SCHEME OF EXAMINATION

and

SYLLABI

for

Bachelor of Technology
Common To All Branches

Offered by

University School of Engineering and Technology

1st SEMESTER and 2nd SEMESTER

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

www.ipu.ac.in

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
**BACHELOR OF TECHNOLOGY**  
(Common to all branches)  
First Semester Examination

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper ID</th>
<th>Paper</th>
<th>L</th>
<th>T/P</th>
<th>Credits</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETMA-101</td>
<td></td>
<td>Applied Mathematics-I</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td>ETPH-103</td>
<td></td>
<td>Applied Physics-I</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td>ETME-105</td>
<td></td>
<td>Manufacturing Processes</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td>ETEE-107</td>
<td></td>
<td>Electrical Technology</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td>ETHS-109</td>
<td></td>
<td>Human Values &amp; Professional Ethics-I#</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>ETCS-111</td>
<td></td>
<td>Fundamentals of Computing</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>ETCH-113</td>
<td></td>
<td>Applied Chemistry</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>M</td>
</tr>
</tbody>
</table>

**PRACTICAL/VIVA VOCE**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper ID</th>
<th>Paper</th>
<th>L</th>
<th>T/P</th>
<th>Credits</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETPH-151</td>
<td></td>
<td>Applied Physics Lab-I</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ETEE-153</td>
<td></td>
<td>Electrical Technology Lab</td>
<td></td>
<td>2</td>
<td>1</td>
<td>M</td>
</tr>
<tr>
<td>ETME-155</td>
<td></td>
<td>Workshop Practice</td>
<td></td>
<td>3</td>
<td>2</td>
<td>M</td>
</tr>
<tr>
<td>ETME-157</td>
<td></td>
<td>Engineering Graphics Lab</td>
<td></td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>ETCS-157</td>
<td></td>
<td>Fundamentals of Computing Lab</td>
<td></td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>ETCH-161</td>
<td></td>
<td>Applied Chemistry Lab</td>
<td></td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NCC/NSS*#</td>
<td></td>
<td></td>
<td></td>
<td>--</td>
</tr>
</tbody>
</table>

**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.

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
# BACHELOR OF TECHNOLOGY
## (COMMON TO ALL BRANCHES)
### SECOND SEMESTER EXAMINATION

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper ID</th>
<th>Paper</th>
<th>L</th>
<th>T/P</th>
<th>Credits</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETMA-102</td>
<td></td>
<td>Applied Mathematics-II</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td>ETPH-104</td>
<td></td>
<td>Applied Physics-II</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ETEC-106</td>
<td></td>
<td>Electronic Devices</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td>ETCS-108</td>
<td></td>
<td>Introduction to Programming</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>M</td>
</tr>
<tr>
<td>ETME-110</td>
<td></td>
<td>Engineering Mechanics</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>--</td>
</tr>
<tr>
<td>ETHS-112</td>
<td></td>
<td>Communication Skills</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>--</td>
</tr>
<tr>
<td>ETEN-114</td>
<td></td>
<td>Environmental Studies</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>--</td>
</tr>
</tbody>
</table>

### PRACTICAL/VIVA VOCE

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper ID</th>
<th>Paper</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ETPH-152</td>
<td></td>
<td>Applied Physics Lab-II</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ETCS-154</td>
<td></td>
<td>Programming Lab</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ETEC-156</td>
<td></td>
<td>Electronic Devices Lab</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ETME-158</td>
<td></td>
<td>Engineering Mechanics Lab</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ETEN-160</td>
<td></td>
<td>Environmental Studies Lab</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

|                  |          | NCC/NSS*#                         |     |     |        |      |
|                  |          |                                   |     |     |        |      |
|                  |          | TOTAL                             | 17 | 15  | 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.
**APPLIED MATHEMATICS-I**

<table>
<thead>
<tr>
<th>Paper Code : ETMA-101</th>
<th>L</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper : Applied Mathematics-I</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

**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 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.

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

**UNIT- II**

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves. Integration: integration using reduction formula for sin^nθ cos^nθ, reduction formula for sin nθ cos nθ, and reduction of integral to form for sin mθ cos nθ (m<n) or vice versa. 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.

