SCHEME OF EXAMINATION

And

SYLLABI

for

BRIDGE COURSE
(Consumer Electronics)
LEVEL IV SKILL COMPONENT

Offered by

University School of Engineering and Technology

1st SEMESTER to 2nd SEMESTER

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY

Guru Gobind Singh Indraprastha University
Sector 16-C, Dwarka, Delhi – 110078 [INDIA]
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NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF B.VOC

1. **ET** stands for Engineering and Technology.
2. **AP** stands for Architecture and Planning
3. **V** stands for Vocation.
4. **MC** stands for Mobile Communication.
5. **SD** stands for Software Development.
6. **AE** stands for Automobile.
7. **CE** stands for Consumer Electronics.
8. **PT** stands for Printing Technology.
9. **CT** stands for Construction Technology.
10. **RA** stands for Refrigeration & Air-Conditioning.
11. **PD** stands for Power Distribution Management.
12. **ID** stands for Interior Design.
13. **AA** stands for Applied Arts.
14. **CS** stands for Computer Science.
15. **MS** stands for Management Studies.
16. **EN** stands for Environmental Engineering
17. **PH** stands for Physics
18. **AS** stands for Applied Science.
19. **HS** stands for Humanities and Social Sciences.
20. **SS** stands for Social Services.
21. **L/T** stands for Lecture and Tutorial
22. **P** stands for Practical.
23. **S/D** stands for Drawing/Studio
24. **P/D** stands for Practical/Drawing

BACHELOR OF VOCATION
CONSUMER ELECTRONICS
BRIDGE COURSE FOR (10+2) STUDENTS
(FIRST SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVCE-401		Basic Electronics	3	0	3
ETVCE-403		Electronic Workshop	0	3	3
ETVCE-405		Information Technology Workshop	0	3	3
ETVCE-407		Field Technician – Other Home Appliances	1	2	3
TOTAL			**4**	**8**	**12**

No. of hours: 12 x 15 =180

Note: Only one course is to be chosen by the student out of the three choices mentioned above for the bridge course component of the first semester.

BACHELOR OF VOCATION
CONSUMER ELECTRONICS
BRIDGE COURSE FOR (10+2) STUDENTS
(SECOND SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVCE-402		Basic Electrical Engineering	4	0	4
ETVCE-404		Basic Electrical Engineering Lab	0	4	4
ETVCE-406		Field Technician – Digital Camera	2	2	4
TOTAL			**6**	**6**	**12**

No. of hours: 12 x 15 =180

Note: Only one course (other than the one chosen in first semester) is to be chosen by the student out of the three choices mentioned above for the bridge course component of the second semester.

Note: The students are advised to mandatorily complete the bridge course alongwith LEVEL-V regular course. The credits earned are of qualifying nature and should be completed within four semesters (2 years) for obtaining Diploma/Advanced Diploma/ B.Voc Degree, as a pre-requisite. A certificate to this affect shall be issued by the Principal/Director of affiliated Institutes to be submitted to COE. NSQF LEVEL-IV certification may be done through the respective agencies involved.

BACHELOR OF VOCATION
CONSUMER ELECTRONICS
BRIDGE COURSE FOR STUDENTS (10+2 YEARS OF ITI)
(FIRST SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVCE-401		Applied Mathematics	3	1	4
ETVCE-403		English Language	2	0	2
ETVCE-405		Information Technology Workshop	0	3	3
ETVCE-407		Field Technician – Other Home Appliances	1	2	3
TOTAL			**6**	**6**	**12**

No. of hours: 12 x 15 =180

Note: Only one course is to be chosen by the student out of the three choices mentioned above for the bridge course component of the first semester.

BACHELOR OF VOCATION
CONSUMER ELECTRONICS
BRIDGE COURSE for students (10+2 years of ITI)
(SECOND SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L	T/P	Credits
ETVCE-402		Applied Physics	3	0	3
ETVCE-404		Applied Physics Lab	0	2	2
ETVCE-406		Field Technician – Digital Camera	2	2	4
ETVCE-408		English Language Lab	0	3	3
TOTAL			**5**	**7**	**12**

No. of hours: 12 x 15 =180

Note: Only one course (other than the one chosen in first semester) is to be chosen by the student out of the three choices mentioned above for the bridge course component of the second semester.

Note: The students are advised to mandatorily complete the bridge course alongwith LEVEL-V regular course. The credits earned are of qualifying nature and should be completed within four semesters (2 years) for obtaining Diploma/Advanced Diploma/ B.Voc Degree, as a pre-requisite. A certificate to this affect shall be issued by the Principal/Director of affiliated Institutes to be submitted to COE. NSQF LEVEL-IV certification may be done through the respective agencies involved.

BASIC ELECTRONICS

Paper Code: ETVCE-401	**L**	**T/P**	**C**
Paper: Basic Electronics	**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.

Objectives and Pre-requisites: *This course provides comprehensive idea about working principle, operation and characteristics of electronic devices, transducers, Digital Electronics and Communication Systems. At the end of the course students will be able to gain knowledge about the fundamentals of electronic components, devices, and transducers, Basic principles of digital electronics and basic principles of various communication systems*

Prerequisites: *Basic knowledge of semiconductor physics and elementary mathematics help in understanding the subject*

UNIT-I

Electronic Components: Passive components: resistors, capacitors & inductors (properties, common types, I-V relationship and uses), transformers.

Semiconductor Devices: Semiconductor Devices : Overview of Semiconductors - basic principle, operation and characteristics of PN diode, zener diode, BJT, JFET, MOSFET ,optoelectronic devices (LDR, photodiode, phototransistor, solar cell, opto couplers).

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

UNIT II 8 Hours

Transducers: Instrumentation – general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers – piezoelectric and thermocouple.

[T1, T2][No. of Hrs. 08]

UNIT-III 14 Hours

Digital Electronics: Number systems , binary codes , logic gates , Boolean algebra, laws & theorems , simplification of Boolean expression using K maps, implementation of Boolean expressions using logic gates , standard forms of Boolean expression. Decoder, Multiplexer, Demultiplexer, Priority Encoder, Flip Flops, Registers, Counters (only circuits and working of synchronous and asynchronous modulo n counters and decade counters).

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

UNIT-IV 10 Hours

Communication Systems: Block diagram of a basic communication system – frequency spectrum , need for modulation , methods of modulation ,over view of AM, FM, AM / FM transmitters & receivers ,navigational aids(block diagram description only).

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

Text Books:

[T1] Soumitra Kumar Mandal, "Basic Electronics", Tata McGraw-Hill
[T2] Debashis De, "Basic Electronics", Pearson India
[T3] Santiram Kal, "Basic Electronics: Devices, Circuits and Its Fundamentals", PHI Eastern Economy Edition

Reference Books:

[R1] V. K. Mehta, "Principles of Electronics", S Chand & Sons.
[R2] Malvino, "Electronic Principles", McGraw Hill

ELECTRONICS WORKSHOP

Paper Code: ETVCE-403	**L**	**T/P**	**C**
Paper: Electronics Workshop	**0**	**3**	**3**

Objectives: *These subjects equip the student to gain practical experience on how to handle commonly used electronic equipments, devices and component. This is essential for 10 +2 stream students to easily handle practical classes in higher semesters*
Pre-requisites: *Nil*

1. Identification, familiarization, demonstration and use of the following electronic instruments:
   A. Multi-meter analog and digital
   B. CRO, function of every knob on the front panel
   C. Power supply, fixed voltage and variable voltage, single output as well as dual output.
   D. Function generator
   E. Logic probes

2. Identification, familiarization and uses of commonly used tools; active and passive components; color code and types of resistor and potentiometers. Identify different type of IC packages like DIP, PGA, BGA, Quad flat, QFN etc

3. Cut, strip, join and insulate two lengths of wires/cables (repeat with different types of cables/wires)

4. Demonstrate and practice the skill to remove components/ wires by unsoldering

5. Cut, bend, tin component, leads, inserts, Solder components e.g. resistor, capacitor, diodes, transistors on single sided and double sided PCB

6. Wiring of a small circuit on a PCB/tag strip involving laying, sleeving and use of identifier tags

7. Disassemble a working circuit and reassemble it and test

8. Testing devices BJT, FET, Diode, Resistor, Capacitor, Inductor, Transformers,

9. Identify different type of switches and connectors , IC bases and their area of usage ,ZIF socket

10. Study of different soldering techniques and SMT .Solder different IC bases in general purpose PCB

INFORMATION TECHNOLOGY WORKSHOP

Paper Code: ETVCE-405	**L**	**T/P**	**C**
Paper: Information Technology Workshop	**0**	**3**	**3**

List of Experiments:

1. Given a PC, name its various components and list their functions

2. Identification of various parts of a computer and peripherals

3. Practice in installing a computer system by giving connections and loading the System software and Application Software.

