SCHEME OF EXAMINATION

and

SYLLABI

for

Bachelor of Technology
Computer Science and Engineering

Offered by
University School of Engineering and Technology

1st SEMESTER TO 8th SEMESTER

Guru Gobind Singh Indraprastha University
Dwarka, Delhi – 110078 [INDIA]

www.ipu.ac.in
## Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.

### BACHELOR OF TECHNOLOGY
(COMMON TO ALL BRANCHES)
FIRST SEMESTER EXAMINATION

<table>
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### PRACTICAL/VIVA VOCE

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**TOTAL**  
16  18  27

M: Mandatory for award of degree  
#NUES (Non University Examination System)  
*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.
BACHELOR OF TECHNOLOGY  
(COMMON TO ALL BRANCHES)  
SECOND SEMESTER EXAMINATION

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M: Mandatory for award of degree  
#NUES (Non University Examination System)  
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BACHELOR OF TECHNOLOGY
(COMPUTER SCIENCE AND ENGINEERING)
THIRD SEMESTER EXAMINATION

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TOTAL 18 14 28

M: Mandatory for award of degree
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#NUES(Non University Examination System)
BACHELOR OF TECHNOLOGY
(COMPUTER SCIENCE AND ENGINEERING)
FOURTH SEMESTER EXAMINATION

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PRACTICAL/VIVA VOCE

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*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

NOTE: 4 weeks Industrial / In-house Workshop will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

#NUES(Non University Examination System)
### Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.

<table>
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**THEORY PAPERS**

- ETCS301: Algorithms Design and Analysis (L 3, T/P 1, Credits 4, Status M)
- ETCS303: Software Engineering (L 3, T/P 1, Credits 4, Status M)
- ETCS 307: Java Programming (L 3, T/P 1, Credits 4)
- ETMS 311: Industrial Management (L 3, Credits 0, Status)
- ETEC-303: Digital Communication (L 3, T/P 1, Credits 4)
- ETHS 301: Communication Skills for Professionals (L 2, T/P 0, Credits 1)

**PRACTICAL/VIVA VOCE**

- ETCS 351: Algorithms Design and Analysis Lab (L 0, T/P 2, Credits 1)
- ETCS 353: Software Engineering Lab (L 0, T/P 2, Credits 1)
- ETCS 357: Java Programming Lab (L 0, T/P 2, Credits 1)
- ETCS 359: Viva Industrial Training / In-house Workshop (L 0, T/P 0, Credits 1)
- ETEC-357: Digital Communication Lab (L 0, T/P 2, Credits 1)
- ETHS 351: Communication Skills for Professionals Lab (L 0, T/P 2, Credits 1)

**TOTAL**

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M: Mandatory for award of degree

*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester.

@A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/MATLAB/ETAP/Lab View.

^Using UML 2.0
# BACHELOR OF TECHNOLOGY
## (COMPUTER SCIENCE AND ENGINEERING)
### SIXTH SEMESTER EXAMINATION

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#### THEORY PAPERS

|          |          | Operating Systems (Linux Programming and Administration) Lab | 0 | 2   | 1       |        |
|          | ETCS 354 | Computer Networks Lab                                              | 0 | 2   | 1       |        |
|          | ETCS 356 | Web Technology Lab                                                  | 0 | 2   | 1       |        |
|          | ETEE-358 | Microprocessor and Microcontroller Lab                             | 0 | 2   | 1       |        |

**TOTAL** 18 13 27

**M:** Mandatory for award of degree

**Note:** Minimum of 4-6 weeks of industrial training related to CSE will be held after 6th semester; however, viva-voce will be conducted in 7th Semester (ETCS 459).

**Imp:** Elective Paper will be floated in 7th Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7th Semester is done before 15th April every year before end of 6th semester.
The document is a syllabus for the 7th semester of B.Tech in Computer Science and Engineering. It includes a list of theory papers, elective papers, practicals, and a new elective may be added as per requirement after getting it duly approved by BOS and AC respectively. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.
## Modified Scheme and Syllabus

**BACHELOR OF TECHNOLOGY**  
*(COMPUTER SCIENCE AND ENGINEERING)*  
EIGHTH SEMESTER EXAMINATION

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### ELECTIVE (SELECT ANY TWO, ONE FROM EACH GROUP)

#### GROUP A

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### PRACTICAL/VIVA VOCE

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**TOTAL**  
13 21 26

*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after staring of Semester. The progress will be monitored through seminars and progress reports.

**Syllabus may be revised after 2 years.**

**NOTE:**

1. The total number of the credits of the B.Tech. (CSE) Programme = 216.
2. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of 200 credits, including mandatory papers (M).

**FOR LATERAL ENTRY STUDENTS:**

1. The total number of the credits of the B.Tech. (CSE) Programme = 162.
2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

Modified Scheme and Syllabus of B. Tech-CSE *(1st Semester to 8th Semester)* implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF
B.TECH AND M.TECH

1. ET stands for Engineering and Technology.
2. PE stands for Power Engineering.
3. ME stands for Mechanical Engineering.
4. MT stands for Mechatronics.
5. AT stands for Mechanical and Automation Engineering.
6. EE stands for Electrical and Electronics Engineering.
7. EL stands for Electrical Engineering.
8. IT stands for Information Technology
9. CS stands for Computer Science and Engineering
10. CE stands for Civil Engineering
11. EC stands for Electronics and Communications Engineering.
12. EN stands for Environmental Engineering
13. TE stands for Tool Engineering
14. MA stands for Mathematics
15. HS stands for Humanities and Social Sciences
16. SS stands for Social Services

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
APPLIED MATHEMATICS-I

Paper Code : ETMA-101
Paper : Applied Mathematics-I

L  T  C
3  1  4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

UNIT- I
Successive differentiation: Leibnitz theorem for $n^{th}$ derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D’Alembert ratio test, Integral Test, Cauchy’s root test, Raabe’s test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor’s and Maclaurin’s expansion(without proof) of function (e^x, log(1+x), cos x , sin x) with remainder terms ,Taylor’s and Maclaurin’s series, Error and approximation.

UNIT- II
Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves.

Integration: integration using reduction formula for $\int_0^\frac{\pi}{2} \sin^n\theta d\theta$, $\int_0^\frac{\pi}{2} \cos^n\theta d\theta$, $\int_0^\frac{\pi}{2} \sin^n\theta\cos^m\theta d\theta$.

Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

UNIT- III

UNIT- IV
Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli’s equation. Exact differential equations , Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters, Bessel’s and Legendre’s equations (without series solutions), Bessel’s and Legendre’s functions and their properties.

Text:

References:
[R5] Schaum’s Outline on Linear Algebra, Tata McGraw-Hill

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

UNIT I
Interference: Introduction, Interference due to division of wave front, Fresnel’s Biprism, Interference due to division of amplitude; wedge shaped film, Newton’s rings.


UNIT II
Polarization: Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.


Fibre optics: Introduction, Single mode fibre, Step index and graded index multimode fibres, Acceptance angle and numerical aperture.

UNIT III

Ultrasonics: Introduction, Production of ultrasonics by magnetostriction and Piezoelectric methods, Applications.

UNIT IV
Nuclear Physics: Introduction, Radioactivity, Alpha decay, Beta decay, Gamma decay, Q value, Threshold energy, Nuclear reactions, Nuclear fission: Liquid drop model, Nuclear fusion, Particle accelerators: Linear accelerator, Cyclotron, Radiation detectors: Ionization chamber, Geiger Mueller Counter.

Text Books:

Reference Books
[R3]. Fundamentals of Optics : Jenkins and White , Latest Edition
MANUFACTURING PROCESSES

Paper Code: ETME-105
Paper: Manufacturing Processes

INSTRUCTIONS TO PAPER SETTERS:

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MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The Objective of the paper is to facilitate the student with the basic Manufacturing processes.

Unit-I


Non-Ferrous metals & alloys: Properties and uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys such as Duralumin.

Casting Processes:

Principles of metal casting, Pattern materials, types and allowance, composition and properties of moulding sand, foundry tools, concept of cores and core print, elements of gating system, description and operation of cupola, special casting processes e.g. die-casting; permanent mould casting; centrifugal casting; investment casting; casting defects.

(T₁, T₂, R₁, R₂, R₃, R₄) [No. of Hrs. 12]

UNIT-II

Smithy and Forging:

Hot working and cold working, Forging tools and equipments, Forging operations, Forging types: Smith forging, Drop forging, Press forging, Machine forging; Forging defects; Extrusion, wire drawing, swaging.

BENCH WORK AND FITTING:

Fitting shop tools, operation: Fitting; sawing; chipping; thread cutting (with taps and dies); Marking and marking tools.

(T₁, T₂, R₁, R₂, R₃, R₄) [No. of Hrs. 12]

Unit-III

Metal joining: Welding principles, classification of welding techniques, Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc. Carbon arc welding, submerged arc welding and atomic hydrogen welding, TIG and MIG welding, Electric resistance welding: spot; seam; flash; butt and percussion welding, Flux: composition; properties and function, Electrodes, Types of joints and edge preparation, Brazing and soldering, welding defects.

(T₁, T₂, R₁, R₂, R₃, R₄) [No. of Hrs. 12]

Unit-IV

Sheet Metal Work:

Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending. Other operations like spinning, stretch forming, embossing and coining.


(T₁, T₂, R₁, R₂, R₃, R₄) [No. of Hrs. 12]

Text Books:

[T1]. Manufacturing Process by Raghuvanshi.(Dhanpat Rai and Co.)
[T2]. Manufacturing Technology by P.N.Rao (TMH publications)

Reference Books:

[R1]. Workshop Technology by Hazra-Chowdhary (Media Promoters and Publishers Pvt. Ltd.)
[R2]. Production Engineering by R.K.Jain (Khanna Publishers)
[R3]. Workshop Technology by Chapman (Elsevier Butterworth-Heinemann)
[R4]. Fundamentals of Modern Manufacturing by Mikell P. Groover (Wiley India Edition)
[R5]. Manufacturing Processes for Engineering Materials by Kalpakjian and Schmid (Pearson)

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## ELECTRICAL TECHNOLOGY

**Paper Code:** ETEE-107  
**Paper:** Electrical Technology  
**L T C:** 3 0 3

### INSTRUCTIONS TO PAPER SETTERS:

**Maximum Marks:** 75
1. This is first introductory course in electrical technology to the students of all the branches of engineering in first year.
2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
3. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

### Objective:
To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.

### UNIT – I: DC Circuits
Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin’s, Norton’s, Reciprocity, Maximum Power Transfer and Millman’s Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

### [T1],[T2][No. of Hrs. 11]

### UNIT – II: A.C.Circuits

### [T1],[T2][No. of Hrs. 14]

### UNIT – III: Measuring Instruments
Basics of measuring instruments and their types, Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter, induction-type Energy Meter, Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

### [T1],[T2],[R2][No. of Hrs. 11]

### UNIT – IV: Transformer and Rotating Machines
Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor.

### [T1],[T2],[R2][No. of Hrs. 12]

### Text Books:

### Reference Books:
**HUMAN VALUES & PROFESSIONAL ETHICS**

**Paper Code: ETHS-109**  
**Paper : Human Values & Professional Ethics**  
**L T C**  
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<th>Non-University Examination Scheme (NUES)</th>
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<td>Note: There will be no End-Term External University Examination. Marks are to be given on the basis of two internal sessional test of 30 marks each and one final Viva-voce project report Examination of 40 marks.</td>
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**Objectives:**  
This introductory course input is intended  
- To help the students appreciate the essential complementarity between ‘VALUES’ and ‘SKILLS’ to ensure sustained happiness and prosperity which are the core aspirations of all human beings.  
- To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.  
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

**UNIT-1: Introduction to Value Education**  
No. of lectures: 03+1

1. Understanding the need, basic guidelines, content and process for value education.
2. Basic Human Aspirations: Prosperity and happiness
3. Methods to fulfil the human aspirations – understanding and living in harmony at various levels.
4. Practice Session – 1.

**UNIT-2: Harmony in the Human Being**  
No. of lectures: 05+1

1. Co-existence of the sentient “I” and the material body – understanding their needs – Happiness & Conveniences.
2. Understanding the Harmony of “I” with the body – Correct appraisal of physical needs and the meaning of prosperity.
3. Programme to ensure harmony of “I” and Body-Mental and Physical health and happiness.
5. Understanding society and nation as extensions of family and society respectively.
6. Practice Session – 02

**UNIT-3: Basics of Professional Ethics**  
No. of lectures: 04+1

1. Ethical Human Conduct – based on acceptance of basic human values.
2. Humanistic Constitution and universal human order – skills, sincerity and fidelity.
3. To identify the scope and characteristics of people – friendly and eco-friendly production system, Technologies and management systems.
4. Practice Session – 03.

**UNIT-4: Professional Ethics in practice**  
No. of lectures: 04+1

1. Profession and Professionalism – Professional Accountability, Roles of a professional, Ethics and image of profession.
2. Engineering Profession and Ethics - Technology and society, Ethical obligations of Engineering professionals, Roles of Engineers in industry, society, nation and the world.
3. Professional Responsibilities – Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle Blowing
4. Practice Session – 04

**Text Books:**
- **[T1]** Professional Ethics, R. Subramanian, Oxford University Press.
- **[T3]** Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

**References:**
- **[R1]** Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMARTstudent.
- **[R2]** Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland Schinzinger, School of Engineering, University of California, Irvine.
- **[R3]** Human Values: A. N. Tripathy (2003, New Age International Publishers)

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
Modified Scheme and Syllabus of B. Tech - CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.

**CONTENT OF PRACTICE SESSION**

**Module 1: Course Introduction – Needs, Basic Guidelines, Content and Process of Value Education**

**PS-1:** Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcomings in your life? Observe and analyze them.

**Expected Outcome:**
The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

**PS-2:** Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?

On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

**Expected Outcome:**
The students start finding out that technical education with study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

**PS-3:** 1. Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:
   a) What is naturally acceptable to you in relationship – feeling of respect or disrespect?
   b) What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?

2. Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

**Expected Outcome:**
1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
2. The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring relationship and not being aware that right understanding is the most important requirement for any human being.

**Module 2: Understanding harmony in human being – Harmony in myself!**

PS-4: Prepare the list of your desires. Observe whether the desires are related with self “I” or body. If it appears to be related with both, see which part of it is related to self “I” and which part is related to body.

Expected Outcome:
The students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to “I” and “body” distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to “I” while the physical facility is related to the body. They are also able to see that “I” and “body” are two realities, and most of their desires are related to “I” and not with the “Body”; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of “I” too.

PS-5:
1. [A]. Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful – unnecessary & tasteful – unnecessary & tasteless.
   [B]. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
2. List Down all your activities. Observe whether the activity is of “I” or of “body” or with the participation both “I” and “body”.
3. Observe the activities with “I”. Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

Expected Outcome:
1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.
2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of “I” only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of “I”, while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both “I” and “body”.
3. The students become aware of their activities of “I” and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.

PS-6:
1. Chalk out the program to ensure that you are responsible to your body – for the nurturing, protection and right utilization of the body.
2. Find out the plants and shrubs growing in and your campus. Find out their use for curing different diseases.

Expected Outcome:
The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

Module 3: Understanding harmony in the family and society - Harmony in Human – Human relationship
PS-7: Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

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<th>S.No.</th>
<th>Intention (Natural Acceptance)</th>
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<th>Competence</th>
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<tbody>
<tr>
<td>1.a.</td>
<td>Do I want to make myself happy?</td>
<td>1.b.</td>
<td>Am I liable to make myself always Happy?</td>
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<tr>
<td>2.a.</td>
<td>Do I want to make the other happy?</td>
<td>2.b.</td>
<td>Am I liable to make the other always happy?</td>
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<tr>
<td>3.a.</td>
<td>Does the other want to make him happy?</td>
<td>3.b.</td>
<td>Is the other able to make him always happy?</td>
</tr>
<tr>
<td>4.a.</td>
<td>Does the other want to make me happy?</td>
<td>4.b.</td>
<td>Is the other able to make me always happy? What is answer?</td>
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<td>What is answer?</td>
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Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

**Expected Outcome:**
The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking.

We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other’s intention as a result we conclude that I am a good person and other is a bad person.

PS-8:

1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation.
2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

**Expected Outcome:**
The students are able to see that respect is right evaluation and only right evaluation leads to fulfillment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.

All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

PS-9:

1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child.
   Evaluate it in a group.
2. Develop three chapters to introduce “social science”, its needs, scope and content in the primary education of children.

**Expected Outcome:**
The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4: Understanding harmony in the nature and existence – Whole existence as Co – existence -

PS-10: Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

**Expected Outcome:**
The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

PS-11:

*Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.*
1. Make a chart for the whole existence. List down different courses of studies and relate them to different or levels in the existence.
2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

Expected Outcome:
The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

PS-12: Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

Expected Outcome:
The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

PS-13:
1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.
2. Suggest one format of humanistic constitution at the level of nation from your side.