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

**UNIT- III**


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

**UNIT- IV**

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernoulli’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.

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

*Text:*


*References:*


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

APPLIED PHYSICS – I

Paper Code: ETPH – 103

L T C

2 1 3

INSTRUCTIONS TO PAPER SETTERS:

<table>
<thead>
<tr>
<th>Maximum Marks: 75</th>
</tr>
</thead>
<tbody>
<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>
</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>
</tr>
</tbody>
</table>

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


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, Laurens half shade polarimeter.


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

UNIT III


Ultrasoundics: 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

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

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 basic Manufacturing processes.

UNIT-I

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.

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.

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.

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.


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)

Scheme and Syllabi for B. Tech, 1st year (Common to all branches w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
### ELECTRICAL TECHNOLOGY

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

**INSTRUCTIONS TO PAPER SETTERS:**

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
1 1 1

Non-University Examination Scheme (NUES)
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.

Objectives:
This introductory course input is intended
a. 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.
b. 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.
c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustworthy 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. [T1], [R1], [R4]

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 [T2], [R1], [R2]

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. [T1],[R4]

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 [T1], [T2], [T3], [R3]

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

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
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.

*PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS* will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi.)

**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. Observe whether the desires are related with self “I” or body. If it appears to be related with the 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 wildy 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-

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Intention (Natural Acceptance)</th>
<th>S.No.</th>
<th>Competence</th>
</tr>
</thead>
<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>
</tr>
<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>
</tr>
<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? What is answer?</td>
<td>4.b.</td>
<td>Is the other able to make me always happy? What is answer?</td>
</tr>
</tbody>
</table>

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 fulfilment 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:**
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** 2  **T** 0  **C** 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.

**[T1], [T2] [8 Hours]**

**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.

**[T1], [T2] [8 Hours]**

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

**[T1],[T2],[R1] [8 Hours]**

**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-pointer presentation

**[R2][R3] [8 Hours]**

**Text:**

**References:**

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
**INSTRUCTIONS TO PAPER SETTER:**

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. 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 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). [T1,T2] [No. of hrs. 08]

**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). [T1,T2] [No. of hrs. 08]

**UNIT III: WATER**


**UNIT IV: CORROSION & ITS CONTROL**

Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemical or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Electroplating, Electroless plating, Prevention of Corrosion by Material selection & Design. [T1,T2] [No. of hrs. 08]

**Text Books:**


**Reference Books:**


Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
APPLIED PHYSICS LAB – I

Paper Code: ETPH-151


<table>
<thead>
<tr>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

1. To determine the wavelength of sodium light by Newton’s Rings.
2. To determine the wavelength of sodium light by Fresnel's biprism.
3. To determine the wavelength of sodium light using diffraction grating.
4. To determine the refractive index of a prism using spectrometer.
5. To determine the dispersive power of prism using spectrometer and mercury source.
6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
7. To find the wavelength of He-Ne laser using transmission diffraction grating.
8. To determine the numerical aperture (NA) of an optical fibre.
9. To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find
   (a) The acceleration due to gravity
   (b) The radius of gyration and the moment of inertia of the bar about an axis.
10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).
11. To verify inverse square law.
12. To determine Planck’s constant.

**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.

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
ELECTRICAL TECHNOLOGY LAB

Paper Code: ETEE 153
Paper: Electrical Technology Lab

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.
9. Starting, Reversing and speed control of DC shunt Motor
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  
**L P C**  

## 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:

- **[T1]** Engineering Drawing by N.D.Bhatt (Charotar Publications).  
- **[T2]** Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)

### Reference Books:

- **[R1]** Engineering Drawing by Venugopalan, (New Age International).  
- **[R2]** Engineering Drawing by P.S.Gill (S.K. Kataria & Sons)  
- **[R3]** Engineering Graphics by K.C.John (PHI)

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

Paper Code: ETCS 157  L  P  C
Paper: Fundamental of Computing Lab  0  2  1

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

<table>
<thead>
<tr>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

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 MgSO₄ 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) λ max of the solution of KMnO₄, (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

L T C

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 12.5 marks.