4. Feature: of Windows XP onwards:
Start, shut down and restore, creating operating on the icons, opening, closing and sizing the windows using elementary job commands like creating saving modifying, renaming, finding and deleting a file, creating and operating a folder, changing setting like date, time, color (background and foreground) ,using shortcuts ,using online help, Windows system Tools, Control Panel.

5. Exercise on various features of MS WORD:
Creation of Curriculum Vitae, Bio-Data, Creation of Time Table of Class Routine, Mail Merge Application, Uses of Macros
6. Exercise on various features of MS –EXCEL:
Salary sheet, Hotel Bill preparation, Preparation of Chart, Creating a chart, working with chart types, changing data in chart. Formatting a chart, use chart to analyze data, using a list to organize data, sorting and filtering data in list

7. Exercise on various features of MS – ACCESS:
Creating a database; table; the table window in designed view, defining fields primary key fields, planning the table. Using database sheet view and designed view; modifying the design of a table, making a backup copy, Adding and editor: The access editor, adding and modifying records, moving data among records, adding sample data Finding records: Find options, finds using wild card, find and replace-Quick sort: Creating a quick sort, removing a quick sort

8. MS-POWER POINT:
Preparing presentation: Creating a new slide, Sorting slides, inserting pictures, setting header and footer, Formatting ,Setting fonts, alignments, slide design, slide layout , Slide show, View show, Rehearse timing, action buttons, slide transition, animations skills

9. INTERNET AND ITS APPLICATIONS:
Log-in to internet, Navigation for information seeking on Internet, Browsing and downloading of information from internet, Sending and receiving e-mail ,Creating a message, Creating an address book, Attaching a file with e-mail message ,Receiving a message, Deleting a message, Configuring MS-Outlook Express

FIELD TECHNICIAN-OTHER HOME APPLIANCES

Paper Code: ETVCE-407	**L**	**T/P**	**C**
Paper: Information Technology Workshop	**1**	**2**	**3**

List of Experiments:

Objectives: *To train the individual to installs the appliance and interacts with customers to diagnose the problem and possible causes. Once the problem and causes have been identified, the individual rectifies minor problems or replaces faulty modules for failed parts or recommends factory repairs for bigger faults.*
Pre-requisites*: Nil*

UNIT-I

A. Interact with the customer prior to visit
B. Interact with customer at their premises
C. Suggest possible solutions to customer
D. Achieve productivity and quality as per company's norms

UNIT-II

A. Install the water purifier
B. Undertake pre-installation site visit
C. Remove packaging and check accessories
D. Fix the water purifier at identified location
E. Check water purifier's functioning
F. Complete the documentation
G. Interact with supervisor or superior
H. Achieve productivity and quality as per company's norms

UNIT-III

A. Interact with supervisor or superior
B. Coordinate with colleagues

UNIT-IV
CASE STUDY:

A. Repair dysfunctional water purifier
B. Repair dysfunctional microwave oven
C. Repair dysfunctional mixer/juicer/grinder

PRACTICALS:

Repair dysfunctional water purifier
Repair dysfunctional microwave oven
Repair dysfunctional mixer/juicer/grinder

BASICS ELECTRICAL ENGINEERING

	L	T/P	C
Paper Code: ETVCE-402			
Paper: Basics Electrical Engineering	**4**	**0**	**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.

Objectives and Pre-requisites: *The students should have studied Calculus, Matrices, Complex numbers and Electrical concepts from physics. The course aims to provide exposure to basic electrical engineering concepts to non-major students.*

Learning Outcomes: *A student who successfully fulfills the course requirements will have demonstrated:*

1. *An understanding of charge, current, voltage, power, energy, electrical safety, resistors (R), and the fundamental principles of Ohm's law, KVL and KCL, behavior of inductances (L) and capacitances (C).*
2. *An ability to write the differential equations for a given RLC network and solve them analytically for the transient and steady state responses to a step input.*
3. *An ability to qualitatively and quantitatively predict and compute the steady state AC responses of basic circuits using the phasor method.*
4. *An understanding of resonance, frequency response and the principles of electric filters*
5. *An ability to determine the conditions for maximum power transfer to any circuit element.*
6. *An proficiency in calculating parameters of a two port network.*

UNIT-I

Basic Circuit Concepts: Voltage and Current Sources, Resistors: Fixed and Variable resistors, Construction and Characteristics, Color coding of resistors, resistors in series and parallel.

Inductors: Fixed and Variable inductors, Self and mutual inductance, Faraday's law and Lenz's law of electromagnetic induction, Energy stored in an inductor, Inductance in series and parallel, Testing of resistance and inductance using multimeter.

Capacitors: Principles of capacitance, Parallel plate capacitor, Permittivity, Definition of Dielectric Constant, Dielectric strength, Energy stored in a capacitor, Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic capacitor, Construction and application, capacitors in series and parallel, factors governing the value of capacitors, testing of capacitors using multimeter.

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

UNIT-II

Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis, Star-Delta Conversion.

DC Transient Analysis: Initially Charged RC Circuit, RL Circuit with Initial Current, Time Constant, RL and RC Circuits With Sources, DC Response of Series RLC Circuits.

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

UNIT-III

AC Circuit Analysis: Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Voltage-Current relationship in Resistor, Inductor and Capacitor, Phasor, Complex Impedance, Power in AC Circuits: Instantaneous Power, Average Power, Reactive Power, Power Factor. Sinusoidal Circuit Analysis for RL, RC and RLC Circuits. Mesh Analysis, Node Analysis and Network Theorems for AC Circuits.

Resonance in Series and Parallel RLC Circuits, Frequency Response of Series and Parallel RLC Circuits, Quality (Q) Factor and Bandwidth. Passive Filters: Low Pass, High Pass, Band Pass and Band Stop.

[T1][T2][No. of Hrs. 13]

UNIT – IV

Network Theorems: Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, and Maximum Power Transfer Theorem.

Two Port Networks: Impedance (Z) Parameters, Admittance (Y) Parameters, Transmission (ABCD) Parameters.

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

Text Books:

[T1] Hambley, A. R., Electrical Engineering, Principles and Applications, 5th Edition, Prentice Hall, (2011).
[T2] B. L. Theraja, Electrical Technology: Basic Electrical Engineering (Volume-1), S. Chand (2008).

References Books:

[R1] S. A. Nasar, Electric Circuits, Schaum's outline series, Tata McGraw Hill (2004).
[R2] Electrical Circuits, M. Nahvi and J. Edminister, Schaum's Outline Series, Tata McGraw-Hill.(2005).
[R3] W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill(2005).
[R4] Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)
[R5] M. E. Van Valkenburg, Network Analysis, 3rd Edition, PHI Learning (2014).

BASICS ELECTRICAL ENGINEERING LAB

	L	P	C
Paper Code: ETVCE-404			
Paper: Basics Electrical Engineering Lab	**0**	**4**	**4**

Instructions: *Twelve Experiments are to be chosen from given the list of Experiments/ Practicals. The rest of the Experiments (i.e., three in number) may be designed by the faculty at the respective institute according to the Syllabus being taught.*

List of Experiments:

1. a) Color coding of resistances
   b) Resistance in series, parallel and series – Parallel.
2. Capacitors & Inductors in series & Parallel.
3. Study of Multimeter – Checking of components.
4. Voltage sources in series, parallel and series – Parallel
5. Voltage and Current dividers
6. Measurement of Amplitude, Frequency & Phase difference using CRO.
7. Verification of Kirchoff's Law.
8. Verification of Norton's theorem.
9. Verification of Thevenin's Theorem.
10. Verification of Superposition Theorem.
11. Verification of the Maximum Power Transfer Theorem.
12. RC Circuits: Time Constant, Differentiator, Integrator.
13. Designing of a Low Pass RC Filter and study of its Frequency Response.
14. Designing of a High Pass RC Filter and study of its Frequency Response.
15. Study of the Frequency Response of a Series LCR Circuit and determination of its (a) Resonant
16. Frequency (b) Impedance at Resonance (c) Quality Factor Q (d) Band Width.