Expected Outcome:
The students are able to grasp the right utilization of their knowledge in their streams of technology / engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-
- Thoughts
- Behavior
- Work and
- Realization
  Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

Expected Outcome:
The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.
FUNDAMENTALS OF COMPUTING

Paper Code: ETCS-111
Paper: Fundamentals of Computing

L T C
2 0 2

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Objective: The objective of the paper is to facilitate the student with applied working knowledge of computers. This is the first course of computing and does not assume any pre-requisite.

UNIT-I
Five Component Model of a Computer, System and Application software ( introduction ) storage devices , primary (RAM, ROM, PROM, EPROM, cache ) Memory and secondary (magnetic tape, hard disk, Compact disks) memory , peripheral devices , printers.

UNIT-II
Operating Systems: DOS Internal, External commands, Windows ( 2000 and NT) , Overview of architecture of Windows, tools and system utilities including registry , partitioning of hard disk , Overview of Linux architecture , File system , file and permissions , concept of user and group , installation of rpm and deb based packages.

UNIT-III
Basics of programming through flow chart , Networking Basics - Uses of a network and Common types of networks , Network topologies and protocols , Network media and hardware , Overview of Database Management System.

UNIT-IV
Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates
Libre / Open Office Calc : Worksheet Management, Formulas, Functions, Charts
Libre / Open Office Impress: designing powerful power-point presentation

Text:

References:
Objective: The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry.

UNIT I: FUELS
Definition, Classification & Calorific value of fuels (gross and net), Dulong’s formula (Numericals), Determination of calorific value of fuels using bomb’s calorimeter (Numericals), Determination of calorific value of fuels using Boy’s Gas-Calorimeter (Numericals), Cracking—Thermal & catalytic cracking, Octane & Cetane numbers with their significance. High & Low temperature carbonization, Manufacture of coke (Otto – Hoffmann oven) Proximate and ultimate analysis of Coal (Numericals) Combustion of fuels (Numericals).

UNIT II: THE PHASE RULE & CATALYSIS
Definition of various terms, Gibb’s Phase rule & its derivation, Application of phase rule to One component system- The water system, Application of phase rule to Two component system- The Lead-Silver system (Pattinson’s process). Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Application of catalysts for industrially important processes Enzyme catalysis: Characteristics, Kinetics & Mechanism of enzyme catalysed reaction ( Michaelis-Menten equation), Acid-Base catalysis: Types, Kinetics & Mechanism, Catalysis by metals salts (Wilkinson’s Catalyst), Auto-catalysis, Heterogeneous catalysis (Langmuir-Hinshelwood mechanism).

UNIT III: WATER

UNIT IV: CORROSION & ITS CONTROL

Text Books:

Reference Books:
### Applied Physics Lab – I

**Paper Code:** ETPH-151  
**Paper:** Applied Physics Lab – I  
**P C**  

<table>
<thead>
<tr>
<th>List of Experiments</th>
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<tbody>
<tr>
<td>1. To determine the wavelength of sodium light by Newton’s Rings.</td>
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<td>2. To determine the wavelength of sodium light by Fresnel's biprism.</td>
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<tr>
<td>3. To determine the wavelength of sodium light using diffraction grating.</td>
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<td>4. To determine the refractive index of a prism using spectrometer.</td>
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<td>5. To determine the dispersive power of prism using spectrometer and mercury source.</td>
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<td>6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.</td>
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<tr>
<td>7. To find the wavelength of He-Ne laser using transmission diffraction grating.</td>
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<tr>
<td>8. To determine the number aperture (NA) of an optical fibre.</td>
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<tr>
<td>9. To find the wavelength of He-Ne laser using transmission diffraction grating.</td>
</tr>
<tr>
<td>(a) The acceleration due to gravity</td>
</tr>
<tr>
<td>(b) The radius of gyration and the moment of inertia of the bar about an axis.</td>
</tr>
<tr>
<td>10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).</td>
</tr>
<tr>
<td>11. To verify inverse square law.</td>
</tr>
<tr>
<td>12. To determine Planck’s constant.</td>
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</table>

**Text Books:**  
[T1] C. L. Arora ‘B. Sc. Practical Physics’ S. Chand

**Note:** Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.
# ELECTRICAL TECHNOLOGY LAB

**Paper Code:** ETEE 153  
**Paper:** Electrical Technology Lab  

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## LIST OF EXPERIMENTS

1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view.
2. Study and applications of CRO for measurement of voltage, frequency and phase of signals.
3. Connection of lamp by:
   - (1) Single Switch Method,
   - (2) Two-way Switch Method.
   OR
   Performance comparison of fluorescent Tube & CFL Lamp.
4. To Verify **Thevenin’s** & **Norton’s** Theorem
   OR
   To Verify **Superposition** & **Reciprocity** Theorem.
   OR
   To Verify **Maximum Power Transfer** Theorem.
5. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three Voltmeters.
7. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
8. To perform open circuit and short circuit test on 1-phase transformer.
10. Starting, Reversing and speed control of 3-phase Induction Motor.
11. To Study different types of Storage Batteries & its charging system.
12. To Study different types of earthing methods including earth leakage circuit breaker (GFCI).

**Note:** Any 8-10 Experiments out of the list may be chosen.
WORKSHOP PRACTICE

Paper Code: ETME-155
Paper: Workshop Practice

LIST OF EXPERIMENTS

Sheet Metal Shop
1. To study the tools and machineries used in sheet metal shop.
2. To make a tray using sheet metal tools.
3. To make a Funnel using sheet metal tools.
4. To make a cylindrical mug in sheet metal shop.

Foundry Shop
5. To make a mould in Foundry Shop.

Carpentry Shop
6. To make a half lap T-joint in Carpentry Shop.
7. To make a half cross lap joint in Carpentry Shop.
8. To make a pattern using Carpentry Tools.

Welding Shop
9. To study arc and gas welding equipments and tools.
10. To make Lap Joint, T-Joint and Butt Joint in Welding shop.

Fitting Shop
11. To make V-Section and T-Slot in fitting shop.

Machine Shop
12. To study basic operations on lathe, shaper, milling, drilling and grinding machines..
13. To perform step turning, knurling and threading operations on lathe.
14. To prepare a simple job on shaper.

Note: Any 8-10 Experiments out of the list may be chosen.
ENGINEERING GRAPHICS

Paper Code: ETME-157  
Paper: Engineering Graphics Lab  

LIST OF EXPERIMENTS

UNIT - I
General: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Projections of Point and Lines: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.  
(T₁, T₂, R₁, R₂, R₃)

UNIT - II
Planes other than the Reference Planes: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Projections of Plane Figures: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.  
(T₁, T₂, R₁, R₂, R₃)

UNIT - III
Projection of Solids: Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.  
(T₁, T₂, R₁, R₂, R₃)

UNIT - IV
Isometric Projection of plain surface and bodies.  
(T₁, T₂, R₁, R₂, R₃)

Text Books:
[T2] Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)

Reference Books:
[R2] Engineering Drawing by P.S.Gill (S.K. Kataria & Sons)

Note:- Any 8-10 Experiments out of the list may be chosen.
FUNDAMENTAL OF COMPUTING LAB

Paper Code: ETCS 157
Paper: Fundamental of Computing Lab

LIST OF EXPERIMENTS
For program development an IDE e.g. CodeBlock\(^{[a]}\), Eclipse CDT\(^{[b]}\), Netbeans\(^{[c]}\) is recommended

1. Dismantling a PC Part -1
2. Dismantling a PC Part -2
3. Internal and External commands of DOS
4. System utilities of windows including regedit
5. Installation of any rpm or debianlinux distribution with emphasis on drive partitioning
6. Installation of rpm and deb based packages
7. Understanding of File system of Linux
8. Creating user and group ( through CLI)
9. Understanding and working knowledge of Libre / Open Office Writer
   : Editing and Reviewing, Drawing, Tables, Graphs, Templates
10. Understanding and working knowledge of Libre / Open Office Calc
11. Understanding and working knowledge Libre / Open Office Impress
12. Understanding of flow chart development through Dia *
13. Two Mini Projects based on the skills learned in experiments 1-12

   * [ Dia ] http://projects.gnome.org/dia/

Note:- Any 8-10 Experiments out of the list may be chosen.
APPLIED CHEMISTRY LAB

Paper Code – ETCH-161
Paper : Applied Chemistry Lab

P C
2 1

LIST OF EXPERIMENTS

1. Determination of alkalinity of water sample.
2. Determination of hardness of water sample by EDTA method.
3. Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride.
4. Determine the amount of oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.
5. Determine the amount of copper in the copper ore solution, provided hypo-solution (Iodometric Titration).
6. Determine the amount of chloride ions present in water using silver nitrate (Mohr’s Precipitation Method).
7. Determine the strength of MgSO_4 solution by Complexometric titration.
8. Determine the surface tension of a liquid using drop number method.
9. Determine the viscosity of a given liquid (density to be determined).
10. Determine the cell constant of conductivity cell and titration of strong acid/strong base conductometrically.
11. To determine (a) \( \lambda \) max of the solution of K\textsubscript{MnO}_4. (b) Verify Beer’s law and find out the concentration of unknown solution by spectrophotometer.
12. Determination of the concentration of iron in water sample by using spectrophotometer.
13. Determination of the concentration of Iron (III) by complexometric titration.
15. Determination of eutectic point and congruent melting point for a two component system by method of cooling curve.

(At least 8 to 10 experiments are to be performed)

Suggested Books:


Note:- Any 8-10 Experiments out of the list may be chosen.
APPLIED MATHEMATICS-II

Paper Code : ETMA-102
Paper: APPLIED MATHEMATICS-II

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INSTRUCTIONS TO PAPER SETTERS:

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

Unit –I

[T2][No. of 12hrs.]

Unit-II

[T1, T2][No. of 12hrs.]

Unit-III

[T1, T2][No. of 12hrs.]

Unit-IV

[T1, T2][No. of 12hrs.]

Text:

References:

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.
APPLIED PHYSICS – II

Paper Code: ETPH-104
Paper : APPLIED PHYSICS – II

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INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

UNIT I
Electromagnetic Theory: Gradient, Divergence, Curl, Gauss’ law, Ampere’s Law, Continuity equation, Maxwell’s equations (differential and integral forms), Significance of Maxwell’s equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

UNIT II
Quantum Mechanics: Postulates of Quantum mechanics, de-Broglie hypothesis, Davisson Germer experiment, Wave function and its physical significance, Wave Packet, Phase and group velocities, Uncertainty principle, Schrodinger equation for free particle, Time dependent Schrodinger equation, Particle in a box (1-D).

UNIT III
Crystal Structure: Types of solids, Unit cell, Types of crystals, Translation vectors, Lattice planes, Miller indices, Simple crystal structures, Interplaner spacing, Crystal structure analysis: Bragg’s law, Laue method, Point defects: Schottcky and Frankel defects.

UNIT IV

Text Books:

Reference Books
ELECTRONIC DEVICES

Paper Code: ETEC-106
Paper : Electronic Devices

L T C 3 0 3

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. This is the first introductory course in Electronics Engineering to the students of all the branches of engineering during the first year.
2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions from each unit. It should be of 25 marks.
3. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

Unit-I

[T1][T2][T3][No. Of Hours: 12]

Unit – II

[T1][T2][T3][No. Of Hours: 11]

Unit – III
Bipolar junction transistor: Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll’s model.

[T1][T2][T3][No. Of Hours: 11]

Unit – IV
Application of BJT: CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

Fundamentals of digital electronics: Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

[T1][T2][T3][No. Of Hours: 11]

Text Books

Reference Books
INTRODUCTION TO PROGRAMMING

Paper Code: ETCS-108
Paper: Introduction to Programming

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3  0  3

INSTRUCTIONS TO PAPER SETTERS:

<table>
<thead>
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</tr>
</tbody>
</table>

Objective: The objective of the paper is to facilitate the student with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the first course on programming and does not assume any prerequisite.

UNIT I
Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC), Assembler, linker and loader, Structure of a simple Hello World Program in C, Overview of compilation and execution process in an IDE (preferably Code Block)

[T1], [T2], [R4], [R5] [No. of hrs 8]

UNIT II
Programming using C: Preprocessor Directive, C primitive input output using get char and put char, simple I/O Function calls from library, data type in C including enumeration, arithmetic, relational and logical operations, conditional executing using if, else, switch and break. Concept of loops, for, while and do-while, Storage Classes: Auto, Register, Static and Extern

[T1], [T2], [R7] [No. of hrs 8]

UNIT III
Arrays (one and two dimensional), 2-d arrays used in matrix computation. Concept of Sub-programming, functions. Parameter transmission schemes i.e. call by value and call by reference, Pointers, relationship between array and pointer, Argument passing using pointers, Array of pointer, passing arrays as arguments

[T2], [R1], [R7] [No. of hrs 8]

UNIT IV
Structure and unions, Strings and C string library, File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer

[T1], [T2], [R2], [R7] [No. of hrs 8]

Text Books:

Reference Books:
[R2] K.R Venugopal, “Mastering C ”, TMH

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
ENGINEERING MECHANICS

Paper Code: ETME 110
Paper: Engineering Mechanics

<table>
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<tr>
<th>INSTRUCTIONS TO PAPER SETTERS:</th>
<th>MAXIMUM MARKS: 75</th>
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<tr>
<td>1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.</td>
<td></td>
</tr>
<tr>
<td>2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.</td>
<td></td>
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</table>

OBJECTIVE: THE OBJECTIVE OF THE PAPER IS TO GIVE THE BASIC PRINCIPLES OF MECHANIC APPLIED IN DIFFERENT DISCIPLINES OF ENGINEERING.

UNIT-I

**Force system:** Free body diagram, Parallel force system, concurrent force system, Equilibrium equations and applications in different force systems.

**Friction:** Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, Belt drive - derivation of equation \( \frac{T_1}{T_2} = e^{\mu \theta} \) and its application, M.A, V.R and Efficiency of Screw Jack, Application of friction in pivot and collar bearing.

**[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]**

UNIT-II

**Structure:** Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section, graphical method.

**Distributed Force:** Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia.

**[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]**

**Unit-III**

**Kinematics of Particles:** Rectilinear motion, plane curvilinear motion-rectangular coordinates, normal and tangential component.

**Kinetics of Particles:** Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum, conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

**[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]**

**Unit-IV**

**Kinematics of Rigid Bodies:** Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, instantaneous center of velocity, Velocity polygons for four bar mechanism and single slider mechanism.

**Kinetics of Rigid Bodies:** Equation of motion, transatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy. Shear force and bending Moment Diagram.

**[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]**

**Text Books:**


**Reference Books:**

## COMMUNICATION SKILLS

**Paper Code:** ETHS – 112  
**Paper:** Communication Skills

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### INSTRUCTIONS TO PAPER SETTERS:

**MAXIMUM MARKS:** 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To enhance the language and communication competence of professional students with emphasis on English for Specific Purposes (ESP) through communication skills related activities.

### UNIT-I

**I. Basic Remedial Grammar** (Errors in Parts of Speech, Tenses, Verbs and Modal; Reported Speech; Active and Passive Voice; Conditional clauses; Question Tags and Short Responses)  
[T1],[R2],[R3][No. of hrs 06]

### UNIT-II

**II. Vocabulary and usage** (Synonyms and Antonyms; Suffixes and Prefixes; Homophones and Homonyms; One-word substitution; Prepositions; Phrasal verbs and Idioms, Indianism)  
[T1],[R2],[R3][No. of hrs 06]

### UNIT-III

(A)  
I. Types of writing (Expository, Descriptive, Narrative, Analytical and Argumentative)  
II. Definition, description and explanation of scientific objects, instruments and processes etc.  
III. Interpretation and use of charts, graphs and tables in technical writing.[T1],[R1]

(B)  
I. Paragraph writing  
II. Precis writing  
III. Comprehension  
[T1],[R2],[R3][No. of hrs 10]

### UNIT-IV

I. Reading different types of texts (speed and purpose)[T1]  
II. Reading five essays [T2]  
III. E.M. FORSTER, *What I Believe*  
(Pg-123)  
IV. JAMES BRYCE, *Some Hints on Public Speaking*  
(Pg-135)  
V. L.A. HILL, *Principles of Good Writing*  
(Pg-150)  
VI. A.P.J. ABDUL KALAM, *Work Brings Solace*  
(Pg-207)  
VII. SALIM ALI, *Man and Nature in India: The Ecological Balance*  
(Pg-213)[No. of hrs 10]

### TEXT BOOKS

[T1] Technical Communication: Principles and practice (OUP), (Meenakshi Raman and Sangeeta Sharma)  
OXFORD UNIVERSITY PRESS  
[T3] Wren and Martin: High School English Grammar and Composition; S. Chand  
[T4] Exploration of Ideas; An Anthology of Prose; Orient Blackswan.

### REFERENCE BOOKS:

[R1] Professional Communication: Aruna Koneru, MCGRAW HILLS EDUCATION PVT. LTD  
[R2] Wren and Martin: High School English Grammar and Composition; S. Chand  
[R3] Advanced English Grammar and Composition: Gurudas Mukherjee & Inidbar Mukherjee; (ANE BOOKS PVT. LTD.)

