) To Study Various types of maps
3) GIS application – Program in C for finding sitting for nuclear radioactive waste
4) Disposable site.
5) GIS application – Program in C to assist in house hunting.
6) GIS application – Program in C to identify conservation zones in Zdarske Vrchy
7) To Study GIS data Model and Spatial entity
8) To study layer based and object oriented approach in building computer world.
9) To study data analysis in GIS.
10) To study data quality and GIS project management.
11) Case study – GIS project
COURSE OBJECTIVES

The student should be made to:

- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop

LIST OF EXERCISES

Use Globus Toolkit or equivalent and do the following:

- Develop a new Web Service for Calculator.
- Develop new OGSA-compliant Web Service.
- Using Apache Axis develop a Grid Service.
- Develop applications using Java or C/C++ Grid APIs
- Develop secured applications using basic security mechanisms available in Globus Toolkit.
- Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.
- Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
- Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
- Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
- Install a C compiler in the virtual machine and execute a sample program.
- Show the virtual machine migration based on the certain condition from one node to the other.
- Find procedure to install storage controller and interact with it.
- Find procedure to set up the one node Hadoop cluster.
- Mount the one node Hadoop cluster using FUSE.
- Write a program to use the API's of Hadoop to interact with it.
- Write a word count program to demonstrate the use of Map and Reduce tasks.
COURSE OBJECTIVES
- To familiarize fundamental concepts in the area of natural language processing.
- To impart training on part-of-Speech tagging techniques
- To implement parsing techniques
- To inculcate the skills on language modeling

LIST OF EXERCISES
1) Write a program to construct FSA for the given word or statement.
2) Write a program to convert into a Regular Expression for the any given word.
3) Write a program to parse a sentence or any string into distinct words.
4) Write a program to count the number of given words using N-gram in a sentence.
5) Write a program to get the number of occurrences of each word in a String.
6) Write a program to implement morphological operations.
7) Write a program to implement finite state transducers.
8) Write a program to perform Simple Expression Evaluator.
9) Write a program to implement Syntactic Level Analysis.
10) Write a program to implement Semantic Analysis.
11) Write a program to implement top down parsing with Context Free Grammar.
12) Write a program to implement bottom up parsing with Context Free Grammar.
13) Write a program to implement Earley algorithm.
14) Write a program to implement Lexical semantics.

OPEN ELECTIVES

COURSE OBJECTIVES
- To know the basics of ERP
- To understand the key implementation issues of ERP
- To know the business Modules of ERP
- To be aware of some popular products in the area of ERP
- To appreciate the current and future trends in ERP

Unit—I
Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
Design and develop ERP implementation cycle.
Awareness of core and extended Modules of ERP.
Knowledge about the business Modules of ERP.

| Mapping with Programme Outcomes |
|--------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
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| CO3 | ✓   | ✓   |     |     |     |     | ✓   | ✓   |     |
COURSE OBJECTIVES

- To provide basic knowledge about the types of Electronic payment systems.
- To illustrate the concepts of various On-Demand Education and Software Agents

Unit–I


Unit–II


Unit–III


Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Identify and analyze the construction and working principles of E-Commerce.
2) Develop and implement the Electronic Payment Systems and EDI.
3) Select suitable Computer based Education and Training.

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COURSE OBJECTIVES
• To study the fundamentals of Bioinformatics technologies
• To learn principles of modern bioinformatics and to apply basic predictive methods those are common use in the field.
• To study the tools and databases applied in the field.

Unit–I
Introduction: Need for Bioinformatics technologies –Overview of Bioinformatics technologies Structural bioinformatics –Data format and processing–Secondary resources and applications –Role of Structural bioinformatics –Biological Data Integration System.

Unit–II

Unit–III
Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Develop models for biological data.
2) Apply pattern matching techniques to bioinformatics data –protein data genomic data.
3) Apply micro array technology for genomic expression study.

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COURSE OBJECTIVES

- To understand the importance of major decisions in supply chain management
- To present the vision of supply chain management and their role in enterprise competitiveness
- To appreciate the current trends in SCM

Unit–I

Unit–II

Unit–III

Unit–IV
Demand Forecasting in a Supply Chain – The Role of Forecasting in a Supply Chain – Characteristics – Components – Risk Management in Forecasting – Managing Economies of Scale in a Supply Chain – Role-Economies of Scale to Exploit Fixed Costs – Estimating Cycle Inventory – Managing supply chain cycle inventory – Uncertainty in the supply chain.