FIELD TECHNICIAN-DIGITAL CAMERA

Paper Code: ETVCE-406	**L**	**T/P**	**C**
Paper: Information Technology Workshop	**2**	**2**	**4**

Objectives: *To train the individual to diagnose the problem to assess possible causes of malfunction. Once the problem and causes have been identified, the individual rectifies minor problems or replaces faulty modules for failed parts.*
Prerequisites*: Nil*

UNIT-I
Engage with customer for service:

A. Interact with the customer prior to visit
B. Interact with customer at their premises
C. Suggest possible solutions to customer
D. Achieve productivity and quality as per company's norms
E. Interact with colleagues:
F. Interact with supervisor or superior
G. Coordinate with colleagues

UNIT-II

Different types of digital cameras and their specifications. Features of different models of digital cameras of the company. LCD screen removal procedure, disassembling and re-assembling the camera . Functioning of various electromechanical parts of the digital camera. Components of the camera such as imaging chip, processing board, etc. and their specific functions. Common mechanical problems and how they can be fixed . Troubleshooting with respect to digital cameras. Frequently occurring faults such as shutter not closing, broken LCD screen, lens problem, etc. ESD precautions. Hazards, their causes and prevention

Practicals:

A. Repair dysfunctional digital camera
B. Understanding symptoms and identifying fault
C. Replacing faulty module
D. Confirming functionality of repaired unit

APPLIED MATHEMATICS

Paper Code: ETVRA-401	**L**	**T/P**	**C**
Paper: Applied Mathematics	**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.

Objectives and Pre-requisites: *The students should have studied Mathematics up to secondary level and the subject aims at developing analytical abilities in applied mathematics such as: algebra, trigonometry, numerical analysis, coordinate geometry, differential and integral calculus. Besides application of above the elements in engineering, the course of study will also provide continuing education base to them.*

Learning Outcomes: *The students should be able to apply the advance knowledge to the engineering problems. To improve their ability in solving geometrical applications of differential calculus problems. To expose to the concept of co-ordinate geometry.*

UNIT-I

Algebra:

(i) Arithmetic Progression (A.P.) – its n^{th} term, sum to n terms. Geometric Progression (G.P.) - its n^{th} term, sum to n terms. Infinite Geometric series. Partial Fractions.

(ii) Binomial theorem for positive integral index (without proof), Binomial theorem for any index, Expansions.

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

UNIT-II

Trigonometry:

(i) Sum and difference formulas for trigonometric ratios of angles and their application (without proof). Formula from product to sum, difference and vice-versa. Ratio of multiple angles, sub multiple angles (like 2A, 3A, A/2).

(ii) In a triangle sine formulas, cosine formulas, Solution of triangle.

(iii) Simple problems on height and distance.

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

UNIT-III

Co-ordinate Geometry:

(i) Equation of straight line in various standard forms. Intersection of two straight lines and angle between them. Concurrent lines, perpendicular distance formula.

(ii) General equation of a circle and its characteristics. Equation of a circle given center and radius, three point form and diametrical form.

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

UNIT-IV

Differential & Integral Calculus:

(i) Functions, concept of evaluation of following limits.

$\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to 0}\frac{a^x-1}{x}$

(ii) Differential coefficient. Its physical application- As rate measure, Geometric interpretation as slope of a curve. Differentiation from first principles of functions like x^n, a^x, Log x , Sin x, Cos x and Tan x. Differentiation of sum, product and quotient of functions.

(iii) Differentiation of Trigonometric and inverse Trigonometric functions. Differentiation of function of a function, Implicit functions, parametric functions, Logarithmic differentiation.

(iv) Integration as inverse operation of differentiation. Integrals of standard functions. Integration by substitution, by parts and by partial fractions.

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

Text Book(s):

[T1] Dr Neeraj Pant. "Engineering Mathematics", Vol-I, Vol-II, Kings India Publication, New Delhi

[T2] H K Dass, "Engineering Mathematics", S.Chand Publishers, New Delhi

References Book(s);

[R1] Grewal B.S, "Higher Engineering Mathematics", Khanna Publications, 42nd Edition, 2012.

[R2] Veerajan T, "Engineering Mathematics-I", Tata McGraw Hill Publishing Co, New Delhi, 5th Edition, 2006.

[R3] Kandasamy P et.al. "Engineering Mathematics", Vol.I (4th revised edition), S.Chand &Co., New Delhi, 2000.

ENGLISH LANGUAGE

Paper Code: ETVRA-403	**L**	**T/P**	**C**
Paper: English Language	**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

Objectives and Pre-requisites: S*tudents should have studied General English up to secondary level and the subject aims at developing communication skills in writing, speaking as well as body language.*

Learning Outcomes: *The students should be able to communicate effectively to his/her superiors as well as juniors at work place in his/her professional field.*

UNIT-I

Introduction: Definition, Introduction and Process of Communication, Objectives of Communication, Essentials of Communication, Media and Modes of Communication, Channels of Communication, Barriers to Communication, Body language, Humour in Communication, Silence in Communication.

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

UNIT-II

Grammar: Identification of parts of speech, using a word as different parts of speech, Correction of in-correct sentences, Tenses, Voice.

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

UNIT-III

Writing: Significance, essentials and effectiveness of writing, Paragraph of 100-120 words.

[T1, T2][No. of Hrs. 09]

UNIT-IV

Speaking: Significance, essentials, barriers and effectiveness of Speaking, Introduction to phonetics (Dictionary: meaning and pronunciation of words as given in the standard dictionary using symbols of phonetics).

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

Text Books:

[T1] Text Book of English and Communication Skills Vol – 1, By Alvinder Dhillon and Parmod Kumar Singla; Published by: M/S Abhishek Publications, Chandigarh

[T2] Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.

[T3] Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.

[T4] A Practical Course in Spoken English by JK Gangal; Published by PHI Learning Pvt. Ltd; New Delhi.

[T5] English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.

[T6] Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.

ENGLISH LANGUAGE LAB

Paper Code: ETVRA-451	**L**	**T/P**	**C**
Paper: English Language	**0**	**3**	**3**

List of Experiments:

The following exercises to be conducted in practical sessions:

1. Exercises on pronunciation of common words as given in the standard dictionary using symbols of phonetics.
2. Greetings for different occasions.
3. Introducing oneself, others and leave taking (talking about yourself).
4. Just a minute (JAM) sessions: Speaking extempore for one minute on given topics.
5. Paper reading before an audience (reading unseen passages).
6. Situational Conversation/role-playing with feedback, preferably through video recording.
7. Reading aloud of Newspaper headlines and important articles improving pronunciation through tongue twisters.
8. Exercises on spellings.
9. Group exercises on writing paragraphs on given topics.

APPLIED PHYSICS

Paper Code: ETVCE-402	**L**	**T/P**	**C**
Paper: Applied Physics	**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.

Objectives and Pre-requisites: *Students should have studied papers such as General Science, Physics & Mathematics up to secondary level. Applied physics is a foundation course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students.*

Learning Outcomes: *The students should be well verse with the concepts of Physics. The student will be able to understand the functioning of automobile and will be able to perform the measurement and testing.*

UNIT-I

Measurement

(i) **Units and Dimensions**

Fundamental and derived units, SI units, dimensions of physical quantities, dimensional formula and dimensional equation, principles of homogeneity of dimensions and applications of homogeneity principle in:

a) Checking the correctness of physical equation.

b) Deriving relations among various physical quantities.

c) Conversion of numerical values of physical quantities from one system of units into other system.

(ii) Errors in measurement accuracy, estimation of percentage error in the result of measurement.

UNIT-II

Waves

Generation of waves by vibrating particles, progressive wave, equation of waves, energy transfer by particles and waves, superposition of waves and its applications to interference, beats and stationary waves (graphical); sound and light as wave – range of frequencies, wavelengths, velocities and their nature, electromagnetic spectrum.

UNIT-III

Ultrasonic

Production of ultrasonic waves by magnetostriction and piezoelectric effect, detection and properties of ultrasonic; applications to drilling, cold welding, cleaning, flaw detection and exploration (sonar).

UNIT-IV

Radioactivity and Detection of Radiations

Natural radioactivity; half-life; decay constant; mean life; radioactive transformation. Principles of nuclear fission and fusion; energy generation. Source of background radiations; health Hazards of radiations. Units of radiation.

Text Books:

[T1] Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
[T2] A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

Reference Books

[R1] G. Aruldhas, "Engineering Physics", PHI 1st Edition, 2010.
[R2] C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
[R3] Feynman "The Feynman lectures on Physics", Pearson Volume 3 Millennium Edition, 2013
[R4] Uma Mukhrji, "Engineering Physics", Narosa, 3rd Edition, 2010.
[R5] H.K. Malik & A. K. Singh "Engineering Physics" [McGraw-Hill], 1st Edition, 2009.