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*Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.*
ENVIRONMENTAL STUDIES

Paper Code: ETEN-114
Paper : Environmental Studies

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2  1  3

INSTRUCTIONS TO PAPER SETTER:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student’s mind that how our environment is interdependent on various factors and how human being must care for their natural surroundings.

UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation

(i) The Multidisciplinary Nature of Environmental Studies
Definition, scope and importance of Environmental Studies. Biotic and a biotic component of environment, need for environmental awareness.

(ii) Ecosystems
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, structures and function of the following ecosystem:
(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

(iii) Bio-diversity and its Conservation
Introduction to biodiversity —definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: Habitat loss, Poaching of wildlife, man-wildlife conflicts, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: In-situ and ex-situ conservation.

UNIT II: Natural Resources: problems and prospects

(i) Renewable and Non-renewable Natural Resources
Concept and definition of Natural Resources and need for their management
- Forest resources: Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
- Mineral resources: Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes causes by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Urban problems related to energy, case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3][No. of hrs. 08]
UNIT III: Environmental Chemistry and Pollution Control

(i) Chemistry of Environment

(a) Green Technology
Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies, clean development mechanisms (CDM), concept of environmental impact assessment.

(b) Eco-Friendly polymers
Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone, Concept of bioremediation.

(ii) Environmental Pollution
Definition, types, causes, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.

Chemical toxicity-Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

UNIT IV: Disaster Management, Social Issues, Human Population and the Environment

(i) Disaster Management
Disaster management: floods, earthquake, cyclone and landslides, nuclear accidents and holocaust, case studies.

(ii) Social Issues, Human Population and the Environment


Text Books:

References Books:
[R1] G. T. Miller, Environmental Science, Thomas Learning, 2012
**APPLIED PHYSICS LAB – II**

<table>
<thead>
<tr>
<th>Paper Code: ETPH-152</th>
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<tr>
<td>Paper: Applied Physics Lab – II</td>
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**LIST OF EXPERIMENTS**

1. To determine the e/m ratio of an electron by J.J. Thomson method.
2. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
3. To determine the frequency of A.C. mains by using Sonometer.
4. To determine the frequency of electrically maintained tuning fork by Melde’s method.
6. To study the charging and discharging of a capacitor and to find out the time constant.
7. To study the Hall effect.
8. To verify Stefan’s law.
9. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
10. To study the I-V characteristics of Zener diode.
11. To find the thermal conductivity of a poor conductor by Lee’s disk method.
12. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

**Suggested Books:**


**Note:** Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.
### Electronic Devices

**Paper Code:** ETEC-156  
**Paper:** Electronic Devices Lab  

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**LIST OF EXPERIMENTS**

1. Introduction to C.R.O, Function Generator & Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
2. Identification & testing of Active & passive components
3. To plot V-I characteristics of a semiconductor diode & Calculate Static & Dynamic Resistance
4. To Study the Reverse characteristics of Zener diode
5. To Study the Rectifier circuit:  
   a) Half Wave Rectifier  
   b) Centre Tapped Rectifier  
   c) Bridge Rectifier
6. To Study the output waveforms of different Filter Ckts of Rectifier.
7. To Plot Input & Output characteristics CB transistor.
8. To Plot Input & Output characteristics of CE transistor.
9. Realization of basic gates.
10. Implementation of Boolean functions (two or three variables).
11. Few experiments mentioned above to be performed on P-spice.
12. To develop a working model of any electronic circuit.

**Note:** Any 8-10 Experiments out of the list may be chosen.
ENGINEERING MECHANICS LAB

Paper Code: ETME-158
Paper: Engineering Mechanics Lab

LIST OF EXPERIMENTS:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus, (simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
4. To find the forces in the members of Jib Crane.
5. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
6. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
7. To determine the MA, VR, of Worm Wheel (2-start)
8. Verification of force transmitted by members of given truss.
9. To verify the law of moments using Bell crank lever
10. To find CG and moment of Inertia of an irregular body using Computation method.

Note:- Any 8-10 Experiments out of the list may be chosen.
<table>
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<tr>
<th>LIST OF EXPERIMENTS</th>
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<tbody>
<tr>
<td>For program development an IDE e.g. CodeBlock[^a], Eclipse CDT[^b], Netbeans[^c] is recommended</td>
</tr>
<tr>
<td>1. Write a program to find divisor or factorial of a given number.</td>
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<tr>
<td>2. Write a program to find sum of a geometric series</td>
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<td>3. Write a recursive program for tower of Hanoi problem</td>
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<td>4. Write a recursive program to print the first m Fibonacci number</td>
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<tr>
<td>5. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices</td>
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<tr>
<td>- Addition of two matrices</td>
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<td>- Subtraction of two matrices</td>
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<tr>
<td>- Finding upper and lower triangular matrices</td>
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<td>- Transpose of a matrix</td>
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<tr>
<td>- Product of two matrices.</td>
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<tr>
<td>6. Write a program to copy one file to other, use command line arguments.</td>
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<tr>
<td>7. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.</td>
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<tr>
<td>8. Write a program to perform the following operators an Strings without using String functions</td>
</tr>
<tr>
<td>- To find the Length of String.</td>
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<tr>
<td>- To concatenate two string.</td>
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<tr>
<td>- To find Reverse of a string.</td>
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<tr>
<td>- To Copy one sting to another string.</td>
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<tr>
<td>9. Write a Program to store records of an student in student file. The data must be stored using Binary File.Read the record stored in “Student.txt” file in Binary code.Edit the record stored in Binary File.Append a record in the Student file.</td>
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<tr>
<td>10. Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.</td>
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<tr>
<td>11. Two Mini Projects based on the skills learned in experiments 1-10 [ These mini projects may be done in a group not exceeding group size of 4 ]</td>
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[^a] http://www.codeblocks.org/
[^c] https://netbeans.org/features/cpp/

Note:- Any 8-10 Experiments out of the list may be chosen.
LIST OF EXPERIMENTS

1. Determination of pH, conductivity and turbidity in drinking water sample.
2. Determination of pH and conductivity of soil/sludge samples.
3. Determination of moisture content of soil sample.
4. Determination of Total Dissolved Solids (TDS) of water sample.
5. Determination of dissolved oxygen (DO) in the water sample.
6. Determination of Biological oxygen demand (BOD) in the water sample.
7. Determination of Chemical oxygen demand (COD) in the water sample.
8. Determination of Residual Chlorine in the water sample.
10. Determination of carbon dioxide in the water sample.
11. Determination of nitrate ions or sulphate ions in water using spectrophotometer.
13. Base catalyzed aldol condensation by Green Methodology.
15. To determine the concentration of particulate matter in the ambient air using High Volume Sampler.

P.S.: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

Suggested Books:
2. dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).

Note:- Any 8-10 Experiments out of the list may be chosen.
APPLIED MATHEMATICS-III

Paper Code: ETMA-201
Paper: Applied Mathematics-III

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INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of this course is to teach the students the applications of fourier series, fourier transform, difference equation and numerical methods to solve various engineering problems.

UNIT-I
Fourier series: Definition, Euler’s formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions, half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transform, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation), Application to partial differential equations.

UNIT-II
Difference equation: Definition, formation, solution of linear difference equation with constant coefficients, simultaneous difference equations with constant coefficients, applications of difference equations. Z-transform: Definition, Z-transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z-transform, inverse of Z-transform, Application to difference equations.

UNIT-III

UNIT-IV

Text Books:

Reference Books:
[R5] Schaum’s Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill
FOUNDATION OF COMPUTER SCIENCE

Paper Code: ETCS-203
Paper: Foundation of Computer Science

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INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To give basic knowledge of combinatorial problems, algebraic structures and graph theory.

UNIT- I

UNIT- II
Overview of Sets and set operations, permutation and combination, principle of inclusion, exclusion (with proof) and pigeonhole principle (with proof), Relation, operation and representation of a relation, equivalence relation, POSET, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

UNIT- III
Principle of mathematical induction, principle of complete induction, solution methods for linear and non-linear first-order recurrence relations with constant coefficients, Graph Theory: Terminology, isomorphic graphs, Euler’s formula (proof), chromatic number of a graph, five color theorem (with proof), Euler & Hamiltonian paths.

UNIT- IV
Groups, Symmetry, subgroups, normal subgroups, cyclic group, permutation group and Cayley’s theorem (without proof), cosets lagrange’s theorem (with proof) homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

Text Books:

Reference Books:
SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEC-205
Paper: Switching Theory and Logic Design

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<th>MAXIMUM MARKS: 75</th>
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Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

UNIT- I
Number Systems and Codes: - Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.
Switching Theory: - Boolean Algebra- Postulates and Theorems, De’ Morgan’s Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.
Combinational Logic Circuits:- Review of basic gates- Universal gates, Adder, Subtractor, Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

UNIT- II
Integrated circuits: - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.
Counters and Shift Registers: - Design of Synchronous and Asynchronous Counters: - Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

UNIT- III
Finite state machine- capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

UNIT- IV
Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.
Fault Detection and Location: Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

Text Book:

Reference Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
CIRCUITS & SYSTEMS

Paper Code: ETEE 207
Paper: Circuits & Systems

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Q. No.1 rest of the paper shall consist of four units as per the syllabus, every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The purpose of this course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

UNIT-I
Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform.

[T1,T2][No. of Hours: 10]

UNIT-II

[T1,T2][No. of Hours: 12]

UNIT-III
Graph theory: concept of tree, tie set matrix, cut set matrix and application to solve electric networks.

[T1,T2][No. of Hours: 10]

Unit IV
Positive real function and synthesis of LC, RC, RL Networks in Foster’s I and II, Cauer’s I & II forms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

[T1,T2][No. of Hours: 10]

Text Books:

Reference Books
DATA STRUCTURES

Paper Code: ETCS-209
Paper: Data Structures

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INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

UNIT – I:
Introduction to programming methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

[ T1,T2][No. of hrs. 12]

UNIT – II:
Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

[ T1,T2][No. of hrs. 12]

UNIT – III:
Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B* and B+ Trees. Graphs, Graph representation, Graph traversal.

[ T1,T2][No. of hrs. 12]

UNIT – IV:
Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

[ T1,T2][No. of hrs. 12]

Text Books:

Reference Books:
COMPUTER GRAPHICS & MULTIMEDIA

Paper Code: ETCS-211
Paper: Computer Graphics & Multimedia

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand various aspects of media and to learn the concept of sound, images and videos.

UNIT- I

UNIT- II
Clipping Algorithms, Sutherland-Cohen line Clipping Algorithm Bezier Curves, B-Spline Curves. Parallel Projection, Perspective Projection, Illumination Model for diffused Reflection, Ambient light, Specular Reflection Model, Reflection Vector.

UNIT- III

UNIT- IV
Data Compression: storage space, coding requirements, Basic compression techniques: run length code, Huffman code, Lempel-Ziv JPEG: Image preparation, Lossy sequential DCT, expanded lossy DCT, Lossless mode, Hierarchical mode. MPEG, Media synchronization, Media Integration, Production Standards.

Text Books:

Reference Books:
## SWITCHING THEORY AND LOGIC DESIGN LAB

**Paper Code:** ETEC-253  
**Paper:** Switching Theory and Logic Design Lab  
**L T/P C**

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### List of Experiments:

1. Realize all gates using NAND & NOR gates
2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
3. Realize a BCD adder
4. Realize a Serial Adder
5. Realize a four bit ALU
6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
7. Realize Universal Shift Register
8. Realize Self-Starting, Self Correcting Ring Counter
9. Realize Multiplexer and De-Multiplexer
10. Realize Carry Look ahead Adder / Priority Encoder
11. Simulation of PAL and PLA
12. Simulation Mealy and Moore State machines

**NOTE:** At least 8 Experiments out of the list must be done in the semester
CIRCUITS AND SYSTEMS LAB

Paper Code: ETEE 257
Paper: Circuits and Systems Lab

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List of Experiments

1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB.
2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system.
3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
4. To determine Z and Y parameters of the given two port network.
5. To determine ABCD parameters of the given two port network.
6. To verify Reciprocity Theorem for the given two port network.
7. To determine Hybrid parameters of the given two port network.
8. To design Cascade Connection and determine ABCD parameters of the given two port network.
9. To design Series-Series Connection and determine Z parameters of the given two port network.
10. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.
11. To design Series-Parallel Connection and determine \( h \) parameters of the given two port network.
12. Study the frequency response of different filter circuits.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
DATA STRUCTURES LAB

Paper Code: ETCS-255
Paper: Data Structures Lab

List of Experiments:

1. Perform Linear Search and Binary Search on an array.
   Description of programs:
   a. Read an array of type integer.
   b. Input element from user for searching.
   c. Search the element by passing the array to a function and then returning the position of the element from
      the function else return -1 if the element is not found.
   d. Display the position where the element has been found.
2. Implement sparse matrix using array.
   Description of program:
   a. Read a 2D array from the user.
   b. Store it in the sparse matrix form, use array of structures.
   c. Print the final array.
3. Create a linked list with nodes having information about a student and perform
   I. Insert a new node at specified position.
   II. Delete of a node with the roll number of student specified.
   III. Reversal of that linked list.
4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of
   doubly linked list and perform deletion at end of that doubly linked list.
5. Create circular linked list having information about a college and perform Insertion at front perform Deletion
   at end.
6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.
7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display
   the queue elements.
8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the
   concept of recursion.
9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree with the
   information in the tree about the details of a automobile (type, company, year of make).
10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Bucket sort, Radix sort, Shell sort, Selection
    sort, Heap sort and Exchange sort using array as a data structure.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
## COMPUTER GRAPHICS & MULTIMEDIA LAB

**Paper Code:** ETCS-257
**Paper:** Computer Graphics & Multimedia Lab

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**List of Experiments:**

2. Implementation of Line drawing algorithms: DDA Algorithm, Bresenham's Algorithm
3. Implementation of Circle drawing algorithms: Bresenham's Algorithm, Mid Point Algorithm.
4. Programs on 2D and 3D transformations
5. Write a program to implement cohen Sutherland line clipping algorithm
6. Write a program to draw Bezier curve.
7. Using Flash/Maya perform different operations (rotation, scaling move etc.) on objects
8. Create a Bouncing Ball using Key frame animation and Path animation.

**NOTE:** At least 8 Experiments out of the list must be done in the semester.
OBJECTIVES: The objective of this course is to teach the students about the difference equation, probability, curve fitting etc. and other numerical methods to solve various engineering problems.

UNIT – I
Partial Differential Equation: linear partial differential equations with constant coefficient, homogeneous and non homogeneous linear equations. Method of separation of variables. Laplace equation, wave equation and heat flow equation in Cartesian coordinates only with initial and boundary value.

UNIT II
Probability Theory: Definition, addition law of probability, multiplication law of probability, conditional probability, Baye’s theorem, Random variable: discrete probability distribution, continuous probability distribution, expectation, moments, moment generating function, skewness, kurtosis, binomial distribution, Poisson distribution, normal distribution.

UNIT-III
Curve Fitting: Principle of least square Method of least square and curve fitting for linear and parabolic curve, Correlation Coefficient, Rank correlation, line of regressions and properties of regression coefficients. Sampling distribution: Testing of hypothesis, level of significance, sampling distribution of mean and variance, Chi-square distribution, Student’s T- distribution, F- distribution, Fisher’s Z- distribution.

UNIT IV

Text Books:

References Books:
[R2] Miller and Freund, “ Probability and statistics for Engineers”, PHI
**COMPUTER ORGANIZATION & ARCHITECTURE**

**Paper Code:** ETCS-204

**Paper:** Computer Organization & Architecture

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**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks:** 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

**Objective:** To understand the architecture and organization of computer in depth.

**UNIT- I**

**Basic Computer Organization and Register transfer language:**

Over view of basic digital building blocks, Basic structure of a digital computer: Von-Neuman architecture, Introduction to types of buses, Bus and memory transfer, Bus architecture using multiplexer and tri-state buffer, register transfer language, Micro operation: arithmetic, logical, shift micro operation with hardware implementation, Arithmetic Logic Shift Unit.

Levels of programming languages: Machine language, Assembly language, High level language, programme development steps: compiling and assembling programmes.

[T1,T2][No. of hrs. 10]

**UNIT- II**

**Computer Design and Instruction set architecture**

Instruction codes, General computer registers with common bus system, addressing modes, computer instructions: Memory Reference, Register reference, Input-Output Instructions, Instruction cycle, Input-Output configuration and interrupt cycle.

Internal architecture of 8085 microprocessor: Pin diagram, 8085 instruction set.

[T1,T2][No. of hrs. 12]

**UNIT- III**

**CPU Design:**

Hardwired Control Unit, Timing and control, Micro Programmed Control Unit: Control memory and address sequencing.

Pipelining: Introduction to Flynn’s classification, arithmetic pipeline, instruction pipeline, pipeline conflict and hazards.