Unit–V

TEXT BOOKS
REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Ability to build a competitive supply chain using strategies, models, techniques and information technology.
2) Manage a competitive supply chain using strategies, models, techniques and information technology.
3) Knowledge about current trends in Supply Chain Management.

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Unit–III


Unit–IV


Unit–V


TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Identify the present indicators that a Cyber Security incident has occurred.
4) Work in teams to analyze and resolve Cyber Security issues.
### COURSE OBJECTIVES

- To understand the basic system concept and definitions of system.
- To understand the system concept and apply functional modeling method to model the activities of a static system.
- To understand the behavior of a dynamic system and create an analogous model for a dynamic system.
- To understand simulate the operation of a dynamic system and make improvement according to the simulation results.

#### Unit–I


#### Unit–II


#### Unit–III


#### Unit–IV

Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.
Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Acquiring knowledge of Simulation Terminologies and Classification.
2) Familiarizing the idea of Mathematical Models.
3) Familiarizing of Simulation Data.
4) Gaining experience skills on Verification and Validation of Simulation Models.
5) Familiarizing on Simulation Tools and Simulation Project Management.

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COURSE OBJECTIVES

- To introduce fundamental techniques and tools required for data analytics
- To learn basic tools for statistical analysis, R, and key methods used in machine Learning
- To learn MapReduce techniques for parallel processing and Hadoop

Unit–I


Unit–II


Unit–III


Unit–IV


Case Studies: Social Network Analysis – Text analysis –Marketing analysis.

Unit–V


TEXT BOOKS


REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand fundamental techniques and tools required for data analytics.
2) Use basic tools for statistical analysis, R, Hadoop, and key methods used in machine learning.
3) Apply Map Reduce techniques for parallel processing.
4) Apply fundamental algorithmic ideas to process data, and apply hypotheses and data into actionable predictions.
5) Document and transfer the results, and effectively communicate the findings using visualization techniques.

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COURSE OBJECTIVES
- To understand the concept of semantic web and related applications
- To learn knowledge representation using ontology
- To understand human behavior in social web and related communities
- To learn visualization of social networks
Unit–I

Unit–II

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS


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

1) Know basic notation and terminology used in network science
2) Work on the internals components of the social network
3) Model and visualize the social network
4) Understand the behaviour of the users in the social network

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COURSE OBJECTIVES
- Learn the various soft computing frameworks
- Be familiar with the design of various Neural Networks
- Be exposed to Fuzzy Logic
- Learn Genetic programming
- Be exposed to Hybrid Systems

Unit–I

Unit–II
weights – Training data – Network sizing – Weights and Learning Parameters – BPN
Applications – Data compression.

Unit–III

Membership functions: Features, Fuzzification, methods of membership value
assignments– Defuzzification: Lambda cuts – Methods – Fuzzy arithmetic and fuzzy
measures: Fuzzy arithmetic – Extension principle–Fuzzy measures – Measures of
fuzziness – Fuzzy integrals – Fuzzy rule base and approximate reasoning: Truth
values and tables, Fuzzy propositions, formation of rules– Decomposition of rules,
Aggregation of fuzzy rules, Fuzzy reasoning–Fuzzy inference systems–Overview of
fuzzy expert system–Fuzzy decision making.

Unit–IV

Genetic algorithm: Fundamentals, basic concepts, working principle, encoding,
fitness function, reproduction, Genetic modeling: Inheritance operator, cross over,
inversion & deletion, mutation operator, Bitwise operator, Generational Cycle,
Convergence of GA, Applications & advances in GA, Differences & similarities
between GA & other traditional methods.

Unit–V

Neuro–fuzzy hybrid systems – Genetic Neuro Hybrid systems – Genetic fuzzy
hybrid and Fuzzy genetic hybrid systems – Simplified fuzzy ARTMAP – Applications:
A fusion approach of Multispectral images with SAR, Optimization of Traveling
Salesman Problem using Genetic Algorithm approach, Soft computing based hybrid
fuzzy controllers.