APPLIED PHYSICS

Paper Code: ETVRA-404	L	T/P	C
Paper: Applied Physics	0	2	2

Lab Experiment should be based on the theory ETVRA-402

SCHEME OF EXAMINATION

And

SYLLABI

for

BACHELOR OF VOCATION
in
CONSUMER ELECTRONICS

Offered by

University School of Engineering and Technology

1st SEMESTER to 6th SEMESTER

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

Guru Gobind Singh Indraprastha University
Dwarka, Delhi – 110078 [INDIA]
www.ipu.ac.in

BACHELOR OF VOCATION
CONSUMER ELECTRONICS
FIRST SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVCE-501		Instrumentation and Measurement	3	1	4
ETVCE-503		Modern Communication System	3	1	4
ETVHS-519		Communication Skills (Common to all disciplines)	2	1	3
OPEN ELECTIVE-I (Select any one)					
ETVAS-507		Applied Mathematics	3	0	3
ETVME-501		Applied Mechanics	3	0	3
ETVAS-511		Aptitude & Logical Reasoning	3	0	3
GENERAL ELECTIVE-I (Select any one)					
ETVHS-513		Human Values and Professional Ethics	2	1	2
ETVHS-515		Life Skills	2	0	2
ETVHS-517		Personality Development & Behavioural Science	2	0	2
PRACTICAL/VIVA VOCE (Select any one Lab based on OPEN ELECTIVE-I)					
ETVCE-555		Applied Mathematics Lab	0	3	3
ETVCE-557		Applied Physics Lab	0	3	3
ETVME-551		Applied Mechanics Lab	0	3	3
ETVAS-561		Aptitude & Logical Reasoning Lab	0	3	3
PRACTICAL/VIVA VOCE					
ETVCE-551		Instrumentation and Measurement Lab	0	3	3
ETVCE-553		Modern Communication System Lab	0	3	3
ETVCE-559		Basic Programming Lab (Common to all disciplines except MC,SD, CT)	0	2	2
ETVCE-563		Vocation Workshop – I (Circuit tracing & PCB Design)	0	3	3
TOTAL			**13**	**18**	**30**

Industrial Training-I: The students are advised to undergo two weeks training in-house/industry/ Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) during winter vacation and should submit training report for evaluation during the second semester.

General Elective –II (Select any One): **NCC, NSS, YOGA, Sports, Community Services, ECO Club**
Note: The student can opt to take General Elective-II during the first to fifth semesters and can earn credits and /or certificate as per the requirements of the course opted for during the fifth semester. ***The camps or classes for the said programme can be held either during weekend/holidays or winter/summer vacations. If in case, the classes are held during Saturday /Sunday then faculty should be given off in lieu of Saturday/Sunday.*** Those students who complete General Electives-II shall be given certificate if they opt out of the programme taking Diploma/Advanced Diploma.

Note for Project Work: 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.

Note: **It is very important to decide the General Elective(s), Core Elective(s) and Open Elective(s) to be offered in the next semester well before the completion of current semester. General/Core/Open Elective Paper(s) will be floated if about 50% (Not Less than 1/3rd) of the total students opt for the same in each case.**

BACHELOR OF VOCATION

(CONSUMER ELECTRONICS)
SECOND SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVCE-502		Microprocessors & Microcontroller	3	1	4
ETVCE-504		Trouble Shooting & Maintenance of Electronic Equipments	3	1	4
ETVEN-502		Environmental Science (Common to all disciplines)	3	0	3
OPEN ELECTIVE-I (Select any one)					
ETVCE-506		Electric Machines	3	0	3
ETVPH-502		Applied Physics	3	0	3
ETVCE-508		Sensors & Transducers	3	0	3
ETVCE-510		Data Communication and Networking	3	0	3
PRACTICAL/VIVA VOCE (Select any one Lab based on OPEN ELECTIVE-II)					
ETVCE-556		Electric Machines	0	2	2
ETVCE-558		Sensors & Transducers	0	2	2
ETVME-560		Data Communication and Networking	0	2	2
PRACTICAL/VIVA VOCE					
ETVCE-551		Microprocessors & Microcontroller	0	3	3
ETVCE-553		Trouble Shooting & Maintenance of Electronic Equipments	0	3	3
ETVCE-559		Environmental Science Lab / Field work (Common to all disciplines)	0	2	2
ETVCE-562		Project-I	0	3	3
ETVCE-564		Industrial Training-I	0	0	2
ETVCE-566		Vocation Workshop – II (Implementation of Electronic Circuits)	0	3	3
TOTAL			**12**	**18**	**32**

Note for Project: 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.

Industrial Training-II: The students are advised to undergo 6-8 weeks training in industry/ Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) during summer vacation and should submit training report for evaluation during the Third semester and credits will be posted during third semester.

INSTRUMENTATION AND MEASUREMENT

Paper Code: ETVCE-501	**L**	**T/P**	**C**
Paper: Instrumentation and Measurements	**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 12.5marks.

Objectives: *To provide adequate knowledge in electrical instruments and measurements techniques. To make the student have a clear knowledge of the basic laws governing the operation of the instruments, relevant circuits and their working. Introduction to general instrument system, error, calibration etc. Emphasis is laid on analog and digital techniques used to measure voltage, current, energy and power etc. To have an adequate knowledge of comparison methods of measurement. Elaborate discussion about storage & display devices. Exposure to various transducers and data acquisition system.*

Prerequisites: *Student must have basic understanding about semiconductor devices and their working*

UNIT-I

Basic Measurement Concepts: Measurement systems, Static and dynamic characteristics, units and standards of measurements, errors in measurement, accuracy and precision, types, statistical analysis Electromechanical Instruments: Permanent magnet moving coil meter, Dc ammeter, DC voltmeter, Ohm meter, Megger, Watt-hour meter, Power factor meter.

[T1, T2, T3][No. of Hrs. 10]

UNIT-II

Basic Electronic Measurements: Bridge measurements: Wheatstone, Kelvin, Maxwell, Hay, Schering, Anderson and Wien Bridge. Electronic multimeters, Cathode ray oscilloscopes, block schematic, applications special oscilloscopes: delayed time base oscilloscopes, analog and digital storage oscilloscope, sampling oscilloscope, Q meters, Vector impedance meters, RF voltage and power measurements, True RMS meters. Measurement of power (AF and RF).

[T1, T2, T3]No. of Hrs. 12]

UNIT-III

Signal Generators And Analyzers: Function generators, pulse and square wave generators, RF signal generators, Sweep generators, Frequency synthesizer, wave analyzer, Harmonic distortion analyzer, spectrum analyzer, Vector Network Analyzer.

[T1, T2, T3]No. of Hrs. 12]

UNIT-IV

Digital Instruments: Comparison of analog and digital techniques, digital voltmeter, multimeters, frequency counters, Digital RLC meters, measurement of frequency and time interval.

Measurement of non electric quantities: Sensors, Types of sensors, measurement of Pressure, Temperature, Flow, Displacement, Torque

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

[T1, T2, T3]No. of Hrs. 12]

Text Book(s):

[T1] Albert D. Helfrick and William D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", Pearson / Prentice Hall of India, 2007.

[T2] B.C. Nakra and K.K. Choudhry, "Instrumentation, Measurement and Analysis", 2nd Edition, TMH, 2004

[T3] A.K. Sawhney, "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2004.

Reference Book(s):

[R1] Joseph J. Carr, "Elements of Electronics Instrumentation and Measurement", Pearson India

[R2] Alan. S. Morris, "Principles of Measurements and Instrumentation", 2nd Edition, Prentice Hall of India, 2003.

[R3] David A. Bell, "Electronic Instrumentation and Measurements", Prentice Hall of India Pvt. Ltd, 2003.
[R4] James W. Dally, William F. Riley, Kenneth G. McConnell, "Instrumentation for Engineering Measurements", 2nd Edition, John Wiley, 2003

MODERN COMMUNICATION SYSTEMS

	L	T/P	C
Paper Code: ETVCE-503			
Paper: Modern Communication Systems	**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 12.5marks.

Objectives: *After completing this course student must gain good understanding about various modulation techniques, transmitters and receivers. Student also gains basic understanding about TV receivers and fiber optic communication and pulse communication.*

Prerequisites: *Student must have basic knowledge about electronic devices. Must have done course on basic electronics*

UNIT-I

Modulation, Need for modulation, Amplitude modulation, Frequency spectrum, Power relation, Detection of AM waves SSB generation detection, VSB, AM transmitters, Block Diagram, High level & Low level transmitters.