Computer arithmetic: Unsigned, Signed 1’s, 2’s compliment notations, addition, subtraction, multiplication and division (Hardware implementation), introduction to floating point notation: IEEE 754 standard.

[T1,T2][No. of hrs. 11]

**UNIT- IV**

**Memory & Input/output organization:** Memory Hierarchy, Main Memory (RAM and ROM Chips), Virtual memory, Cache memory and mappings.

Input/Output interface: I/O bus and interface modules, I/O bus Vs memory bus, Isolated Vs Memory mapped I/O, Bus arbitration, modes of transfer.

[T1,T2][No. of hrs. 11]

**Text Books:**


**Reference Books:**


Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
THEORY OF COMPUTATION

Paper Code: ETCS-206
Paper: Theory of Computation

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Maximum Marks: 75

Objective: To understand fundamental requirements for building algorithms of any language.

UNIT- I
Overview: Alphabets, Strings & Languages, Chomsky Classification of Languages, Finite Automata, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NDFA), Equivalence of NDFA and DFA, Minimization of Finite Automata, Moore and Mealy machine and their equivalence, Regular expression and Kleen’s Theorem (with proof), Closure properties of Regular Languages, Pumping Lemma for regular Languages (with proof).

[ T1,T2][No. of hrs. 11]

UNIT- II
Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFGs: Chomsky Normal Form & Greibach Normal Form, Pumping Lemma for Context Free languages, Closure properties of CFL (proof required), Push Down Automata (PDA), Deterministic PDA, Non Deterministic PDA, Equivalence of PDA and CFG, Overview of LEX and YACC.

[ T1,T2][No. of hrs. 11]

UNIT- III
Turing machines, Turing Church’s Thesis, Variants and equivalence of Turing Machine, Recursive and recursively enumerable languages, Halting problem, Undecidability, Examples of Undecidable problem.

[ T1,T2][No. of hrs. 11]

UNIT- IV
Introduction to Complexity classes, Computability and Intractability, time complexity, P, NP, Co-NP, Proof of Cook’s Theorem, Space Complexity, SPACE, PSPACE, Proof of Savitch’s Theorem, L, NL, Co-NL complexity classes.

[ T1,T2][No. of hrs. 11]

Text Books:

References Books:
DATABASE MANAGEMENT SYSTEMS

Paper Code: ETCS-208
Paper: Database Management Systems

L T/P C
3 1 4

INSTRUCTIONS TO PAPER SETTERS:

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Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.


UNIT-IV: Transaction Management: ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

Implementation Techniques: Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

Text Books:

References Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
OBJECT ORIENTED PROGRAMMING

Paper Code: ETCS-210
Paper: Object Oriented Programming

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To learn object oriented concepts to enhance programming skills.

UNIT – I:
Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism). Review of C, difference between C and C++, cin, cout, new, delete operators.

UNIT – II:
Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration, state identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, metaclass/abstract classes.

UNIT – III:
Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

UNIT – IV:
Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

Text Books:

Reference Books:
COMMUNICATION SYSTEMS

Paper Code: ETEC-212
Paper: Communication Systems

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INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: This is the first course which introduces the concepts of communication systems, channels and various analog modulation methods. Further, an insight into the behavior of noise is dealt.

UNIT I
Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels

Introduction of random Variables: Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.

[Τ1, Τ2][No. of Hrs. 11]

UNIT II

[Τ1, Τ2][No. of Hrs. 11]

UNIT III


[Τ1, Τ2][No. of Hrs. 11]

UNIT IV
Noise Theory: Noise, Types of noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure


[Τ1, Τ2][No. of Hrs. 11]

Text Books

Reference Books
### APPLIED MATHEMATICS LAB

**Paper Code:** ETMA-252  
**Paper:** Applied Mathematics Lab

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**List of Experiments:**

1. Solution of algebraic and transcendental equation.
2. Algebra of matrices: Addition, multiplication, transpose etc.
3. Inverse of a system of linear equations using Gauss-Jordan method.
7. Calculation of eigen values and eigen vectors of a matrix.
8. Plotting of Unit step function and square wave function.

It is expected that at least 12 experiments be performed, including the above specified 8 experiments which are compulsory. The remaining experiments may be developed by faculty and students based on applications of Mathematics in Real Life problem.

**Text Books:**


**Reference Books:**

3. Rudra Pratap, “Getting Started With MatLab” Oxford University Press
4. Byrom Gottfried, “Programming With C” Shaum’s Outline

**NOTE:** At least 8 Experiments out of the list must be done in the semester.
COMPUTER ORGANISATION AND ARCHITECTURE LAB

Paper Code: ETCS-260
Paper: Computer Organisation and Architecture Lab

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**List of Experiments:**
Based on 8085 simulator

1. To draw and explain
   i. Block diagram and pin diagram of 8085.
   ii. Instruction set of 8085.
2. Write a program to perform:
   i. Addition of two 8 bit numbers without carry.
   ii. Addition of two 8 bit numbers with carry
3. Write a program to perform:
   i. Subtraction of two 8 bit numbers without borrows.
   ii. Subtraction of two 8 bit numbers with borrows.
4. Write a program to find 1’s complement of an 8 bit number.
5. Write a program to find 2’s complement of an 8 bit number.
6. Write a program to perform Multiplication of two 8 bit numbers.
7. Write a program to find to find the smallest and largest number from the given series.
8. Write a program to find sum of series of n consecutive numbers.
9. Write a program to find factorial of a number.
10. Write a program to reverse an 8 bit number.
11. Write a program to sort array in ascending/descending order.
12. Write a program to perform division of two 8 bit numbers.

The instructor is advised to develop lab programs based on the learning concepts of architecture and insight into operating systems.

**NOTE:** - At least 8 Experiments from the syllabus must be done in the semester
DATABASE MANAGEMENT SYSTEMS LAB

Paper Code: ETCS-256

Paper: Database Management Systems Lab

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LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

List of Experiments:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
4. Write the queries to implement the joins
5. Write the queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
6. Write the queries to implement the concept of Integrity constrains
7. Write the queries to create the views
8. Perform the queries for triggers
9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

TEXT BOOK:

NOTE:- At least 8 Experiments out of the list must be done in the semester.
OBJECT ORIENTED PROGRAMMING LAB

Paper Code: ETCS-258
Paper: Object Oriented Programming Lab

List of Experiment:

1. Write a program for multiplication of two matrices using OOP.
2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
3. Write a program to find the greatest of two given numbers in two different classes using friend function.
4. Implement a class string containing the following functions:
   - Overload + operator to carry out the concatenation of strings.
   - Overload = operator to carry out string copy.
   - Overload <= operator to carry out the comparison of strings.
   - Function to display the length of a string.
   - Function tolower( ) to convert upper case letters to lower case.
   - Function toupper( ) to convert lower case letters to upper case.
5. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
6. Write a program to define the function template for calculating the square of given numbers with different data types.
7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.
8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space ,line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.
9. Write a program to read the class object of student info such as name , age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.
10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
COMMUNICATION SYSTEMS LAB

Paper Code: ETEC-256  
Paper: Communication Systems Lab  
L  T/P  C  
0  2  1

List of Experiments:

2. To study amplitude demodulation by linear diode detector.
4. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
5. To generate FM signal using voltage controlled oscillator.
6. To generate a FM Signal using Varactor & reactance modulation.
8. To study Super heterodyne AM receiver and measurement of receiver parameters viz. sensitivity, selectivity & fidelity.
9. To study Pre-emphasis and De-emphasis in FM.
10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

NOTE:- At least 8 Experiments out of the list must be done in the semester.
**ALGORITHMS DESIGN AND ANALYSIS**

**Paper Code:** ETCS-301

**Paper:** Algorithms Design and Analysis

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**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS:** 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

**Objective:** The objective of this paper is to teach the students various problem solving strategies like divide and conquer, Greedy method, Dynamic programming and also the mathematical background for various algorithms. After doing this course, students will be able to select an appropriate problem solving strategies for real world problems. This will also help them to calculate the time, complexity and space complexity of various algorithms.

**UNIT – I**

Asymptotic notations for time and space complexity, Big-Oh notation, Θ notation, Ω notation, the little-oh notation, the little-omega notation, Recurrence relations: iteration method, recursion tree method, substitution method, master method (with proof), subtract and conquer master method (with proof), Data Structures for Disjoint Sets, Medians and Order statistics. Complexity analysis, Insertion sort, Merge sort, Quick sort. Strassen’s algorithm for Matrix Multiplications.

**UNIT – II**


**UNIT – III**


**UNIT – IV**


NP-Complete Problem: Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP –hard, Case study of NP-Complete problems (vertex cover problem, clique problem).

**Text Books:**


**Reference Books:**

[R1] Sara Basse, “introduction to Design & analysis”, Pearson


Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
SOFTWARE ENGINEERING

Paper Code: ETCS-303
Paper: Software Engineering

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INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To improvise the concept to build any software.

UNIT – I
Introduction:
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.
Software Metrics:
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

UNIT – II
Software Project Planning:
Software Requirement Analysis and Specifications:

UNIT – III
Software Design:
Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.
Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

UNIT – IV
Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.
Software Maintenance:

TEXT BOOKS:

Reference:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
JAVA PROGRAMMING

Paper Code: ETCS-307
Paper: Java Programming

INSTRUCTIONS TO PAPER SETTERS:  MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To learn object oriented concepts and enhancing programming skills.

UNIT I
Overview and characteristics of Java, Java program Compilation and Execution Process, Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

UNIT II
Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, Life cycle of applet and Security concerns.

UNIT III
Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

UNIT IV
Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.
Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

Text Books:
[T1] Patrick Naughton and Herber tz Schidt, “Java-2 the complete Reference”, TMH
[T2] Sierra & bates, “Head First Java”, O’Reilly

Reference Books:
[R1] E. Balaguruswamy, “Programming with Java”, TMH
INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311

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INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

UNIT I
Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining.

UNIT II

UNIT III

UNIT IV

Text Books:
[T1, T2][No. of Hrs. 10]


Reference Books:
DIGITAL COMMUNICATION

Paper Code: ETEC-303
Paper: Digital Communication

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Objective: To enable the students
1. To distinguish between analog and digital communication.
2. To understand the concept of digital communication system.
3. To understand the concept of random variables and random process.
4. To learn the digital modulation techniques.

UNIT- I Introduction to Digital Communication:
Line coding: NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes,
Review of Sampling theorem, uniform and non-uniform quantization, companding, μ-Law and A-Law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.

UNIT- II Random Signal Theory:
Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.

UNIT- III Designing of Receiver:

UNIT- IV Digital modulation schemes:

Text Books:

Reference Books:

INSTRUCTIONS TO PAPER SETTERS:
MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
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UNIT- II Random Signal Theory:
Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.

UNIT- III Designing of Receiver:

UNIT- IV Digital modulation schemes:

Text Books:

Reference Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
COMMUNICATION SKILLS FOR PROFESSIONALS

**Paper Code:** ETHS-301  
**Paper:** Communication Skills for Professionals  
**L T/P C**  
**2 0 1**

### INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Maximum Marks:** 75

*Objective:* To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

### UNIT I

**Organizational Communication:** Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C’s of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

**Soft Skills:** Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills - Time management, Team building, Leadership skills. Emotional Intelligence. Self Development and Assessment - Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

### UNIT II

**Introduction to Phonetics:** IPA system (as in Oxford Advanced Learner’s Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

**Non-Verbal Language:** Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

### UNIT III

**Letters at the Workplace** – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint.  
Job Application -- resume and cover letter  
**Meeting Documentation** -- notice, memo, circular, agenda and minutes of meeting.  

### UNIT IV

**Listening and Speaking Skills:** Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

**Presentations:** Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

**Group Discussion:** Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

**Interview Skills:** Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

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*Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.*
Text Books:

References Books:
ALGORITHMS ANALYSIS AND DESIGN LAB

Paper Code: ETCS-351

L  T/P  C
Paper: Algorithms Analysis and Design Lab  0  2  1

List of Experiments:

1. To implement following algorithm using array as a data structure and analyse its time complexity.
   a. Merge sort
   b. Quick sort
   c. Bubble sort
   d. Bucket sort
   e. Radix sort
   f. Shell sort
   g. Selection sort
   h. Heap sort
2. To implement Linear search and Binary search and analyse its time complexity.
3. To implement Matrix Multiplication and analyse its time complexity.
4. To implement Longest Common Subsequence problem and analyse its time complexity.
5. To implement Optimal Binary Search Tree problem and analyse its time complexity.
6. To implement Huffman Coding and analyse its time complexity.
7. To implement Dijkstra’s algorithm and analyse its time complexity.
8. To implement Bellman Ford algorithm and analyse its time complexity.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
SOFTWARE ENGINEERING LAB

Paper Code: ETCS-353
Paper: Software Engineering Lab

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Tool Required: Rational Rose Enterprise Edition

List of Experiments:

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user’s view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram: State-chart diagram, Activity diagram
7. To perform the behavioral view diagram for the suggested system: Sequence diagram, Collaboration diagram
8. To perform the implementation view diagram: Component diagram for the system.
9. To perform the environmental view diagram: Deployment diagram for the system.
10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
11. To Perform Estimation of effort using FP Estimation for chosen system.
12. To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Text Books:

NOTE:- At least 8 Experiments out of the list must be done in the semester.
JAVA PROGRAMMING LAB

Paper Code: ETCS-357 | L | T/P | C
Paper: Java Programming Lab | 0 | 2 | 1

List of Experiments:

1. Create a java program to implement stack and queue concept.
2. Write a java package to show dynamic polymorphism and interfaces.
3. Write a java program to show multithreaded producer and consumer application.
4. Create a customized exception and also make use of all the 5 exception keywords.
5. Convert the content of a given file into the uppercase content of the same file.
6. Develop an analog clock using applet.
7. Develop a scientific calculator using swing.
8. Create an editor like MS-word using swing.
9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
10. Create a simple java bean having bound and constrained properties.

NOTE: At least 8 Experiments out of the list must be done in the semester.
DIGITAL COMMUNICATION LAB

Paper Code: ETEC–357
Letter/Practical Credit: 0/2/1

List of Experiments: MATLAB/ LABVIEW based practical on:

1. To Study Sampling Theorem.
7. To calculate S/N ratio and Probability of error of Phase Shift Keying (PSK).
8. To calculate S/N ratio and Probability of error of Frequency Shift Keying (FSK).
11. To calculate S/N ratio and Probability of error of QAM.
12. Faculty can opt for practical of Digital Communication to be performed on Kit.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
COMMUNICATION SKILLS FOR PROFESSIONALS LAB

Paper Code: ETHS-351

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. These activities will enhance students’ communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

Lab Activities to be conducted:

1. **Listening and Comprehension Activities** – Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
2. **Reading Activities** – Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
3. **Conversation Activities** – Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
4. **Making an Oral Presentation** – Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
5. **Making a Power Point Presentation** – Structure and format; Covering elements of an effective presentation; Body language dynamics.
6. **Making a Speech** – Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
7. **Participating in a Group Discussion** – Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others’ views / ideas; Arguing against others’ views or ideas, etc.
8. **Participating in Mock Interviews** – Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

Suggested Lab Activities:

1. Interview through telephone/video-conferencing
2. Extempore, Story Telling, Poetry Recitation
3. Mock Situations and Role Play; Enacting a short skit
4. Debate (Developing an Argument), News Reading and Anchoring.

Reference Books:


Note: The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.
COMPILER DESIGN

Paper Code: ETCS-302  L  T/P  C
Paper: Compiler Design  3  1  4

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

UNIT- I
Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator- precedence parsing, top-down parsing, predictive parsing ,LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

UNIT- II
Design and implementation of a lexical analyzer and parsing using automated compiler construction tools(eg. Lex, YACC, PLY), Syntax-directed translation schemes, implementation of syntax directed translations, intermediate code, postfix notation, three address code, quadruples, and triples, translation of assignment statements, Boolean expressions, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Conversion

UNIT- III
Symbol table, data structures and implementation of symbol tables, representing scope information.
Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

UNIT-IV
The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

Text Books:

Reference Books:
[R3] Vinu V. DAS, “Compiler Design Using FLEX and YACC”, PHI

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
OPERATING SYSTEMS

Paper Code: ETCS-304  L  T/P  C
Paper: Operating Systems  3  1  4

INSTRUCTIONS TO PAPER SETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: The goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

UNIT I
Memory Organization & Management: Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging

UNIT II
Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.
Process Synchronization: Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems. Case study on Dining philosopher problem, Barber shop problem etc.

UNIT III
Deadlocks: examples of deadlock, resource concepts, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery.
Device Management: Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

UNIT IV

Text Books:

Reference Books:
OBJECTIVE:
To understand the basics of networking with reference to OSI and TCP/IP models.

UNIT-I
Introduction: Internet History, Uses of computer networks, Network hardware, network software, Protocol layering, Reference models (OSI & TCP/IP), Network standardization. The Physical Layer: Theoretical basis for data communication, Transmission media: Guided and Unguided media, Switching (circuit, packet), Multiplexing (FDM, WDM, and TDM), Overview of PSTN, ISDN, and ATM.