TEXT BOOKS
PHI/Pearson Education 2004.
2) S.N. Sivanandam and S.N. Deepa, “Principles of Soft Computing”, Wiley India

REFERENCE BOOKS
1) S. Rajasekaran and G.A. Vijayalakshmi Pai, ”Neural Networks, Fuzzy Logic and
Genetic Algorithm: Synthesis & Applications”, Prentice-Hall of India Pvt. Ltd.,
2006.
2) David E. Goldberg, “Genetic Algorithm in Search, Optimization and Machine
Learning” Pearson Education India, 2013.
3) James A. Freeman, David M. Skapura, “Neural Networks Algorithms,
4) George J. Klir, Ute St. Clair, Bo Yuan, “Fuzzy Set Theory: Foundations and
5) Simon Haykin, “Neural Networks Comprehensive Foundation” Second Edition,
COURSE OUTCOMES
At the end of this course, the students will be able to
1) Select and apply various soft computing frameworks
2) Design of various neural networks
3) Use fuzzy logic
4) Apply genetic programming
5) Understand hybrid soft computing

Mapping with Programme Outcomes

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COURSE OBJECTIVES
- Design and maintain knowledge management system.
- Coverage of knowledge management concepts and methodologies which includes knowledge creation, knowledge architecture and knowledge codification.
- Broad understanding of knowledge management tools and knowledge portals as well as the notions of knowledge transfer in the E-world.

Unit–I

Unit–II

Unit–III
Unit–IV


Unit–V


TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES

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

1) Obtain Knowledge of components in KMS and how to use in business environment for effective decision making.
2) Become familiar with the current theories, practices, tools and techniques in Knowledge Management.
3) Learn to determine the infrastructure requirements to manage the intellectual capital in organizations.
4) Identify and select tools and techniques of KM for the stages of creation, acquisition, transfer and management of knowledge.
5) Evaluate the impact of technology including telecommunications, networks, and internet/intranet role in managing knowledge.
Mapping with Programme Outcomes

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09OExxx PROJECT MANAGEMENT

COURSE OBJECTIVES

- To understand the activities in project management.
- To impart knowledge on project scheduling, monitoring and to control.
- To Study about managing people and teams.

Unit–I

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

Unit–II


Unit–III


Unit–IV


Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Understand the basic concepts and issues of software project management
2) Effectively planning the software projects and Create project plans that address real–world management challenges.
3) Implement the project plans through managing people, communications and change.
4) Deliver successful software projects that support your organization’s strategic goals.

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09OExxx PRODUCT DESIGN
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COURSE OBJECTIVES
- To familiarize the students about the aspects of product design and development.
- To provide basic knowledge about the costs of product development.
- To illustrate the concepts of Quality control and reliability of product.

Unit–I
Introduction: Significance of product design– challenges of product design– product design and development process–sequential engineering design method– the challenges of product development– Identifying opportunities evaluate and prioritize projects–allocation of resources.
Unit–II
Identifying customer needs and product Specifications: Competitor and customer behavior analysis– understanding customer–involve customer in development and managing requirements–Interpret raw data in terms of customers need–organize needs in hierarchy – establish the relative importance of needs– Establish target specifications– setting final specifications .

Unit–III

Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES
At the end of this course, the students will be able to
1) Describe an engineering design and development process
2) Demonstrate individual skill using selected manufacturing techniques, including drilling, tapping, and rapid prototyping
3) Employ engineering, scientific and mathematical principles to execute a design from concept to finished product
Mapping with Programme Outcomes

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COURSE OBJECTIVES

- Educate the students with the basic nature of management and its process.
- Know the responsibilities of a professional manager as well as the organizational behavior.
- Know the importance about leadership.
- Understand the performance at the individual and group levels.

Unit–I


Unit–II


Unit–III


Unit–IV

Unit–V


TEXT BOOKS

REFERENCE BOOKS

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

1) Understand about management, its process and also the responsibilities of a professional manager.
2) Understand the performance at the individual and group levels.
3) Obtain leadership quality.

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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
DISASTER MANAGEMENT

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

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


Unit–IV

Unit–V

TEXT BOOKS

REFERENCE BOOKS

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COURSE OBJECTIVES
- Develop an entrepreneurship spirit
- 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.

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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


Rights – Historical Development of Human Rights.

Unit–II


Unit–III


Unit–IV


Unit–V

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  

**TEXT BOOKS**  
2) Training Programme on National Programme scheme, TISS.  

**REFERENCE BOOKS**  
1) Orientation Courses for N.S.S. Programme officers, TISS.  
2) Case material as Training Aid for field workers, Gurmeet Hans.  
3) Social service opportunities in Hospitals, Kapilk. Krishan, TISS.  
4) Social Problems in India, Ram Ahuja.

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