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

UNIT-II

Angle modulation, Principle of frequency and phase modulation, Relation between FM and PM waves band width of FM, Narrow and wide band FM, Single tone and multi tone FM, Generation of FM waves. Direct and indirect methods, Detection of FM waves, FM transmitters block diagram, Super heterodyne receivers, Choice of IF and oscillator frequency, Tracking, AGC, AFC, Receiver characteristics.

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

UNIT-III

Pulse modulation system, Sampling theorem-pulse amplitude modulation, Pulse time modulation Generation of PWM and PPM, PCM, Quantization, Encoder and Decoder, TDM and FDM, Digital modulation techniques, ASK, FSK and PSK.

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

UNIT-IV

(Block diagram approach) Fiber optical communication: Need, Principles of optical communication, Transmissions in fiber, optical fiber communication system, Optical light sources, Photo detectors, Advantages. Television Engineering: Basic principles, Camera tubes, Bandwidth considerations, Generation of Composite Video, Monochrome and colour transmitters, Picture tubes, HDTV, Flat screen TV.

Text Book(s):

[T1] G. Kennedy, "Electronic Communication System", McGraw Hill. 1989.
[T2] D.Roody and J. Coolen, "Electronic Communication", 4th Edition, Prentice Hall of India, 1991

Reference Book(s):

[R1] Uday A. Bakshi, "Analog Communication", Technical Publications Pune
[R2] B.P. Lathi, "Analog and Digital Communications", Oxford University Press
[R3] Shanmugam, "Digital and Analog Communication Systems", Wiley Student Edition

COMMUNICATION SKILLS
(Common to All Disciplines)

Paper Code: ETVHS-519	**L**	**T/P**	**C**
Paper: Communication Skills	**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.

Objectives and Pre-requisites: *Students should have studied General English up to secondary level and the subject aims at developing communication skills in writing, speaking as well as body language.*

Learning Outcomes: *The students should be able to communicate effectively to his/her superiors as well as juniors at work place in his/her professional field.*

UNIT-I

Recognizing and Understanding Communication Styles: What is Communication? Passive Communication, Aggressive Communication, Passive-Aggressive Communication, Assertive Communication, Verbal and Non Verbal Communication, Barriers and Gateways to Communication.

[T1, T2][No. of Hrs. 08]

UNIT-II

Listening Skills: Types of Listening (theory /definition), Tips for Effective Listening Academic Listening-(lecturing), Listening to Talks and Presentations, Basics of Telephone communication

Writing Skills: Standard Business letter, Report writing, Email drafting and Etiquettes, Preparing Agenda and writing minutes for meetings, Making notes on Business conversations, Effective use of SMS, Case writing and Documentation.

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

UNIT-III

Soft Skills: Empathy (Understanding of someone else point's of view), Intrapersonal skills, Interpersonal skills, Negotiation skills, Cultural Aspects of Communication.

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

UNIT-IV

Group Communication: The Basics of Group Dynamics, Group Interaction and Communication, How to Be Effective in Groups, Handling Miscommunication, Handling Disagreements and Conflicts, Constructive Criticism.

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

Text Books:

[T1] Mckay, M., Davis, M. & Fanning, P. (2008). Messages, "The Communication Skills Book", New Harbinger Publications

[T2] Perkins, P.S., & Brown, L. (2008). "The Art and Science of Communication: Tools for effective communication in the workplace", John Wiley and Sons

Reference Books:

[R1] Krizan et al (2010). Effective Business Communication, Cengage Learning.

[R2] Scot, O. (2009). Contemporary Business Communication, Biztantra, New Delhi.

[R3] Chaney & Martin (2009). Intercultural Business Communication, Pearson Education

[R4] Penrose et al (2009). Business Communication for Managers, Cengage Learning.

ENGINEERING MATHEMATICS
(Open Elective-I)

Paper Code: ETVAS-507	**L**	**T/P**	**C**
Paper: Applied Mathematics	**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.

Objectives and Pre-requisites: *The students should have studied mathematics up to senior secondary level. The course aims to develop an ability in the students to identify, formulate, abstract, and solve mathematical problems that use tools from a variety of mathematical areas, including differential equations, matrices, complex variables, sequence and series.*

Learning Outcomes: *The students should be able to design mathematical models, apply mathematical analysis and problem-solving skills in a broad range of intellectual domains, especially in communication engineering.*

UNIT – I

Ordinary Differential Equations: First Order Ordinary Differential Equations, Basic Concepts, Separable Ordinary Differential Equations, Exact Ordinary Differential Equations, Linear Ordinary Differential Equations. Second Order homogeneous and non-homogeneous differential Equations.

Series solution of differential equations and special functions: Power series method, Legendre Polynomials, Bessel's equations and Bessel's functions of first and second kind. Error functions and gamma function.

[T1][T2][No. of Hrs. 12]

UNIT - II

Matrices: Introduction to Matrices, System of Linear Algebraic Equations, Gaussian Elimination Method, Gauss-Seidel Method, LU decomposition, Solution of Linear System by LU decomposition. Eigen Values and Eigen Vectors, Linear Transformation, Properties of Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem, Diagonalization, Powers of a Matrix. Real and Complex Matrices, Symmetric, Skew Symmetric, Orthogonal Quadratic Form, Hermitian, Skew Hermitian, Unitary Matrices.

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

UNIT- III

Sequences and series: Sequences, Limit of a sequence, Convergence, Divergence and Oscillation of a sequence, Infinite series, Necessary condition for Convergence, Cauchy's Integral Test, D'Alembert's Ratio Test, Cauchy's nth Root Test, Alternating Series, Leibnitz's Theorem, Absolute Convergence and Conditional Convergence, Power Series.

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

UNIT – IV

Complex Variables and Functions: Complex Variable, Complex Function, Continuity, Differentiability, Analyticity. Cauchy-Riemann (C- R) Equations, Harmonic and Conjugate Harmonic Functions, Exponential Function, Trigonometric Functions. Line Integral in Complex Plane, Cauchy's Integral Theorem, Cauchy's Integral Formula, Derivative of Analytic Functions. Taylor's Series, Laurent Series, Zeroes and Poles. Residue integration method, Residue integration of real Integrals.

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

Text Books:

[T1] E. Kreyszig, Advanced Engineering Mathematics, Wiley India (2008).
[T2] R. K. Jain, and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House (2007).

References Books:

[R1] Murray Spiegel, Seymour Lipschutz, John Schiller, Outline of Complex Variables, Schaum Outline Series, Tata McGraw Hill (2007).
[R2] C .R. Wylie and L. C. Barrett, Advanced Engineering Mathematics, Tata McGraw Hill (2004).
[R3] B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill (2007).
[R4] B. S. Grewal, Engineering Mathematics, Khanna Publishers.

APPLIED PHYSICS

	L	T	C
Paper Code: ETVPH-502			
Paper: Applied Physics	**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: *The objective of the paper is to facilitate the student with the basic understanding of Applied Physics aspects that are required for his understanding of electronics and Electromagnetics.*

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.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

[T1][T2](No. of Hrs. 11)

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.

[T1][T2](No. of Hrs. 11)

UNIT-III

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. 12]

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. 11]

Text Book(s):

[T1] Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
[T2] A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

Reference Book(s):

[R1] A. Ghatak 'Optics' , TMH, 5th Edition, 2013
[R2] G. Aruldhas 'Engineering Physics' PHI 1st Edition, 2010.
[R3] Feynman " The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013
[R4] Uma Mukhrji 'Engineering Physics' Narosa, 3rd Edition, 2010.
[R5] H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1st Edition, 2009.

APPLIED MECHANICS

	L	T/P	C
Paper Code: ETVME-501			
Paper: Applied Mechanics	**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 12.5marks.

Objectives and Pre-requisites: The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required to the students for further understanding of other applied subjects. To introduce the concepts of rigid body mechanics for bodies at rest and in motion to students. To make the students appreciate the applications of basic laws of physics to a variety of problems. Inculcating and enhancing analytical skills to solve numerical problems. Upon the completion of course student should be able to understand the importance of mechanics in engineering and various concepts.

Learning outcomes: Students will be able to state the relevant laws and apply them to numerical problems. Students will be able to draw free-body diagrams for a given problem and get the required solution. Students will be able to visualize the applications of basic laws in solving numerical problems. Students will be able to correlate the concepts learnt in the relevant courses of higher classes.

UNIT-I:

Introduction- Concept of mechanics and applied mechanics – Explanation of mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject.