UNIT-II
The Data Link Layer: Data link layer design issues, Error detection and Correction Techniques, Elementary data link control protocols, Sliding window protocols, Example data link protocols (HDLC and PPP). The Medium Access Sub layer: The channel allocation problem, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLANs, Network devices-repeaters, hubs, Bridge, Switches and Routers.

UNIT-III
Transmission Networks: PDH Networks, SONET/SDH Networks, DWDM Networks, Introduction to Cell Switched Networks e.g Asynchronous Transfer Mode (ATM) and Packet Switched Networks. The Network Layer: Network layer design issues, routing algorithms, congestion control algorithms, Quality of Service, Introduction to IPv4 Addressing, Subnetworks and Subnetting, IPv4 protocol Packet Format, Forwarding of IP packets, IPv4 vs IPv6, Congestion control algorithms. Delay Models in Data Networks: Queueing Models, M/M/1 Queueing System, M/M/m/m and Markov Systems.

UNIT-IV
Transport layer: Transport layer services, Elements of transport protocols, Overview of UDP and TCP.

TEXT BOOKS:

REFERENCE BOOKS:
WEB TECHNOLOGY

Paper Code: ETCS-308
Paper: Web Technology

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INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This paper gives understanding of web designing to the students.

UNIT - I

**Markup languages-XHTML:** Introduction to HTML, basics of XTHML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML’s abstract syntax, defining HTML documents.

**CSS style sheets:** Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, Introduction to WML.

UNIT – II
Client Side Programming: JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVA Script form programming, Intrinsic event handling, modifying element style, document trees,

**Server side programming** – Java Servlets: Servlet architecture, life cycle, parameter data, sessions, cookies, servlets capabilities, servlets & concurrency. Introduction to JSP, JSP Tags, JSP life cycle, custom tags.

UNIT - III

Server-side security tools, Web Application Firewalls (WAFs) and Fuzzers.

UNIT – IV

Text Books:

Reference Books:
[R5] Thinking on the Web: Berner’s LEE, Godel and Turing, John Wiley & Sons Inc.
ARTIFICIAL INTELLIGENCE

Paper Code: ETCS-310
Paper: Artificial Intelligence

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INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

UNIT-I
Introduction: Introduction to intelligent agents

Problem solving: Problem formulation, uninformed search strategies, heuristics, informed search strategies, constraint satisfaction

Solving problems by searching, state space formulation, depth first and breadth first search, iterative deepening

UNIT-II
Logical Reasoning: Logical agents, propositional logic, inferences, first-order logic, inferences in first order logic, forward chaining, backward chaining, unification, resolution

UNIT-III
Game Playing: Scope of AI -Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction

UNIT-IV
Learning from observations: Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications: Environmental Science, Robotics, Aerospace, Medical Sciences etc.

Text Book:  

Reference Books:  
[R1] KM Fu, "Neural Networks in Computer Intelligence”, McGraw Hill  
MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310
Paper: Microprocessors and Microcontrollers

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

UNIT- I

[T1][No. of hrs. 10]

UNIT- II
8086 Microprocessor: 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

[T2][No. of hrs. :12]

UNIT- III
Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

[T1][No. of hrs. :12]

UNIT-IV
Overview of Microcontroller 8051: Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer’s model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

[T3][No. of hrs. 11]

Text Books:
[T3] Ramesh Gaonkar, “MicroProcessor Architecture, Programming and Applications with the 8085”, PHI

References Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
## OPERATING SYSTEMS (LINUX PROGRAMMING AND ADMINISTRATION) LAB

**Paper Code:** ETCS-352  
**Paper:** Operating Systems (Linux Programming and Administration) Lab

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### List of Experiments:

1. Write a program to implement CPU scheduling for first come first serve.
2. Write a program to implement CPU scheduling for shortest job first.
3. Write a program to perform priority scheduling.
4. Write a program to implement CPU scheduling for Round Robin.
5. Write a program for page replacement policy using a) LRU b) FIFO c) Optimal.
6. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
7. Write a program to implement reader/writer problem using semaphore.
8. Write a program to implement Banker’s algorithm for deadlock avoidance.

**NOTE:** At least 8 Experiments out of the list must be done in the semester.

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Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
# COMPUTER NETWORKS LAB

**Paper Code:** ETCS-354  
**Paper:** Computer Networks  
**L**  
**T/P**  
**C**

### List of Experiments:

1. **Introduction to Computer Network laboratory**  
   Introduction to Discrete Event Simulation  
   Discrete Event Simulation Tools - ns2/ns3, Omnet++

2. **Using Free Open Source Software tools for network simulation – I**  
   Preliminary usage of the tool ns3  
   Simulate telnet and ftp between N sources - N sinks (N = 1, 2, 3). Evaluate the effect of increasing data rate on congestion.

3. **Using Free Open Source Software tools for network simulation - II**  
   Advanced usage of the tool ns3  
   Simulating the effect of queueing disciplines on network performance - Random Early Detection/Weighted RED / Adaptive RED (This can be used as a lead up to DiffServ / IntServ later).

4. **Using Free Open Source Software tools for network simulation - III**  
   Advanced usage of the tool ns3  
   Simulate http, ftp and DBMS access in networks

5. **Using Free Open Source Software tools for network simulation - IV**  
   Advanced usage of the tool ns3  
   Effect of VLAN on network performance - multiple VLANs and single router.

6. **Using Free Open Source Software tools for network simulation - IV**  
   Advanced usage of the tool ns3  
   Effect of VLAN on network performance - multiple VLANs with separate multiple routers.

7. **Using Free Open Source Software tools for network simulation - V**  
   Advanced usage of the tool ns3  
   Simulating the effect of DiffServ / IntServ in routers on throughput enhancement.

8. **Using Free Open Source Software tools for network simulation - VI**  
   Advanced usage of the tool ns3  
   Simulating the performance of wireless networks

9. **Case Study I : Evaluating the effect of Network Components on Network Performance**  
   To Design and Implement LAN With Various Topologies and To Evaluate Network Performance Parameters for DBMS etc)

10. **Case Study II : Evaluating the effect of Network Components on Network Performance**  
    To Design and Implement LAN Using Switch/Hub/Router As Interconnecting Devices For Two Different LANs and To Evaluate Network Performance Parameters.

11. **Mini project - one experiment to be styled as a project of duration 1 month (the last month)**

**NOTE:** At least 8 Experiments out of the list must be done in the semester.

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Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
WEB TECHNOLOGY LAB

Paper Code: ETCS-356
Paper: Web Technology Lab

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Web Technology Lab experiment based on syllabus of (ETCS-308).

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.
### MICROPROCESSORS AND MICROCONTROLLERS LAB

**Paper Code:** ETEE-358  
**Paper:** Microprocessors and Microcontrollers Lab  
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**List of Experiments:**

1. Write a program to add and subtract two 16-bit numbers with/without carry using 8086.
2. Write a program to multiply two 8-bit numbers by repetitive addition method using 8086.
3. Write a Program to generate Fibonacci series.
4. Write a Program to generate Factorial of a number.
5. Write a Program to read 16 bit Data from a port and display the same in another port.
6. Write a Program to generate a square wave using 8254.
7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1 (using 8051).
8. Write a Program to transfer data from external ROM to internal (using 8051).
9. Design a Minor project using 8086 Microprocessor (Ex: Traffic light controller/temperature controller etc)
10. Design a Minor project using 8051 Microcontroller

**NOTE:** At least 8 Experiments out of the list must be done in the semester.

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Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
INFORMATION SECURITY

Paper Code: ETCS-401

Paper: Information Security

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INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the basic concepts of web threats, legal ethical and professional issues of information security.

UNIT- I

Information and Security:


[T1, T2][No. of hrs. 12]

UNIT-II

Networks and E-Security:


[T1, T2][No. of hrs. 11]

UNIT-III

Physical Security and Bio-metrics as Security:


[T1, T2][No. of hrs. 11]

UNIT-IV

Network Cryptography:


[T1, T2][No. of hrs. 10]

Text Books:


References:

[R1] Yadav, "Foundations of Information Technology", New Age, Delhi

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
SOFTWARE TESTING AND QUALITY ASSURANCE

Paper Code: ETCS-403
Paper: Software Testing and Quality Assurance

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To check the productivity of software alongwith its quality comparison with other software and core components of quality.

UNIT I
Introduction

Software testing:

Software Quality:
Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.

UNIT II
White Box and Black Box Testing

Different Testing Techniques, Differences between testing techniques

Black Box Testing: Requirements based testing techniques, Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing

White Box Testing: Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing


UNIT III
Quality Assurance:
Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement


UNIT IV
Test Selection & Minimization for Regression Testing

Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing.

Test Management and Automation

Text Books:


REFERENCE BOOKS:


Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
WIRELESS COMMUNICATION

Paper Code: ETEC-405
Paper: Wireless Communication

[Table: INSTRUCTIONS TO PAPER SETTER:]

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MAXIMUM MARKS: 75

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2. Apart from Question No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.

UNIT – I
Introduction To Wireless Communication Systems: Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

UNIT - II

UNIT - III
2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes. EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

UNIT – IV

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

Text Books:

Reference Books:

INSTRUCTIONS TO PAPER SETTER:

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UNIT - II

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UNIT – IV

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

Text Books:

Reference Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
COMPLEXITY THEORY

Paper Code: ETCS-407
Paper: Complexity Theory

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Objective: This subject focuses on the key tools and combines ideas from economics, political science, biology, physics, and computer science to illuminate topics in organization, adaptation, decentralization, and robustness.

UNIT I

Complexity, properties common to complex systems, introduction to Net logo, Dynamics and Chaos, Fractals, Information, Order, and Randomness, Maxwell's Demon, Shannon Information.

[T1][R2][T2][No. of hrs. 12]

UNIT II


[T1][R1][No. of hrs. 11]

UNIT III

Small-World Networks, Scale-Free and Long-Tailed Degree Distributions, Scaling in Cities, Metabolic Scaling.

[T1][T2][R1][No. of hrs. 10]

UNIT IV

Evolving Automata, Agent Behavior, Adaptation, Taxonomy of 2 x 2 Games, Game Theory, One Agent, Many Games

[T2][R1][No. of hrs. 11]

Text Books:


Reference Books:

INTELLECTUAL PROPERTY RIGHTS

INSTRUCTIONS TO PAPER SETTER:  MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the basic concept of legal rights of an individual.

UNIT-I


Patents: introduction; granting; infringement; searching & filing; Introduction of Utility Models [T1][R2][T2][No. of hrs. 12]

UNIT-II

Copyrights: Introduction, granting, infringement, searching & filing, Copy related rights-Explanation, comparison of copy rights and related rights Industrial Designs ; Design Patents; scope; protection; filing infringement; difference between Designs & Patents [T1][R2][T2][No. of hrs. 11]

UNIT-III

Trademarks: role in commerce, importance, protection, registration; domain name International protection; Plant varieties; breeder's rights, protection.

UNIT-IV

Biotechnology& research and rights managements; licensing, commercialisation; ; legal issues, enforcement; Case studies in IPR.

Text Books:
[T2] Ajit Parulekar and Sarita D’ Souza, Indian Patents Law – Legal & Business Implications; Macmillan India ltd, 2006

References Books:
[R5] P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi , 2010
EMBEDDED SYSTEMS

Paper Code: ETEC-401
Paper: Embedded Systems

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Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks.

UNIT- I

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

[T1][No. of hrs. 12]

UNIT- II
ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.


[T2][No. of hrs. 12]

UNIT- III

[T3][No. of hrs. 10]

UNIT-IV

[T3][No. of hrs. 10]

Text Book:

[T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002

References Books:

[R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
DATA MINING AND BUSINESS INTELLIGENCE

Paper Code: ETCS-413
Paper: Data Mining and Business Intelligence

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

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Objective: The objective of the paper is to facilitate the student with the basics of Data Warehouse and Data Mining, to study algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data.

UNIT – I
Introduction to Data Warehousing: Overview, Difference between Database System and Data Warehouse, The Compelling Need for data warehousing, Data warehouse – The building Blocks: Defining Features, data warehouses and data marts, overview of the components, Three tier architecture, Metadata in the data warehouse.

Data pre-processing: Data cleaning, Data transformation ETL Process. ETL tools.

Defining the business requirements: Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content.

[T1][No. of Hrs: 12]

UNIT – II
Principles of Dimensional Modeling: Objectives, From Requirements to data design, Multi Dimensional Data Model, Schemas: the STAR schema, the Snowflake schema, fact constellation schema.

OLAP in the Data Warehouse: Demand for Online Analytical Processing, limitations of other analysis methods-OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, hyper cubes.

OLAP Operations: Drill-down and roll-up, slice-and-dice, pivot or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, the DOLAP model, ROLAP versus MOLAP, OLAP implementation considerations. Query and Reporting, Executive Information Systems (EIS), Data Warehouse and Business Strategy.

[T1][R4][No. of Hrs: 11]

UNIT – III
Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process (KDD Process), Data Mining Applications- The Business Context of Data Mining, Data Mining for Process Improvement, Data Mining as a Research Tool, Data Mining for Marketing, Benefits of data mining.

Major Data Mining Techniques: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN Algorithm.

[T2][R4][No. of Hrs: 11]

UNIT – IV

Data mining tools.

[T2][R3][No. of Hrs: 10]

Text Books:

Reference Books:
[R3] Pang- Ning Tan, Michael Steinbach, Viach, Vipin Kumar, Introduction to Data Mining, Pearson

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
ADVANCED COMPUTER ARCHITECTURE

Paper Code: ETCS-415
Paper: Advanced Computer Architecture

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Maximum Marks: 75

Objective: To understand different program and network properties, concepts of pipelining and architectures of computers.

UNIT-I
Parallel Computer Models:
The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers.

Program and Network Properties:
Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms

UNIT-II
Pipelining:
Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines

UNIT-III
Arithmetic for Computers:
Signed and unsigned Numbers, Addition and Subtraction, Multiplication, Division, Floating Point. CPU Performance and Its factors, Evaluating performance of CPU.

UNIT-IV
Memory Hierarchy:
Introduction, The basics of Cache, Measuring and Improving of Cache Performance, Virtual Memory, Common framework for memory hierarchies
Case study of PIV and AMD opteron memory hierarchies

Text Books:

Reference Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
NATURAL LANGUAGE PROCESSING

Paper Code: ETCS-410
Paper: Natural Language Processing

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand semantics and machine translation for any compiler.

UNIT-I
Introduction to NLP
Achievement and brief history, open problems, major goal, characteristic of Language, Language structure, Language analyzer

UNIT-II
Study of Grammar and Semantics
Morphology, word formation, theory of semantics, componential theory of meaning, truth conditional theory of meaning, pragmatics and discourse

UNIT-III
Machine Translation

UNIT-IV
Lexical: Functional Grammar (LFG) and Indian Languages
Overview of LGF, LFG formalism, well formedness conditions, computational aspects, CFG and Indian languages, functional specification, tree adjoining grammar.

Text Books:
[T1] Natural language processing by Akshar Bhartati, Sangal and Chaitanya, Eastern Economy Edition

References:
[R1] Natural Language Processing with Python 1st Edition, Steven Bird
[R2] Foundations of Statistical Natural Language Processing, Christopher Manning
**DIGITAL SIGNAL PROCESSING**

**Paper Code:** ETIT-415  
**Paper:** Digital Signal Processing  
**L T/P C**  
3 0 3

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**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

**UNIT – I:**  
Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter  

[T2, T1][No. of Hours: 11]

**UNIT – II:**  
Design & Structure of IIR filters from analog filters: Impulse Invariance; Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

Design & structure of FIR filters: Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure  

[T1, T2] [No. of Hours: 11]

**UNIT – III:**  
Implementation of Discrete Time Systems:  
Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

Linear predictive Coding:  
Lattice filter design, Levension Darwin Technique, Schur Algorithm  

[T1, T2] [No. of Hours: 10]

**UNIT – IV:**  
Quantization Errors in Digital Signal Processing: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

Multirate Digital Signal Processing: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Poly phase decomposition.  

[T1, T2][No. of Hours: 10]

**Text Books:**
[T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

**Reference Books:**

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
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Objectives: The objective of this course is to teach students methods for modelling of systems using discrete event simulation. Emphasis of the course will be on modelling and on the use of simulation software. The students are expected to understand the importance of simulation in IT sector, manufacturing, telecommunication, and service industries etc. By the end of the course students will be able to formulate simulation model for a given problem, implement the model in software and perform simulation analysis of the system.

UNIT-I:
Introduction to Simulation and Modelling:
Appropriateness, Advantages and disadvantage, application areas, history of simulation software, an evaluation and selection technique for simulation software, general – purpose simulation packages. System and system environment, components of system, type of systems, model of a system, types of models and steps in simulation study.