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:
[T1]. E. kreszig,” Advance Engineering Mathematics”, Wiley publications

References:

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
### APPLIED PHYSICS – II

**Paper Code:** ETPH-104  
**Paper:** APPLIED PHYSICS – II  
L T C  
2 1 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:** 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.

[T1], [T2][No. of Hrs. 8]

**UNIT II**  
**Statistical Physics:** Black body radiation, Planck's radiation formula, Wien’s and Rayleigh-Jeans Laws, Distribution laws: Qualitative features of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics & their comparison (without derivation).

**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).

[T1][T2][No. of Hrs. 8]

**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.

[T1], [T2][No. of Hrs. 8]

**UNIT IV**  
**Band Theory of Solids:** Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

[T1][T2][No. of Hrs. 8]

**Text Books:**


**Reference Books**


---

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) **w.e.f batch 2014-15** and (2nd, 3rd & 4th years) **w.e.f batch 2013-14** approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
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

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
INTRODUCTION TO PROGRAMMING

Paper Code: ETCS-108
Paper: Introduction to Programming
L  T  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 12.5 marks.

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)

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

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

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

Text Books:

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

Paper Code: ETME 110
Paper: Engineering Mechanics

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

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 give the basic principles of mechanics 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 $T_1/T_2 = e^{\mu \theta}$ and its application, M.A, V.R and Efficiency of Screw Jack. Application of friction in pivot and collar bearing..

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.

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.

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, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy, Shear force and bending Moment Diagram.

Text Books:

Reference Books:
R2. Engg Mechanics by U.C.Jindal (Galgota Publications).
COMMUNICATION SKILLS

Paper Code: ETHS – 112
Paper: Communication Skills

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

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.)
ENVIRONMENTAL STUDIES

Paper Code: ETEN-114

<table>
<thead>
<tr>
<th>Paper: Environmental Studies</th>
<th>L</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

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 inter dependent 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 toxicology: 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 land-slides, nuclear accidents and holocaust, case studies.

(ii) Social Issues, Human Population and the Environment


Text Books:


References Books:


**APPLIED PHYSICS LAB – II**

<table>
<thead>
<tr>
<th>Paper Code: ETPH-152</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper: Applied Physics Lab – II</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**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 e.m.f 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

**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.

---

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
ENGINEERING MECHANICS LAB

Paper Code: ETME-158

Paper: Engineering Mechanics Lab

<table>
<thead>
<tr>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

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.
PROGRAMMING LAB

Paper Code : ETCS 154  
Paper : Programming Lab  

LIST OF EXPERIMENTS

For program development an IDE e.g. CodeBlock\(^a\), Eclipse CDT\(^b\), Netbeans\(^c\) is recommended

1. Write a program to find divisor or factorial of a given number.
2. Write a program to find sum of a geometric series
3. Write a recursive program for tower of Hanoi problem
4. Write a recursive program to print the first m Fibonacci number
5. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
   - Addition of two matrices
   - Subtraction of two matrices
   - Finding upper and lower triangular matrices
   - Transpose of a matrix
   - Product of two matrices
6. Write a program to copy one file to other, use command line arguments.
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.
8. Write a program to perform the following operators on Strings without using String functions
   - To find the Length of String.
   - To concatenate two string.
   - To find Reverse of a string.
   - To Copy one string to another string.
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.
10. Write a programme to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.
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 ]

[a] http://www.codeblocks.org/
[c] https://netbeans.org/features/cpp/

Note:- Any 8-10 Experiments out of the list may be chosen.
# ENVIRONMENTAL STUDIES LAB

**Paper Code – ETEN-160**

<table>
<thead>
<tr>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

## 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](dst.gov.in/green-chem.pdf) (monograph of green chemistry laboratory experiments).

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