Laws of Forces- Force and its effects. Units and measurement of force. Characteristics of force vector representation. Bow's notation. Types of forces, action and reaction, tension & thrust. Force systems: Coplanar and space force systems. Coplanar, concurrent and non -concurrent forces. Free body diagrams. Resultant and components of forces, concept of equilibrium; parallelogram law of forces. Equilibrium of two forces, super-position and transmissibility of forces, Newton's third law, triangle law of forces, different cases of concurrent coplanar, two forces systems, extension of parallelogram law and triangle law to many forces acting at one point-polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.

[T1, T2, T3][No. of Hrs: 11]

UNIT-II:

Moments- Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism. Parallel forces, like and unlike parallel forces, calculation of their resultant, concept of couple, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibrium of bodies under coplanar parallel forces.

Friction- Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction and rolling friction, inclined plane.

[T1, T2, T3][No. of Hrs: 11]

UNIT-III:

Centre of Gravity and Centroid- Concept of gravity, gravitational force, Centroid and centre of gravity. Centroid for regular lamina and center of gravity for regular solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies and areas with portions removed.

Moment of Inertia of Plane Areas- Concept of Moment of Inertia and second moment of area and Radius of gyration, theorems of parallel and perpendicular axes, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections. Section modulus without derivation.

[T1, T2, T3][No. of Hrs: 12]

UNIT-IV

Laws of Motion- Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with

string, Newton's third law of motion numerical problems, conservation of momentum, impulse and impulsive force (definition only).

Simple Lifting Machines- Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine, their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

[T1, T2, T3][No. of Hours: 10]

Text Book(s):

[T1] A.K.Tayal, "Engineering Mechanics: Statics and Dynamics", Umesh publications
[T2] R.K. Rajput, "Applied Mechanics", Lakshmi Publications
[T3] A. K. Upadhyay, "Applied Mechanics, Kataria Publications

References Book(s):

[R1] Beer and Johnston, "Mechanics for Engineers (Statics and Dynamics)", McGraw Hill Co. Ltd.
[R2] R. S. Khurmi, "Applied Mechanics", S. Chand publications
[R3] Hibbeler R C, "Engineering Mechanics: Statics, Low Price Edition", Pearson Education
[R4] Hibbeler R C, "Engineering Mechanics: Dynamics, Low Price Edition", Pearson Education
[R5] Timoshenko, S.P., and Young, D.H., "Engineering Mechanics", McGraw Hill international
[R6] V.S. Mokashi, "Engineering Mechanics Vol. I and II", Tata McGraw Hill Publishing Co. ltd., New

APTITUDE & LOGICAL REASONING
(Open Elective-I)

Paper Code: ETVAS-511	**L**	**T/P**	**C**
Paper: Aptitude & Logical Reasoning	**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.

Objectives and Pre-requisites: *At the end of the course the students will be able to (a) Interpret different data, (b) Establish relationship between numbers & (c)Solve different logical. To impart students with logical skills to solve problems easily.*

UNIT-I

Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers.

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

UNIT-II

Basic mathematical relations and formula, Computation, Data interpretation.

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

UNIT-III

Differences, Discrimination, Decision-making, Judgement, Problem-solving, Analogies, Analysis.

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

UNIT-IV

Arithmetic reasoning, Relationship concept, Arithmetic number series, Similarities, Verbal and figure classification, Space visualization, Observation.

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

Text Books:

[T1] Arun Sharma, "How to prepare for Logical Reasoning for the CAT".
[T2] A.K. Gupta, "Logical and Analytical Reasoning".

References Books:

[R1]
[R2]

HUMAN VALUES & PROFESSIONAL ETHICS
(General Elective-I)

Paper Code: ETVHS-513	**L**	**T/P**	**C**
Paper : Human Values & Professional Ethics	**2**	**1**	**2**

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, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.*

UNIT-1: Introduction to Value Education

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][No. of Hrs. 07]

UNIT-2: Harmony in the Human Being

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.
4. Harmony in family and society: Understanding Human-human relationship in terms of mutual trust and respect.
5. Understanding society and nation as extensions of family and society respectively.
6. Practice Session – 02

[T2], [R1],[R2][No. of Hrs. 08]

UNIT-3: Basics of Professional Ethics

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]][No. of Hrs. 07]

UNIT-4: Professional Ethics in practice

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][No. of Hrs. 08]

Text Books:

[T1] Professional Ethics, R. Subramanian, Oxford University Press.
[T2] Professional Ethics & Human Values: Subhash Bhalchandra Gogate, Vikas publication
[T3] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.
[T4] Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi.

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)
[R4] Value Education website, http.//www.universalhumanvalues.info[16]
[R5] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
[R6] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers‟ Manual by the same author.

***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 shortcoming 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 solutions than problems 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 eve 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-

S.No.	Intention (Natural Acceptance)	S.No.	Competence
1.a.	Do I want to make myself happy?	**1.b.**	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	**2.b.**	Am I liable to make the other always happy?
3.a.	Does the other want to make him happy?	**3.b.**	Is the other able to make him always happy?
4.a.	Does the other want to make me happy? What is answer?	**4.b.**	Is the other able to make me always happy? What is answer?

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.

LIFE SKILLS)
(General Elective-I)

Paper Code: ETVHS-515	**L**	**T/P**	**C**
Paper: Life Skills	**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 of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.*

Learning Outcomes: *The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.*

UNIT-I

Introduction: Definition and importance of Life Skills, Livelihood Skills, Survival Skills, Life Skills Approach, Life Skills based education, Life Skills Training- Implementation Models

[T1,T2][No. of Hrs. 07]

UNIT-II

Learning and Performance, Cognitive Development, Maturation, Adult Learning, Approaches to Learning Pillars of Education and Life Skills- Four Pillars: Learning to Know, Learning to Do, Learning to Live Together, Learning to be learning throughout Life

[T1,T2][No. of Hrs. 08]

UNIT-III

Social Skills and Negotiation Skills: Self Awareness, Empathy, Effective Communication, Interpersonal Relationships

Thinking Skills: Nature, Element of Thought, Types, Concept Formation, Reasoning, Creative and Critical Thinking

[T1,T2][No. of Hrs. 08]

UNIT-IV

Coping Skills: Coping with Emotions, Coping with Stress, Integrated use of thinking skills, social skills and coping skills

[T1,T2][No. of Hrs. 07]

Text Books:

[T1] Rajasenan, N.V. (2010). Life Skills, Personality and Leadership, Rajiv Gandhi National Institute of Youth Development, TamilNadu

[T2] Duffy, Grover,K., Eastwood, A. (2008). Psychology for Living-Adjustment, Growth and Behavior Today, Pearson Education

Reference Books:

[R1] Debra McGregor, (2007), "Developing Thinking; Developing Learning - A Guide to Skills in Education", Open University Press, New York, USA

[R2] Singh Madhu, (2003). "Understanding Life Skills, Background paper prepared for Education for All: The Leap to Equality"

[R3] Nair. A. Radhakrishnan, (2010). "Life Skills Training for Positive Behaviour", Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.

[R4] Dahama O.P., Bhatnagar O.P, (2005). "Education and Communication for Development, (2nd Ed.)", Oxford& IBH Publishing Co. Pvt. Ltd. New Delhi

PERSONALITY DEVELOPMENT & BEHAVIORAL SCIENCE (From USMS)
(General Elective-I)

Paper Code: ETVHS-517	**L**	**T/P**	**C**
Paper: Personality Development & Behavioral Science	**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 of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.*

Learning Outcomes: *The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.*

UNIT-I

Definition and Basics of Personality, Understanding Traits and Types of Personality, Analyzing strength and weakness (SW), Body Language

[T1, T2][No. of Hrs. 07]

UNIT-II

Business Etiquettes and Public Speaking: Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

[T1, T2][No. of Hrs. 08]

UNIT-III

How to Make a Presentation, the Various Presentation Tools, along with Guidelines of Effective Presentation, Boredom Factors in Presentation and How to Overcome them, Interactive Presentation & Presentation as Part of a Job Interview, Art of Effective Listening.

Resume Writing Skills, Guidelines for a Good Resume, How to Face an Interview Board, Proper Body Posture, Importance of Gestures and Steps to Succeed in Interviews. Practice Mock Interview in Classrooms with Presentations on Self; Self Introduction – Highlighting Positive and Negative Traits and Dealing with People with Face to Face.