UNIT-II:
Manual Simulation of Systems:
Simulation of Queuing Systems such as single channel and multi channel queue, lead time demand, inventory system, reliability problem, time-shared computer model, job-shop model.
Discrete Event Formalisms:
Concepts of discrete event simulation, model components, a discrete event system simulation, simulation world views or formalisms, simulation of single channel queue, multi channel queue, inventory system and dump truck problem using event scheduling approach.
Statistical Models in Simulation:
Overview of probability and statistics, useful statistical model, discrete distribution, continuous distribution, empirical distribution, Poisson process.
Queuing Models:
Characteristics of queuing systems, queuing notations, long run measures of performance of queuing systems, Steady state behaviour of Markovian models (M/G/1, M/M/1, M/M/c) overview of finite capacity and finite calling population models, Network of Queues.

UNIT-III:
Random Number Generation:
Properties of random numbers, generation of true and pseudo random numbers, techniques for generating random numbers, hypothesis testing, various tests for uniformity, Kolmogorov-Smirnov and Chi-Square) and independence(runs, autocorrelation, gap, poker).
Random Variate Generation:
Introduction, different techniques to generate random variate: - inverse transform technique, direct transformation technique, convolution method and acceptance rejection techniques.
Input Modeling:
Introduction, steps to build a useful model of input data, data collection, identifying the distribution with data, parameter estimation, suggested estimators, goodness of fit tests, selection input model without data, covariance and correlation, multivariate and time series input models.

UNIT-IV:
Verification and Validation of Simulation Model:
Introduction, model building, verification of simulation models, calibration and validation of models:- validation process, face validity, validation of model, validating input-output transformation, test, power of test, input output validation using historical data and Turing test.
Output Analysis:
Types of simulations with respect to output analysis, stochastic nature of output data, measure of performance and their estimation, output analysis of terminating simulators, output analysis for steady state simulation.
Case Studies:
Simulation of manufacturing systems, Simulation of Material Handling system, Simulation of computer systems, Simulation of super market, Cobweb model, and any service sectors.

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Text Books:

References Books:
Objective: To understand different storage techniques and database techniques.

UNIT-I

UNIT-II
Introduction to the Relational Model, Advanced SQL programming, Advanced Transaction Processing, Relational model conformity and Integrity, Data Replication, Security considerations, Relational Model of Data and RDBMS Implementation Techniques, Query optimization, Integrity Constraint Over relations, Querying relational data and relational Algebra.

UNIT-III
Object Relational database concepts, Temporal database concepts, Mobile Databases, Object based databases Complex data types, structured types and inheritance in SQL, object identity and reference types in SQL, Structure of XML, Document Schema, Querying and Transformation, API in XML, XML applications.

UNIT-IV
PostgreSQL, Oracle, IBM DB2 Universal Database, SQL standards, SQL 1999, SQL: 2003, Standards for interoperability and integration, XML related specifications, X-Query, X-Path, Web Services, SOAP.

Text Books:

Reference Books:
PARALLEL COMPUTING

Paper Code: ETCS-427
Paper: Parallel Computing

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I
Parallel computer models: The state of computing, Classification of parallel computers, Flynn and Feng’s classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI Models.
Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnection architecture.

UNIT II
Memory Hierarchy Design: Memory technologies and optimization, inclusion, coherence and locality, cache memory organization and cache performance optimization, shared memory organization, memory protection, virtual memory technology and introduction to buses, crossbar and multi-stage switches.
Pipelining and ILP: Instruction level parallelism and its exploitation - concepts and challenges, overcoming data hazards with dynamic scheduling. Pipelining, instruction and arithmetic pipelining designs, branch handling techniques, linear and non-linear pipeline processors, superscalar and super pipeline design.

UNIT III
Parallel architectures: multi-processor system interconnects, cache coherence and synchronization mechanism, message passing mechanism, vector processing principles, multivector multiprocessors, compound vector processing, principles of multithreading, latency hiding techniques- shared virtual memory, prefetching techniques, distributed coherent cache, scalable and multithread architectures, dataflow and hybrid architecture.

UNIT IV

TEXT BOOKS:

REFERENCE BOOKS:
[R1] Introduction to Parallel Processing by P. Ravi Prakash, M. Sasikumar, Dinesh Shikhare By PHI Publications.
[R2] Fundamentals of Parallel Processing by Jordan Harry, Alagband Gita, PHI Publication
[R3] Introduction to Parallel Programming by Steven Brawer.

Objective: The perquisites are Computer Architecture, OS. The student is introduced to the concepts of parallelism which enhances the speed of operations of an OS. Further, various architectures of multiprocessor is taught.

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23th BOS and 40th AC meeting of USET.
ADVANCED COMPUTER NETWORKS

Paper Code: ETIT-401
Paper: Advanced Computer Networks

INSTRUCTIONS TO PAPER SETTERS:
MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
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Objective: To understand different network protocols with emphasis on TCP/IP protocol suite.

UNIT-I
Network Layer:
ARP, RARP, ICMP, IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6), Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD), The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent Multicast (PIM).

UNIT-II
Transport Layer: Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.

UNIT-III
Optical Networking:
Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. Quality of Service: Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, Diffserv and Intserv.

UNIT-IV
Overview of latest concepts:
TCP/IP Applications: VoIP, NFS, Telnet, FTP, SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS (PAAS, SAAS, HAAS) and Cloud Computing, Big data, Elements of Social Network.

Text Books:

Reference Books:
CONTROL SYSTEMS

INSTRUCTIONS TO PAPER SETTERS:

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MAXIMUM MARKS: 75

Objective: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system

UNIT I : Control Systems - Basics & Components
Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason’s Gain formula. Control system components: Electrical/ Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchrons, Magnetic Amplifiers, Servo Amplifiers,

[T1,T2][No. of Hrs. : 11]

UNIT II : Time – Domain Analysis
Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

[T1,T2][No. of Hrs. : 10]

UNIT III : Frequency Domain Analysis
Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

[T1,T2][No. of Hrs. : 10]

UNIT IV : Stability & Compensation Techniques

[T1,T2][No. of Hrs. : 11]

Text Books:

Reference Books:
INTRODUCTION TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

UNIT I
Module 1A: Introduction to Elements of Indian History: What is History? History Sources- Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

Module 1B: Introduction to sociological concepts- structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

UNIT II
Module 2A: Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

UNIT III
Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

UNIT IV

Module 4B: Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

Text Books:

Reference Books:
[R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

UNIT I
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UNIT III
Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

UNIT IV

Module 4B: Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

Text Books:

Reference Books:
[R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
SOFTWARE TESTING AND QUALITY ASSURANCE LAB

Paper Code: ETCS-453  
Paper: Software Testing and Quality Assurance Lab  
L  T/P  C  
0  2  1

List of Experiments:

Tool Required: Smartbear QA Complete

1. To determine the nature of roots of a quadratic equations, its input is triple of +ve integers (say x,y,z) and values may be from interval[1,100] the program output may have one of the following:-

[Not a Quadratic equations, Real roots, Imaginary roots, Equal roots] Perform BVA.

2. To determine the type of triangle. Its input is triple of +ve integers (say x,y,z) and the values may be from interval[1,100]. The program output may be one of the following [Scalene, Isosceles, Equilateral, Not a Triangle]. Perform BVA

3. Perform robust case testing on Problem No. 1.
4. Perform robust case testing on Problem No. 2.
5. Create a test plan document for any application (e.g. Library Management System)
6. Experiment: Study of Any Testing Tool (Win Runner)
7. Experiment: Study of Any Test Management Tool (QA Complete)
8. Experiment: Automate the Test cases using Test Automation tool(using QA Complete)
9. Experiment: Learn how to raise and report Bugs using Bug tracking tool (Bugzilla, Jira using QA Complete)
10. Experiment: Study of any open source testing tool (Web Performance Analyzer/O STA)

NOTE: At least 8 Experiments out of the list must be done in the semester.
INFORMATION SECURITY LAB

Paper Code: ETCS-451
Paper: Information Security Lab

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List of Experiments:

1. Make an experiment to implement WEP/WPA2 PSK, 802.1x EAP security protocol.
2. Implement firewall through App to login into bank-site; to implement E-commerce, debit card transaction through payment gateway
3. Implement bio-metric system to have physical security through different access control permissions.
4. Implement RSA algorithm.
5. Implement DES algorithm
6. Implement Diffie-Hellman algorithm
7. Make a study of anyone simulation tool based on parameters of information security
8. Implement VPN through Packet-Tracer or any other network simulator tool.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.
WIRELESS COMMUNICATION LAB

Paper Code: ETEC-463  
Paper: Wireless Communication Lab  
L   T/P   C  
0   2   1

List of Experiments:

1. Eight experiments suggested on kits for GSM, CDMA and any possible experiments covering the subjects.
2. Setting up wireless network with and without infrastructure support.
3. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
4. Configuring Routing between wired and wireless Networks.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.
EMBEDDED SYSTEMS LAB

Paper Code: ETCS-457 (ELECTIVE)
Paper: Embedded Systems Lab

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List of Experiments:

1. Introduction to microcontroller and interfacing modules.
2. To interface the seven segment display with microcontroller 8051
3. To create a series of moving lights using PIC on LEDs.
4. To interface the stepper motor with microcontroller.
5. To display character ‘A’ on 8*8 LED Matrix.
6. Write an ALP to add 16 bits using ARM 7 Processor.
7. Write an ALP for multiplying two 32 bit numbers using ARM Processor.
8. Write an ALP to multiply two matrices using ARM processor.

NOTE: At least 8 Experiments out of the list must be done in the semester.
DATA MINING AND BUSINESS INTELLIGENCE LAB

Paper Code: ETCS-457 (ELECTIVE)  L  T/P  C
Paper: Data Mining and Business Intelligence Lab  0  2  1

List of Experiments:

1. Study of ETL process and its tools.
2. Program of Data warehouse cleansing to input names from users (inconsistent) and format them.
3. Program of Data warehouse cleansing to remove redundancy in data.
4. Introduction to WEKA tool.
5. Implementation of Classification technique on ARFF files using WEKA.
6. Implementation of Clustering technique on ARFF files using WEKA.
7. Implementation of Association Rule technique on ARFF files using WEKA.
8. Implementation of Visualization technique on ARFF files using WEKA.
9. Study of DBMINER tool
10. Study of ARMINER tool.

NOTE: At least 8 Experiments out of the list must be done in the semester.
ADVANCED COMPUTER NETWORKS LAB

Paper Code: ETCS-457(ELECTIVE)  L  T/P  C
Paper: Advanced Computer Network Lab  0  2  1

List of Experiments:

1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
2. Configuration of IP addressing for a given scenario for a given set of topologies.
3. Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.
4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
   a. ARP/RARP protocols
   b. RIP routing protocols
   c. BGP routing
   d. OSPF routing protocols
   e. Static routes (check using netstat)
5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.
6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb.Use a TFTP client and repeat the experiment.
7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.
8. Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS). Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

NOTE: At least 8 Experiments out of the list must be done in the semester.
## NATURAL LANGUAGE PROCESSING LAB

**Paper Code:** ETCS-457 (ELECTIVE)  
**Paper:** Natural Language Processing Lab  

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**List of Experiments:**

1. Write a Program for Word Analysis.
2. Write a Program for Word Generation.
3. Write a program to implement Morphology.
4. Write a Program to implement N-Grams.
5. Write a Program to implement N-Grams Smoothing.
6. Write a Program to implement POS Tagging: Hidden Markov Model.
7. Write a Program to implement POS Tagging: Viterbi Decoding.

**NOTE:** At least 8 Experiments from the syllabus must be done in the semester.
DIGITAL SIGNAL PROCESSING LAB

Paper Code: ETCS-457(ELECTIVE)  L  T/P  C
Paper: Digital Signal Processing Lab  0  2  1

List of Experiments:

Software Experiments:
1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and
discrete domains using user defined functions.
2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete
signals.
3. Perform linear convolution using circular convolution and vice versa.
4. Write a MATLAB program to
   i. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
   ii. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
5. Perform the following properties of DFT-
   i. Circular shift of a sequence.
   ii. Circular fold of a sequence.
6. Write a MATLAB Program to design FIR Low pass filter using
   i. Rectangular window
   ii. Hanning window
   iii. Hamming window
   iv. Bartlett window
7. Write a MATLAB program to
   i. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth
      Approximation.
   ii. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev
      Approximation.

Hardware Experiments using Texas Instruments Kits-DSK 6713:
8. Introduction to Code composer Studio.
9. Write a program to generate a sine wave and see the output on CRO
10. Write a Program to Generate ECHO to give audio file.
11. Write a program to demonstrate Band Stop filter by FIR.

Additional Experiments:
12. Write a program to generate a cos wave and see the output on CRO
13. Write a program to blink the LED
14. Write a program to display a string on LCD.

NOTE:  At least 8 Experiments out of the list must be done in the semester.
SIMULATION AND MODELLING LAB

Paper Code: ETCS-457(ELECTIVE)
Paper: Simulation and Modelling Lab

List of Experiments:

1. Design finite State, and complex model Simulations.
2. Design Graph or Network Transitions Based Simulations.
3. Design actor Based Simulations, Mesh Based Simulation, Hybrid Simulations.
4. Convert to Parallel and Distributed Simulations, first Partition data, Algorithms
5. Design Probability and Statistics for Simulations and Analysis, Queues and Random Noise, Random Variates Generation and Sensitivity Analysis
7. Display Forms: Tables, Graphs, and Multidimensional Visualization Terminals, X and MS Windows, and Web Interfaces, Validation of Model Results.

Programming skills in one or more of the following programming languages:
- Java,
- C, or C++

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.
ADVANCED DBMS LAB

Paper Code: ETCS-457 (ELECTIVE)  
Paper: Advanced DBMS Lab  
L T/P C  
0 2 1

Lab based on Advanced DBMS  
Lab includes implementation of Triggers, Procedures, Functions i.e. PL/SQL.  
SQL implementation in PostgreSQL.

Text Books:  
CONTROL SYSTEMS LAB

Paper Code: ETCS-457 (ELECTIVE) L T/P C
Paper: Control Systems Lab 0 2 1

List of Experiments:

1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
   a. excited with dc
   b. excited with ac
3. To study synchro transmitter in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
4. To study remote position indicator systems using synchro transmitter/receiver.
5. To plot speed-torque curves for ac servomotor for different voltages.
6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
7. To study the time response of simulated linear systems.
8. To study the performance of PID Controller.
9. Plot impulse response, unit step response, unit ramp response of any 2nd order transfer function on same graph using MATLAB.
10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
11. Plot root locus for any 2nd order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
**MOBILE COMPUTING**

**Paper Code:** ETIT-402  |  **L**  |  **T/P**  |  **C**  
**Paper:** Mobile Computing  |  3  |  1  |  4  

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionalities of Mobile communication. To understand the concepts of Adhoc and wireless sensor networks. Introduce Mobile Application Development environment.

**UNIT-I**
**Mobile Physical Layer:** Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

**Mobile Computing Architecture:** Issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile file systems, Mobile databases. WAP: Architecture, protocol stack, Data gram protocol, Wireless transport layer security, Wireless transaction protocol, wireless session protocol, application environment, and applications.

**UNIT-II**
**Mobile Data Link Layer:** Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling. Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

**Blue Tooth:** IEEE 802.15 Blue tooth User scenarios, physical, MAC layer and link management. Local Area Wireless systems: WPABX, IrDA, ZigBee, RFID, WiMax.

**UNIT-III**

**Mobile Transport Layer:** Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP.

**UNIT-IV**
**Support for Mobility:** Data bases, data hoarding, Data dissemination, UA Prof and Caching, Service discovery, Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML. Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbion OS, Android, Mobile Agents. Introduction to Mobile application languages and tool kits.

**Course Outcomes:**
1. Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks. 2. Understand the architectures, the challenges and the Solutions of Wireless Communication. 3. Realize the role of Wireless Protocols in shaping the future Internet. 4. Able to develop simple Mobile Applications Using Tool kit.
Text Books:

Reference Books:

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc.,
Language support: XHTML-MP, WML, WML Script.
Mobile application languages- XML, Voice XML, Java, J2ME, Java Card
Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

MACHINE LEARNING

Paper Code: ETCS-402
Paper: Machine Learning

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the knowledge of basic concepts of machine learning systems, types of learning etc.

UNIT-I
Introduction:

Basic concepts: Definition of learning systems, Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, function approximation.


Classification Families: linear discriminative, non-linear discriminative, decision trees, probabilistic (conditional and generative), nearest neighbor.

UNIT-II

UNIT-III

UNIT-IV

Text Books:

Reference Books:
HUMAN VALUES & PROFESSIONAL ETHICS – II

**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS:** 75

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.
3. Two internal sessional test of 10 marks each and one project report* carrying 5 marks.

**Objectives:**

1. The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
2. To enable student to understand the need and importance of value-education and education for Human Rights.
3. To acquaint students to the National and International values for Global development

**UNIT I - Appraisal of Human Values and Professional Ethics:**


Sensitization of Impact of Modern Education and Media on Values:
- a) Impact of Science and Technology
- b) Effects of Printed Media and Television on Values
- c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)
- d) Role of teacher in the preservation of tradition and culture.
- e) Role of family, tradition & community prayers in value development.


**UNIT II – Engineers responsibility for safety:**


Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

**UNIT III – Global Issues:**

Globalization and MNCs: International Trade, Issues,

Case Studies: Kelleg’s, Satyam, Infosys Foundation, TATA Group of Companies

Business Ethics: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

Computer Ethics: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

**UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:**

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

Development and implementation of Codes: Oath to be taken by Engineering graduates and its importance**, [T1] [T2] [R4] [R2] [No. of Hrs. 05]
Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.

Text Books:
[T1] Professional Ethics, R. Subramanian, Oxford University Press,

References Books:
[R8] Charles E Harris; Micheal J Rabin, “Engineering Ethics, Cengage Learning
[R9] PSR Murthy, “Indian Culture Values and Professional Ethics”, BS Publications
[R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
[R13] C, Sheshadri; The Source book of Value Education, NCERT
[R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

**All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available alongwith the scheme and syllabus.
DIGITAL IMAGE PROCESSING

Paper Code: ETIT-418
Paper: Digital Image Processing

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INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

UNIT- I:


UNIT- II:
Filtering in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothening and Sharpening Frequency Domain Filters.


UNIT- III:
Image Compression: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

UNIT- IV:
Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

Text Books:

Reference Books:
Objective: The aim is to provide the student with experience of the use of industry standard commercial software packages for design and simulation of semiconductor devices, processes and circuits.

UNIT I
Semiconductor, VLSI device technology, VLSI design flow, MOS Capacitance fundamentals, MOSFET principles and characteristics, MOS transistor theory, MOS structure, enhancement & depletion transistor, CMOS & NMOS process technology, explanation of different stages in fabrication, Threshold voltage, MOS device design equations

UNIT II
MOSFET Operation and modelling, Short and narrow channel effects, Radiation and hot-carrier effects, Breakdown, LDD, CMOS latch-up, CMOS Device design considerations & performance factors, Brief overview of MOSFET CAD SPICE model - different levels.

UNIT III
CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, Static & Dynamic power dissipation, switching characteristics & inter connection effects, Rise time, fall time delays, Noise margin, power consumption in CMOS.

UNIT IV

Text Books:

Reference Books:
ADHOC AND SENSOR NETWORKS

Paper Code: ETEC-406
Paper: Ad Hoc and Sensor Networks

INSTRUCTIONS TO PAPER SETTER:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.

UNIT I

Ad Hoc Wireless Networks:

MAC Protocols for Ad Hoc Wireless Networks:

UNIT II

Routing Protocols for Ad Hoc Wireless Networks:

Transport Layer and Security Protocols for Ad Hoc Wireless Networks:

UNIT III

Wireless Sensor Networks:

Hybrid wireless Networks:

UNIT IV

Wireless Geolocation Systems:

Recent Advances in Wireless Networks:

INSTRUCTIONS TO PAPER SETTER:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
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UNIT I

Ad Hoc Wireless Networks:

MAC Protocols for Ad Hoc Wireless Networks:

UNIT II

Routing Protocols for Ad Hoc Wireless Networks:

Transport Layer and Security Protocols for Ad Hoc Wireless Networks:

UNIT III

Wireless Sensor Networks:

Hybrid wireless Networks:

UNIT IV

Wireless Geolocation Systems:

Recent Advances in Wireless Networks:
**Text Books:**


**Reference Books**


SOFT COMPUTING

Paper Code: ETIT-410

Paper: Soft Computing

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the various concepts of neural networks and fuzzy logic.

UNIT-I

Neural Networks:

[T1, T2][No. of Hrs. 11]

UNIT-II

Fuzzy Logic:

[T1, T2][No. of Hrs. 11]

UNIT-III

Fuzzy Arithmetic:
Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations, Fuzzy Logic:
Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,
Uncertainty based Information:
Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

[T1, T2][No. of Hrs. 11]

UNIT-IV

Introduction of Neuro-Fuzzy Systems:
Architecture of Neuro Fuzzy Networks.
Application of Fuzzy Logic:
Medicine, Economics etc.
Genetic Algorithm:
An Overview, GA in problem solving, Implementation of GA.

[T1, T2][No of Hrs 11]

Text Books:

Reference Books:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
VLSI DESIGN

Paper Code: ETIC-414
Paper: VLSI Design

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INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Maximum Marks: 75

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

UNIT I
Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances. NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

[T1,T2][No. of Hours: 11]

UNIT II
Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin. CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

[T1,T2][No. of Hours: 11]

UNIT III
Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

[T1,T2][No. of Hours: 11]

UNIT IV
VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

[T1,T2][No. of Hours: 11]

Text Books:

Reference Book:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
DISTRIBUTED SYSTEMS

Paper Code: ETIT-430
Paper: Distributed Systems

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INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand networking, operating systems and various issues.

UNIT-I
Fundamentals of Distributed Computing:
Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing.

Distributed Operating Systems:
Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.

[12, 10] [No. of Hours 22]

UNIT-II
Communication:

Process Concepts:
Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

[10] [No. of Hours 10]

UNIT-III
Synchronization:
Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems

Distributed Databases:
Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

[11] [No. of Hours 11]

UNIT-IV
Processing:
Basic Concepts: Introduction to processing, processing terminology, Design of algorithms, Design of Parallel Databases, Parallel Query Evaluation.

[11] [No. of Hours 11]

Text Books:

Reference Books:
OBJECT ORIENTED SOFTWARE ENGINEERING

Paper Code: ETCS-412
Paper: Object Oriented Software Engineering

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

OBJECTIVE: To make the students well versed with current s/w developments in the industry.

UNIT I:
Introduction – Overview of Object-Orientation; Basic Concepts of Object-Orientation; Data abstraction, Encapsulation, Inheritance, Aggregation, classes; objects; messages, inheritance, polymorphism. Importance of modeling, principles of modeling, Object oriented modeling.
OO Life cycle – Object Oriented analysis, modeling and design; Requirement Elicitation; Introduction to Object Oriented Methodologies, Overview of Requirements Elicitation, Requirements Model-Action & Use cases.

UNIT II:
Architecture: Introduction, System development is model building, model architecture, requirement model, analysis model, design model, implementation model.
Analysis: Introduction, System development based on user requirement, Use case model, interface descriptions, Problem domain objects, interface objects, entity objects, control objects.
Code Design Improvement: Refactoring, Anti patterns, Visitor Patterns.

UNIT III:
Construction: Introduction, the design model, design model dimensions, block design, working with construction.
Testing: Introduction, Object Oriented testing process, testing of analysis and design model, testing of classes.

UNIT IV:
Modelling with UML: Basic Building Blocks of UML, A Conceptual Model of UML.
Basic structural modelling: Classes, interfaces, Dependency, generalization and association relationship, comparison of E-R diagram and UML class Diagram, forward and reverse engineering.
Basic Behavioral Modeling: Use case diagram-relationships between use cases- extend, include, and generalize. Activity diagram-Action state, Activity state, Transition (Fork, Merge, Join), State diagram-events, State Diagram states, transitions, Interaction diagrams: Sequence diagram, Collaboration diagram (iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links.)
Architectural modelling:
Deployment: Common Modelling technique; Modelling processors and devices, modelling distribution of artifacts.
Collaboration: Modeling roles, modelling the realization of a Use Case, modelling the realization of an operation, modelling a mechanism.

Text Books:

Reference Books:
[R2] Booch, Maksimchuk, Engle, Young, Conallen and Houston, “Object Oriented Analysis and Design with Applications”, Pearson Education.

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To make the students well versed with current s/w developments in the industry.

UNIT I:
Introduction – Overview of Object-Orientation; Basic Concepts of Object-Orientation; Data abstraction, Encapsulation, Inheritance, Aggregation, classes; objects; messages, inheritance, polymorphism. Importance of modeling, principles of modeling, Object oriented modeling.
OO Life cycle – Object Oriented analysis, modeling and design; Requirement Elicitation; Introduction to Object Oriented Methodologies, Overview of Requirements Elicitation, Requirements Model-Action & Use cases.

UNIT II:
Architecture: Introduction, System development is model building, model architecture, requirement model, analysis model, design model, implementation model.
Analysis: Introduction, System development based on user requirement, Use case model, interface descriptions, Problem domain objects, interface objects, entity objects, control objects.
Code Design Improvement: Refactoring, Anti patterns, Visitor Patterns.

UNIT III:
Construction: Introduction, the design model, design model dimensions, block design, working with construction.
Testing: Introduction, Object Oriented testing process, testing of analysis and design model, testing of classes.

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Modelling with UML: Basic Building Blocks of UML, A Conceptual Model of UML.
Basic structural modelling: Classes, interfaces, Dependency, generalization and association relationship, comparison of E-R diagram and UML class Diagram, forward and reverse engineering.
Basic Behavioral Modeling: Use case diagram-relationships between use cases- extend, include, and generalize. Activity diagram-Action state, Activity state, Transition (Fork, Merge, Join), State diagram-events, State Diagram states, transitions, Interaction diagrams: Sequence diagram, Collaboration diagram (iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links.)
Architectural modelling:
Deployment: Common Modelling technique; Modelling processors and devices, modelling distribution of artifacts.
Collaboration: Modeling roles, modelling the realization of a Use Case, modelling the realization of an operation, modelling a mechanism.

Text Books:

Reference Books:
[R2] Booch, Maksimchuk, Engle, Young, Conallen and Houston, “Object Oriented Analysis and Design with Applications”, Pearson Education.
COMPUTER VISION

Paper Code: ETCS-414
Paper: Computer Vision

3 0 3

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand geometric, analytical features, edge detection and texture etc.

UNIT I
Geometric Image Features
Elements of Differential Geometry, Contour Geometry,
Analytical Image Features
Elements of Analytical Euclidean Geometry, Geometric Camera Parameters, Calibration Methods.

UNIT II
Linear Filters
Linear Filters and Convolution, Shift invariant linear systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing
Edge Detection
Estimating Derivatives with Finite Differences, Noise, Edges and Gradient-based Edge Detectors.

UNIT III
Texture
Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesizing Textures for Rendering, Shape from Texture: Planes and Isotropy
Shape from Shading
Introduction to the concept of Shading From Shading (SFS), Application of SFS (Texture Shop, Image-Based Material Emitting, Optimization Based SFS), Photometric stereo, Spherical Illumination, Displacement Mapping, Feature Mapping.

UNIT IV
Affine Structure from Motion
Elements of Affine Geometry, Affine Structure from Two Images, Affine Structure from Multiple Images, From Affine to Euclidean Images, Affine Motion Segmentation
Projective Structure from Motion
Elements of Projective Geometry.

Text Books:

Reference Books:
[R1] Introductory Techniques for 3D Computer Vision by E Trucco and A. Verri, Prentice Hall
SOFTWARE PROJECT MANAGEMENT

INSTRUCTIONS TO PAPER SETTERS:  MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the knowledge of software project management, project estimation and evaluation alongwith risk analysis and management.

UNIT-I
Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control.
Software Project scheduling and planning: Basic concepts, project scheduling, defining a task set and task network, scheduling, earned value analysis indicators, Project elements, WBS [Work Breakdown Structure] . Selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities.

[T1, T2][No. of Hrs. 11]

UNIT-II
Project Estimation and Evaluation: software project estimation, decomposition techniques, empirical estimation models, estimation for object oriented projects, estimation for Agile development and Web engineering projects.
Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; choice of process model, structured methods, rapid application development, water fall, spiral models, Prototyping delivery, Albrecht function point analysis.

[T1, T2][No. of Hrs. 11]

UNIT-III
Activity planning: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, Network planning model; Network Diagrams : CPM, Bar Charts, Gantt Chart ; PERT [Activity-on-arrow network; Activity on Node network ] Precedence network; Forward pass; Backward pass; Critical path.
Risk Analysis and Management: Risk and risk types, Risk Break down Structure, Risk management process, Evaluating schedule risk using PERT.

[T1, T2][No. of Hrs. 10]

UNIT-IV
Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, visualizing progress, Project Tracking, Status Reports, Milestone Analysis, Actual Versus Estimated Analysis of Effort and Schedule.
Software quality and project closure: Defining software quality attributes, ISO 9126, Software quality measures, Project Closure Analysis, The Role of Closure Analysis, Performing Closure Analysis.

[T1, T2][No. of Hrs. 10]

Text Books:
[T1] Software Project Management (2nd Edition), by Bob Hughes and Mike Cottrell, 1999, TMH

Reference Books:
[R2] Pankaj Jalote, Software project management in practice, Addison-Wesley

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
HUMAN COMPUTER INTERACTION

Paper Code: ETCS-404
Paper: Human Computer Interaction

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INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the interaction between and computer and human being.

UNIT I

[T1, T2][No. of Hrs. 10]

UNIT II
Models and Theories: Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction.

[T1, T2][No. of Hrs. 11]

UNIT III
Interaction Styles: Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation.

[T1, T2][No. of Hrs. 10]

UNIT IV
Outside the Box: Group ware, Ubiquitous computing and augmented realities, Hypertext, Multimedia and the World Wide Web.

[T1, T2][No. of Hrs. 11]

Text Books:


Reference Books:

INFORMATION THEORY AND CODING

Paper Code: ETIT-416
Paper: Information Theory and Coding

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.

UNIT-I

UNIT-II

UNIT-III
Linear Block Codes, Repetition Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

UNIT-IV
Decoding of Convolutional Codes: Maximum Likelihood decoding, Viterbi’s algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes. Introduction to Cryptography.

Text Books:

Reference Books:
WEB INTELLIGENCE AND BIG DATA

Paper Code: ETCS-418
Paper: Web Intelligence and Big Data

L T/P C
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INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: The objective of this paper is to build web-intelligence applications exploiting big data sources arising social media using new big-data platforms based on the 'map-reduce' parallel programming paradigm.

UNIT-I
Introduction: Web Scale AI and Big Data, Web Intelligence, Big Data
Look: Indexing- Index creation, Ranking, Page Rank Searching- Enterprise search, Searching structured data, Object Search, Locality Sensitive Hashing and Memory.

UNIT-II
Listen: Streams, Information and Language, Analyzing Sentiment and Intent
Load: Databases and their Evolution, Big data Technology and Trends.
Programming: Map-Reduce, Map-Reduce applications and its efficiency, Big-Table and HBase

UNIT-III
Learn: Classification, Clustering, and Mining, Information Extraction
Connect: Reasoning: Logic and its Limits, Dealing with Uncertainty.

UNIT-IV
Predict: Forecasting, Neural Models, Deep Learning, and Research Topics.
Data Analysis: Regression and Feature Selection

Text Book:
[T1] The Intelligent Web: Search, Smart Algorithms and Big Data published by Oxford University Press, UK, in November 2013, authored by Dr. Gautam Shroff.

References Books:
SERVICE ORIENTED ARCHITECTURE

Paper Code: ETCS-420
Paper: Service Oriented Architecture

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: The objective of the paper is to facilitate the student with the fundamentals of Service oriented architecture, enterprise architecture, architectural and design considerations with various SOA Analysis, Design technologies and applications.

UNIT-I

SO Architectures: Architectures like Enterprise architecture, software architecture, SOA Reference architecture overview, The roots of SOA (comparing SOA to Past architectures)

Enterprise-wide SOA: Services-orientation and the enterprise, Considerations, Layers, Strawman architecture and other architectures, Application Development process, SOA methodology for Enterprise, Enterprise Applications.

UNIT-II
Service-Oriented Enterprise Applications: Considerations, Patterns for SOA, SOA Programming Models.

SOA Analysis and Design: Principles and best practices of Service Design, Designing - Activity Services, Data Services, Client Services, Business process services.


Service Context and common Semantics: Importance of Semantics in SOA, Core information modeling, defining types, Beyond the basics, structuring information models, documents and XML, XML: Schema and Patterns, Best practices for SOA Architect.

UNIT-III

Designing Service implementations: Basic Service architecture, Implementing: interface layer, business layer, Resource layer.


Designing and Using Integration in SOA Solutions: Challenges of Integration in SOA, Special Considerations for implementing Integration.

UNIT-IV

SOA Governance: Management and governance defined, Case for SOA governance, service life cycle, Developing and Registering Run Time policies, Run time policy enforcement and adaptation. Approach for Enterprise-wide SOA Implementation. SOA Applications and various Case Studies.

Text Books:

Reference Books:
[R1] Thomas Erl, "SOA Principles of Service Design” by Prentice Hall
[R2] Roshen, "SOA based Enterprise Integration” by TMH publications

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
MULTIAGENT SYSTEMS

Paper Code: ETCS-422
Paper: Multiagent Systems

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Multi-Agent Systems that are helpful for a Computer Engineering student who would like his carrier in Artificial Intelligence and Robotics.

UNIT-I
Agent Programming Languages: Agent-Oriented Programming, Concurrent MetateM.