[T1, T2][No. of Hrs. 08]

UNIT-IV

Coping Management, Working on Attitudes: Aggressive, Assertive and Submissive Coping with Emotions, Coping with Stress

[T1, T2][No. of Hrs. 07]

Text Books:

[T1] McGraw, S. J., (2008), "Basic Managerial Skills for All, Eighth Edition", Prentice Hall of India.
[T2] The Results-Driven Manager (2005). Business Etiquette for the New Workplace: The Results-Driven Manager Series (Harvard Results Driven Manager)

Reference Books:

[R1] Pease, A. & Pease, B. (2006)., "The Definitive Book of Body Language", Bantam Books.
[R2] Scannell, E. & Rickenbacher,C. (2010)., "The Big Book of People Skills Games: Quick, Effective Activities for Making Great Impressions, Boosting Problem-Solving Skills and Improving Customer Service", Mcgraw Hill Education

APPLIED MATHEMATICS LAB

Paper Code: ETVAS-557	**L**	**T/P**	**C**
Paper: Applied Mathematics Lab	**0**	**3**	**3**

Based on theory courses ETVAS-507 (10-12 experiments)

1. Curve fitting using Method of Least squares.
2. Solution of algebraic and transcendental equation using Gauss- Seidal's iteration method.
3. Solution of algebraic and transcendental equation using Finite difference method.
4. Numerical integration using Trapezoidal Rule & Simpson's one third rule.
5. Solution of ordinary differential equations using Runge-Kutta method.
6. Calculation of probability using probability distributions.
7. Calculation of correlation coefficient.
8. Calculation of Numerical measures such as mean, variance, Skewness & Kurtosis.
9. Estimation of mean & variance using sampling & Hypothesis.
10. Calculation of Rank Correlation.
11. Analysis os samples using ANOVA.

APPLIED PHYSICS LAB

	L	T/P	C
Paper Code: ETVPH-552			
Paper: Applied Physics Lab	**0**	**2**	**2**

List of Experiments:

Instructions: *Twelve Experiments are to be chosen from the list given below and rest of the Experiments (i.e., three in number) may be designed by the faculty at the respective institute according to the Syllabus being taught.*

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 measure small thickness of a piece of paper using Newton's Rings technique.
5. To determine the refractive index of a prism using spectrometer.
6. To determine the dispersive power of prism using spectrometer and mercury source.
7. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
8. To find the wavelength of He-Ne laser using transmission diffraction grating.
9. To determine the numeral aperture (NA) of an optical fibre.
10. To determine the e/m ratio of an electron by J.J. Thomson method.
11. To measure time period of a waveform and calculate its frequency and wavelength using CRO.
12. 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.
13. To determine the frequency of A.C. mains by using Sonometer .
14. To determine the frequency of electrically maintained tuning fork by Melde's method.
15. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
16. To study the charging and discharging of a capacitor and to find out the time constant.
17. To study the Hall effect.
18. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
19. To study the V-I characteristics of Zener diode.
20. To measure surface tension of different liquids using capillary rise method.
21. To measure coefficient of viscosity by Stoke's method.

Text Book(s):

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

APPLIED MECHANICS LAB

	L	T/P	C
Paper Code: ETVME-551			
Paper: Applied Mechanics Lab	**0**	**3**	**3**

List of Experiments:

1. Verification of the laws of polygon of forces.
2. To verify the forces in the different members of a jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find out centre of gravity of regular and irregular laminas.
5. To verify the principle of moments using the bell crank lever apparatus
6. To determine the coefficient of static friction between two surfaces
7. To find moment of inertia of a flywheel
8. To find the mechanical advantage, velocity ratio and efficiency in the case of inclined planes.
9. To find the mechanical advantage, velocity ratio and efficiency in the case of Screw Jack
10. To find the mechanical advantage, velocity ratio and efficiency in the case of worm and worm wheel
11. To find the mechanical advantage, velocity ratio and efficiency in the case of single winch Crab.
12. Graphical solutions for the following problems a. Resultant of Coplanar Non Concurrent force system: i. One problem with resultant as a force
    ii. One problem with resultant as a couple b. Equilibrium of Coplanar Non Concurrent force system: one Problem c. Friction: One Problem

INSTRUCTIONAL STRATEGY

This is a gateway subject to remaining course. While imparting theoretical instructions, teachers are expected to demonstrate the various apparatus and related concepts to the students by correlating theory and practical. It is further recommended that more emphasis should be laid in conducting practical work by individual students.

APTITUDE & LOGICAL REASONING LAB
(Open Elective-I)

Paper Code: ETVAS-561	**L**	**T/P**	**C**
Paper: Aptitude & Logical Reasoning Lab	**0**	**3**	**3**

Based on theory courses ETVAS-511 (10-12 experiments)

INSTRUMENTS AND MEASUREMENTS LAB

Paper Code: ETVCE-551	**L**	**T/P**	**C**
Paper: Instruments and Measurements Lab	**0**	**3**	**3**

List of Experiments:

1. Study and demonstration of different types of display devices.
2. Measurement of resistance, voltage and current using digital multimeter / clamp meter.
3. Calibration of Ammeter and Voltmeter.
4. Measurement of resistance, inductance and capacitance using digital RLC meter.
5. Measurement of frequency and time period using digital frequency meter.
6. Study and demonstration of universal frequency counter.
7. Study and measurement of voltage, frequency and phase difference of a.c. quantities using C.R.O.
8. Measurement of inductance and capacitance using C.R.O.
9. Study and measurement of quantities using D.S.O.
10. Study of function generator.
11. Study and use of different types of transducers.
12. Study of different types of recorders /Printers.
13. To study and use different types of ADC and DAC.
14. To study functioning and applications of Wave Analyzer.

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

MODERN COMMUNICATION SYSTEMS LAB

	L	T/P	C
Paper Code: ETVCE-553			
Paper: Modern Communication Systems Lab	**0**	**3**	**3**

List of Experiments:

1. Amplitude modulate a sinusoidal signal over appropriate carrier and then demodulate it. Observe waveforms and measure modulation index.
2. Amplitude modulate a sinusoidal signal over appropriate carrier and then demodulate it. Observe waveforms and measure modulation index.
3. Generate PAM signals and recover the original signal from samples.
4. Generate PWM signals and demodulate it
5. Generate PCM signals and demodulate it
6. Generate ASK,FSK and PSK signals for a known binary data
7. Identify various sections of a AM radio receiver and observe waveforms at various points
8. Identify various sections of a AM radio receiver and observe waveforms at various points
9. Transmit data through optical fiber and observe the output
10. Identify various sections of a colour TV receiver and observe waveforms at various points

BASIC PROGRAMMING LAB
(Common to all Disciplines except MC, SD, CT)

Paper Code: ETVCE-559	**L**	**T/P**	**C**
Paper: Basic Programming Lab	**0**	**2**	**2**

Objectives: *In order to enable the student's use of computer effectively in problem solving, this course offers the model programming language along with exposure to various application of computer. The knowledge of C language will be reinforced by the practical exercises.*
Pre-requisites*: Basic understanding about using Computers, using computers.*

UNIT-I
Introduction of "C' language- Structure of a "C" program, some simple "C" programs, procedure to execute a "C' program. Data type, constants and variables Character sets, Identifiers and keywords, Date type constants, variables, expression, statement, symbolic constants. Operators and expressions, Arithmetic operators, Relational and logical operators, Unary Operators, Assignment operators, Conditional operators.

[T1, T2][No. of Hrs. 08]

UNIT-II
Data Input and output, Library functions, unformatted input output-getchar, putchar, gets, puts, getch and getche. Formatted input output-Scanf, printf, Control statements and loop structure,
Branching: The if-else statement,
Looping: while, do-while for. Nested control structure. Switch statement. Break. Continue, exit. Comma operator.
Jumping: go to statement,
Function: Inductions to function, need of functions, function definition, function declaration and prototype, passing arguments to function. Passing arguments by value, recursion, Arrays-Introduction to Arrays. array declaration, single and multidimensional array Examples: array order reversal, removal of duplicates from an ordered array, binary search, matrix multiplication.

[T1, T2][No. of Hrs. 08]

UNIT-III
Strings: Introduction to strings, string constants, variables, input, output of string date, standard library string function strlen (), strcat () strcpy () strcmp (),Pointers-Introduction to pointers, address operator and indirection operator, declaring and initialize pointers, pointers in parameter passing, call by reference, pointers and one dimensional array, operation on pointers and one dimensional arrays, dynamic memory location malloc, calloc, structure and unions-Introduction to structure, declaration of structure, accessing structure**,** members initialization Arrays of structure, user defined data type (typedef), Introduction to unions**.**

[T1, T2][No. of Hrs. 08]

UNIT-IV
Files-Introduction to file handling-fopen, fclose, fscanf, fprintf, getc, putc Additional feature of c: Enumerations, macro, c pre-processor**.**

[T1, T2][No. of Hrs. 06]

Text Book(s):
[T1] Byron C. Gottfried, "Programming with C", McGraw-Hill Education
[T2] Yashwant Kanetkar, "Let us C", Infinity Science Press, 2008
[T3] Moolish Cooper, "Sprit of C", Jaico Publishing House
[T4] Herbert Schildt, "Teach yourself C", Tata Mc Graw hill

Reference Books:
[R1] Stephen G. Kochan, "Programming in C", Pearson Education
[R2] Kerning & Ritchie, "C Programming Language", Prentice Hall; 2nd Edition
[R3] Balaguruswamy, "Ansi C", Tata Mc Graw Hill

List of Experiments:

1. Programming exercises on executing and editing c programs.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetical, relational operators.
4. Programming exercises on arithmetic expression and their evaluation.
5. Programming exercises on formatting input/out using printf and scanf.
6. Programming exercises using if-statement.