UNIT-II
Distributed Problem Solving and Planning, Introduction, Example Problems, Task Sharing, Result Sharing, Distributed Planning, Distributed Plan Representations, Distributed Planning and Execution,
Search Algorithms for Agents, Introduction, Constraint Satisfaction, Path-Finding Problem, Two-Player Games,

UNIT-III

UNIT-IV

Text Books:

Reference Books:
PRINCIPLES OF PROGRAMMING LANGUAGES

Paper Code: ETCS-424
Paper: Principles of Programming Languages

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INSTRUCTIONS TO PAPER SETTERS:

- Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

MAXIMUM MARKS: 75

Objective: The objective of the paper is to facilitate the student with the principles of programming languages that are required for an engineering student.

UNIT-I
Introduction: Syntax, semantics and pragmatics; Formal translation models, Variables, Expressions & Statements, Binding time spectrum; Variables and expressions; Assignment; I-values and r-values; Environments and stores; Storage allocation; Constants and initialization; Statement-level control structure.

[T1, T2][No. of hrs. 12]

UNIT-II
Primitive Types: Pointers; Structured types; Coercion; Notion of type equivalence;
Polymorphism: overloading, inheritance, type parameterization, Abstract data types; Information hiding and abstraction; Visibility, Procedures, Modules, Classes, Packages, Objects and Object-Oriented Programming.

[T1, T2][No. of hrs. 10]

UNIT-III
Storage Management: Static and dynamic, stack-based, and heap-based storage management.
Sequence Control: Implicit and explicit sequencing with arithmetic and non-arithmetic expressions; Sequence control between statements.
Subprogram Control: Subprogram sequence control, data control and referencing environments; parameter passing; static and dynamic scope; block structure.

[T1, T2] [No. of hrs. 12]

UNIT-IV
Logic programming: Introduction; Rules, Structured Data and Scope of the variables; Operators and Functions; Recursion and recursive rules; Lists, Input and Output; Program control; Logic Program design.

[T1, T2][No. of hrs. 10]

Text Books:
[T1] Programming Languages – Pratt T.V. (Pearson Ed).
[T4] Programming Languages, Adesh K Pandey, Narosa Publishing House

References:

Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23rd BOS and 40th AC meeting of USET.
TELECOMMUNICATION NETWORKS

Paper Code: ETCS-426
Paper: Telecommunication Networks

L T/P C
3 0 3

INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand the basics of telecommunication transport and signalling protocols.

UNIT I

[T1][No. of Hours 10]

UNIT II
Data Transport, Aggregation, grooming, Quality of Service: Carrier Networks: - asynchronous carrier networks - Carrier Ethernet; synchronous carrier networks-TDM hierarchies(E1 to E3, T1 to T3), STS to STMx hierarchies under SDH, Cell Switched Networks(ATM, Burst Switched Networks).

[T1][No. of Hours 10]

UNIT III

[T1][T2][R2][No. of Hours 10]

UNIT IV
Wireless Networks: GSM (2G,3G,4G,5G), CDMA , and UMTS with emphasis on Reference point interfaces, Basics of IP Multimedia systems(IMS, ePC ) and NGN.

[T1, T2][No. of Hours 12]

Text Books:

Reference Books:
[R1] Telecommunication Switching, Traffic & networks by J.E.Flood, Pearson Education Asia
SELECTED TOPICS OF RECENT TRENDS IN COMPUTER SCIENCE AND ENGINEERING

Paper Code: ETCS-428
Paper: Selected Topics of Recent Trends in CSE

INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the recent trends in CSE and IT fields that are required for an engineering student.

UNIT I
Trends in Information Retrieval:
Recent Trends in IR: Parallel and distributed IR, multimedia IR, data modeling Web Searching, Characterizing the Web, Search Engines, Browsing, Meta searchers, Searching using hyperlinks.
Cluster Analysis: Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, hierarchical methods, density based methods, grid based methods.

UNIT II
High Performance Computing

UNIT III
Grid Computing

UNIT IV
BIG DATA Analysis using Hadoop:
Database evolution, Big data and Hadoop overview, Hadoop Distributed File System (HDFS), Map Reduce, Hadoop Streaming and Compression.

Text Books:

Reference Books:
[R3] Hadoop in Practice, Holmes Wiley

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the recent trends in CSE and IT fields that are required for an engineering student.

UNIT I
Trends in Information Retrieval:
Recent Trends in IR: Parallel and distributed IR, multimedia IR, data modeling Web Searching, Characterizing the Web, Search Engines, Browsing, Meta searchers, Searching using hyperlinks.
Cluster Analysis: Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, hierarchical methods, density based methods, grid based methods.

UNIT II
High Performance Computing

UNIT III
Grid Computing

UNIT IV
BIG DATA Analysis using Hadoop:
Database evolution, Big data and Hadoop overview, Hadoop Distributed File System (HDFS), Map Reduce, Hadoop Streaming and Compression.

Text Books:

Reference Books:
[R3] Hadoop in Practice, Holmes Wiley
MOBILE COMPUTING LAB

Paper Code: ETIT-452
Paper: Mobile Computing Lab

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List of Experiments:

The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc.,

Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

For MANETS, use of NS2/NS3 is recommended for two experiments.

Reference Books:


NOTE:- At least 8 Experiments out of the list must be done in the semester.
MACHINE LEARNING LAB

Paper Code: ETCS-454
Paper: Machine Learning Lab

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<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

List of Experiments:

1. Study and Implement the Naive Bayes learner using WEKA. (The datasets taken can be: Breast Cancer data file or Reuters data set).
2. Study and Implement the Decision Tree learners using WEKA. (The datasets taken can be: Breast Cancer data file or Reuter’s data set).
3. Estimate the accuracy of decision classifier on breast cancer dataset using 5-fold cross-validation. (You need to choose the appropriate options for missing values).
4. Estimate the precision, recall, accuracy, and F-measure of the decision tree classifier on the text classification task for each of the 10 categories using 10-fold cross-validation.
5. Develop a machine learning method to classifying your incoming mail.
6. Develop a machine learning method to Predict stock prices based on past price variation.
7. Develop a machine learning method to predict how people would rate movies, books, etc.
8. Develop a machine learning method to Cluster gene expression data, how to modify existing methods to solve the problem better.
9. Select two datasets. Each dataset should contain examples from multiple classes. For training purposes assume that the class label of each example is unknown (if it is known, ignore it). Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameter k.
10. Implement the EM algorithm assuming a Gaussian mixture. Apply the algorithm to your datasets and report the parameters you obtain. Evaluate performance by measuring the sum of Mahalanobis distance of each example from its class center. Test performance as a function of the number of clusters.
11. Suggest and test a method for automatically determining the number of clusters.
12. Using a dataset with known class labels compare the labeling error of the K-means and EM algorithms. Measure the error by assigning a class label to each example. Assume that the number of clusters is known.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
**MICROELECTRONICS LAB**

**Paper Code: ETCS-456(ELECTIVE-I)  **

**Paper: Microelectronics Lab**

<table>
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<tbody>
<tr>
<td></td>
<td>0</td>
<td>2</td>
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</tr>
</tbody>
</table>

**List of Experiments:**

1. To study the MOS characteristics and introduction to Tanner EDA software tools.
2. To design and study the DC characteristics of PMOS and NMOS.
3. To design and study the DC characteristics of resistive inverter.
4. To design and study the transient and DC characteristics of CMOS inverter.
5. To design and study the characteristics of CMOS NAND gate.
6. To design and study the characteristics of CMOS multiplexer.
7. To design any Boolean function using CMOS gates.
8. To design and study the characteristics of CMOS NOR gate.

**NOTE:** At least 8 Experiments out of the list must be done in the semester.
COMPUTER VISION LAB

Paper Code: ETCS-456(ELECTIVE-I)  L  T/P  C
Paper: Computer Vision Lab  0  2  1

List of Experiments:

1. WAP for Affine Transformation
2. WAP for representing epipolar geometry
3. WAP for implementing shapes from shading
4. WAP for finding depth from motion
5. WAP to find the structure by solving the motion equation (Motion equation: rotation and translation)
6. WAP for segmentation by edge Detection
7. WAP for object detection using color, texture and motion cues.

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.
SOFTWARE PROJECT MANAGEMENT LAB

Paper Code: ETCS-456(ELECTIVE-I)  
Paper: Software Project Management Lab  
L T/P C  
0 2 1

List of Experiments:

1. Consider the following information that you have compiled regarding the steps needed to complete a project. You have identified all relevant steps and have made some determination regarding predecessor/successor relationships. Using MS project, develop a simple network diagram for this project, showing the links among the project activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Predecessors</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- Survey Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B- Install sewer and storm</td>
<td>A</td>
<td>9 Days</td>
</tr>
<tr>
<td>C- Install gas and electric</td>
<td>A</td>
<td>4 Days</td>
</tr>
<tr>
<td>D- Excavate site for spec</td>
<td>B,C</td>
<td></td>
</tr>
<tr>
<td>E- Pour Foundation</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

2. Suppose that we add some duration estimates to each of the activities from question 1. A portion of the revised table is shown here. Recreate the network diagram for this project and note how MS project uses nodes to identify activity durations, start and finish dates, and predecessors. What is the critical path for this diagram? How do we know?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Predecessors</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- Survey Site</td>
<td></td>
<td>5 Days</td>
</tr>
<tr>
<td>B- Install sewer and storm</td>
<td>A</td>
<td>9 Days</td>
</tr>
<tr>
<td>C- Install gas and electric</td>
<td>A</td>
<td>4 Days</td>
</tr>
<tr>
<td>D- Excavate site for spec</td>
<td>B,C</td>
<td></td>
</tr>
<tr>
<td>E- Pour Foundation</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

3. Draw the PERT diagram for the question no 2 using Activity on Arrow (AOA) convention and Activity on Node (AON) Convention.

4. Refer to the activity network shown here in the table. Suppose that we have modified the original table slightly to show the following predecessor relationship between tasks and resources assigned to perform these activities. Enter the information using MS project to produce a Gantt chart. Assume that each resource has been assigned to the project activity on full time basis.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Predecessors</th>
<th>Duration</th>
<th>Resource Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- User Survey</td>
<td></td>
<td>5 Days</td>
<td>Gail Wilkins</td>
</tr>
<tr>
<td>B- Coding</td>
<td>A</td>
<td>12 Days</td>
<td>Tom Hodges</td>
</tr>
<tr>
<td>C- Debug</td>
<td>A</td>
<td>5 Days</td>
<td>Tom Hodges</td>
</tr>
<tr>
<td>D- Design Interface</td>
<td>B,C</td>
<td>6 Days</td>
<td>Sue Ryan</td>
</tr>
<tr>
<td>E- Develop Training</td>
<td>D</td>
<td>5 Days</td>
<td>Reed Taylor</td>
</tr>
</tbody>
</table>

A. Using the resource usage view, can you determine any warning signs that some member of the project team has been over assigned?
B. Click on the Task Usage view to determine the specific days when there is conflict in the resource assignment schedule.
5. Using the keywords “Cases on project risk management “search the Internet to identify and generate the report on any recent example of a project facing significant risks. What steps did the project organization take to first identify and then mitigate the risk factors in this case.

6. Go to the site http://www. Do.ca.gov/HTML/IT/PMM/OPT and reproduce the summary project budget worksheet. How would you adjust this worksheet if you were estimating the costs for a new software project? What items would you retain? Which would you remove or modify? Use MS Project to create project summary report.

7. Using the data shown in the network precedence table below, enter various tasks in MS Project. Then select a data approximately halfway through the overall project duration and update all tasks in the network to show current status. You may assume that all tasks in the first half of the project are now 100% completed. What does the tracing Gantt chart look like?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Predecessors</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- Conduct Competitive analysis</td>
<td>---------------</td>
<td>3</td>
</tr>
<tr>
<td>B- Review field sales reports</td>
<td>---------------</td>
<td>2</td>
</tr>
<tr>
<td>C- Conduct tech capabilities assessment</td>
<td>---------------</td>
<td>5</td>
</tr>
<tr>
<td>D- Develop focus group data</td>
<td>A,B,C</td>
<td>2</td>
</tr>
<tr>
<td>E- Conduct telephone surveys</td>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>F- Identify relevant specification</td>
<td>E</td>
<td>3</td>
</tr>
<tr>
<td>G- Interface with marketing staff</td>
<td>F</td>
<td>1</td>
</tr>
<tr>
<td>H- Develop engineering specifications</td>
<td>G</td>
<td>5</td>
</tr>
<tr>
<td>I- Check and debug designs</td>
<td>H</td>
<td>4</td>
</tr>
<tr>
<td>J- Develop testing protocols</td>
<td>G</td>
<td>3</td>
</tr>
<tr>
<td>K- Identify Critical Performance levels</td>
<td>J</td>
<td>2</td>
</tr>
<tr>
<td>L- Assess and modify product components</td>
<td>I,K</td>
<td>6</td>
</tr>
<tr>
<td>M- Conduct capabilities assessments</td>
<td>L</td>
<td>12</td>
</tr>
<tr>
<td>N- Identify selection criteria</td>
<td>M</td>
<td>3</td>
</tr>
<tr>
<td>O- Develop RFQ</td>
<td>M</td>
<td>4</td>
</tr>
<tr>
<td>P- Develop production master schedule</td>
<td>N,O</td>
<td>5</td>
</tr>
<tr>
<td>Q- Liaison with sales staff</td>
<td>P</td>
<td>1</td>
</tr>
<tr>
<td>R- Prepare product Launch</td>
<td>Q</td>
<td>3</td>
</tr>
</tbody>
</table>

8. Draw the PERT diagram for the question no 7 using Activity on Arrow (AOA) convention and Activity on Node (AON) Convention.

9. Go to a search engine and enter the term “Project failure‖ or “Project disaster‖ .Select one example and develop and analysis of the project using MS Project was it terminated or not? If not why in your opinion was it allowed to continue?

10. Do the case study of the following :
    A. The IT department at Kimble college
    B. The Tacoma Narrows suspension bridge
    C. Project Libra to terminate or not to terminate
    D. Johnson and Rogers Software Engineering Inc.  (Ref.:- Jeffrey K. Pinto, Pearson publications)

11. What are the company’s top risks? How severe Is their impact and how likely are they about to occur. Prepare RMMN plan for same.  [Hint. Table should have following columns : Risk, Category, Problem , Impact , RMMN ]


13. What is the Software Project Quality measures related to any projects?
PRINCIPLES OF PROGRAMMING LANGUAGES LAB

Paper Code: ETCS-458(ELECTIVE-II)  L  T/P  C
Paper: Principles of Programming Languages Lab  0  2  1

List of Experiments:-

1. Implement all major functions of string.h in single C program using switch case to select specific function from user choice (like strlen, strcat, strcpy, strcmp, strrev).
2. Write a program (WAP) in C to reverse a linked list iterative and recursive.
3. WAP in C to implement iterative Towers of Hanoi.
4. WAP in C++ to count the nos of object of a class with the help of static data member, function and constructor.
5. WAP in C++ & Java to declare a class Time with data members mm for minutes, ss for seconds and hh for hours. Define a parameterize constructor to assign time to its objects. Add two time objects using member function and assign to third objects. Implement all possible cases of time.
6. WAP in C++ to define a class Complex to represents set of all complex numbers. Overload ‘+’ operator to add two complex numbers using member function of the class and overload ‘*’ operator to multiply two complex numbers using friend function of the class complex.
7. Implement simple multi-threaded server to perform all mathematics operation parallel in Java.
8. Write a program in to prepare a list of 50 questions and their answers.
9. Write a program to display 10 questions at random out of exp.8-50 questions (do not display the answer of these questions to the user now).

NOTE:- At least 8 Experiments out of the list must be done in the semester.
**TELECOMMUNICATION NETWORKS LAB**

**Paper Code:** ETCS-458(ELECTIVE-II)  
**Paper:** Telecommunication Networks Lab  
<table>
<thead>
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<th>L</th>
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</table>

List of Experiments:

1. Experiments: Access Networks (on Telephone Trainer kit)  
3. Check how the Caller ID is transmitted, design a circuit to read the Caller ID  
4. Check the DTMF dialling function, displaying the freq pairs for DTMF, design a circuit for DTMF and Pulse dial-out using a microcontroller  
5. To study dial tone, busy tone and ring back tone waveforms and generations.  
6. To study speech circuit and ring generator using EPABX.  
7. To study the working of sound section or speech section.  
8. Study of working of Voltage Dropper Circuit in Telephone.  
9. Study of the working of Key Matrix Section.  
10. To study working of dialer section and DTMF signals using High Pass and Low Pass Filters.  
11. DSL- Using a DSLAM simulator, checks the functioning of a any ADSL modem.  
12. Ethernet- Using Wireshark checks the Ethernet packet format across a live LAN.  
13. Using OpenNMS, check the status of a Network Element such as a Linux node running SNMPD

**NOTE:** At least 8 Experiments out of the list must be done in the semester.