7. Programming exercises using if-else statement.
8. Programming exercises on switch statement.
9. Programming exercises on do-while statement.
10. Programming exercises on for statement.
11. Programs on 1 dimensional array.
12. Programs on 2 dimensional arrays.
13. Programs on strings (Copying, Concatenation, Compare, Character frequency,
14. string Length Count etc).
15. Simple programs using pointers.
16. Simple programs using structures.
17. Simple programs using files.

VOCATIONAL WORKSHOP-I
(Circuit tracing & PCB Design)

	L	T/P	C
Paper Code: ETVCE-563			
Paper: Vocational Workshop-I	**0**	**3**	**3**

List of Experiments:

1. Trace circuit of an electronic device and redraw the circuit

2. Design using ORCAD PCB for medium level complex circuits.(Introduction to ORCAD schematic capture tool, Simulation of simple electronic circuit, Schematic to layout transfer, Layout Printing Conception Level Introduction: Specifying Parts, Packages and Pin Names, Libraries and Checking foot prints of the components, Partlist, Netlist, Making Netlist Files, Placing Parts, Routing Traces, Modifying Traces, Mounting Holes, Adding Text, PCB Layout, DRC, Pattern Transfer)

3. Fabricate the designed PCB (PCB fabrication process Etching, cleaning, drying and drilling)

4. Assembling and testing Identifying the components and its location on the PCB, soldering of active and passive components, Testing the assembled circuit for correct functionality

5. Cabinet design for different devices (Case study of CRO, Function generators).

MICROPROCESSORS & MICROCONTROLLER

Paper Code: ETVCE-502	**L**	**T/P**	**C**
Paper: Microprocessors & Microcontroller	**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 12.5marks.

Objectives: *Students to learn the architecture, programming, interfacing & rudiments of system design of microprocessors and microcontrollers.To introduce microprocessors and basics of system design using micropr ocessors. Study about architecture, instruction set and programming of 8085 microprocessor and 8086 microprocessors. Most of the home appliances and devices are microcontroller based. Hence two units are devoted for detailed study of 8051 microcontrollers and interfacing*

Prerequisites: *Student must have basic knowledge about computers and their programming. Also basic knowledge of analog and digital electronics is helpful.*

UNIT-I

Introduction to Microprocessors and Microcomputers, Address bus, Control Bus, Data bus, Tristate devices, stored program concept, Microcontroller. Von Newman and Harvard Architecture, Introduction to Digital hardware, Review of buffer/driver, encoder/decoder, multiplexer, Counters and registers.

[T1, T2][No. of Hrs. 06]

UNIT-II

8085 Microprocessor architecture, Addressing modes, Instruction set, Programming the 8085, memory interfacing and IO interfacing. Simple programs based on arithmetic and logic instructions, Interrupts and DMA. Introduction to Intel 8086 microprocessor, Architecture, Instruction Set, Addressing Modes, Interrupts and DMA.

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

UNIT-III

Architecture of 8051 Microcontroller, I/O ports, Internal RAM, Code memory, External Memory interface, counters/ timers and various modes of operation, serial data transfer and various serial data transfer modes ,interrupts, Instruction set and programming.

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

UNIT-IV

Interfacing and Programming. LED, Seven segment Display, LCD, Stepper Motors, DC motors, ADC and DAC, H bridge L293 chip

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

Text book(s):

[T1] B. Ram," Microprocessors and Microcontrollers", Dhanpat Rai Publications
[T2] Krishna Kant, Microprocessors and Microcontrollers: **A**rchitecture, Programming and System Design 8085, 8086, 8051, 8096", PHI learning Pvt. Ltd
[T3] Mazidi, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Pearson

Reference Book(s):

[R1] Kenneth Ayala, "The 8051 Microcontroller", Thomson Delmar Learning
[R2] Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085, PHI
[R3] D.V. Hall, "Microprocessors and Interfacing", 2nd Edition, Tata McGraw-Hill

TROUBLE SHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENTS

Paper Code: ETVCE-504	**L**	**T/P**	**C**
Paper: Trouble Shooting & Maintenance of Electronic Equipments	**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 12.5marks.

Objective: To train a student to identify possible faults in equipments and rectify them. Students are to be trained to handle equipments and also how to perform preventive maintenance

Pre-requisites: *Student must have basic knowledge about electronic devices. Must have done course on basic electronics.*

UNIT-I

Reliability Aspects of Electronic Equipment:Reliability predictions, Accelerated assessment of reliability, Practical reliability considerations, Fundamental Troubleshooting Procedures, Making of an electronic equipment, Reading drawings and diagrams, Equipment failures, Causes of equipment failures, Nature of faults, Maintenance terminology, Troubleshooting process, Fault-finding aids, Troubleshooting techniques, Approaching components for tests, Grounding systems in electronic equipment, Temperature-sensitive intermittent problems, Corrective action, Situations when repairs should not be attempted Electronic Test Equipment: Multimeters, The oscilloscope, Digital oscilloscopes, Logic analyzer, Signature analyzer, Signal generators ,Universal bridge, Power supplies, Fibre-optic test equipment.

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

UNIT-II

Tools and Aids for Servicing and Maintenance: Hand tools, Soldering Techniques, Soldering tools, Soldering material, Soldering procedure Soldering technique, Replacement of components, Special considerations for handling MOS devices, Soldering leadless capacitors, Good and bad soldering joints, De-soldering technique, safety precautions, Mechanical and Electro-mechanical Components, Fuses and fuse holders, Switches, Wires and cables, Connectors, Circuit boards, Transformers, Motors, Electro-magnetic relays, Batteries and battery chargers.

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

UNIT-III

Passive Components and Their Testing, Passive components, Adjustable controls, Resistors, Capacitors, Inductors, Testing of Semiconductor Devices, Types of semiconductor devices, Causes of failures in semiconductor devices, Types of failures, Testing procedures for semiconductor devices, Linear Integrated Circuits, Operational amplifiers (op-amp),Characteristics of op-amps, Typical op-amp circuits, Faults diagnosis in op-amp circuits.

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

UNIT-IV

Troubleshooting Digital Circuits, Characteristics of integrated circuit logic gates, the logic families CMOS digital integrated circuits, Categories of integrated circuits based on packing density, Logic IC series, Packages in digital IC, Identification of integrated circuits, IC pin-outs, Handling IC, Digital troubleshooting methods, The digital IC trouble-shooters, Special considerations for fault diagnosis in digital circuits, Handling precautions for electronic devices subject to damage by static electricity, Function and testing of flip-flops, counters and registers, Troubleshooting Microprocessor-Based Systems, Microprocessors, Semiconductor memories, Microcontrollers, Microprocessor-based systems, Troubleshooting techniques, Data converters, Data acquisition systems,

Rework and Repair of Surface Mount Assemblies, Surface mount technology, Surface mount devices, Surface mounting semiconductor packages. Packaging of passive components as smd, repairing surface mounted pcbs Typical Examples of Troubleshooting: Power supply circuits, Oscilloscope, Electrocardiograph (ecg machine),Cordless telephones

Preventive Maintenance: Indications for preventive maintenance action, Preventive maintenance of electronic circuits, Preventive maintenance of mechanical systems, General guidelines for cleaning and lubricating, Typical examples, preventive maintenance of personal computers, Maintenance Management, Objectives of

maintenance management, Maintenance policy, Equipment service options, Maintenance organization, Essentials of a good equipment management programme, Installation procedures, Service and maintenance laboratory.
Documentation, Professional qualities and work habits.

[T1, T2][No. of Hrs. 13]

Text Book(s):

[T1] Dr. R.S. Khandpur, "Troubleshooting Electronic Equipment: Includes Repair and Maintenance", Second Edition, McGraw Hill Education (India) Private Limited
[T2] Lal A. K, "Trouble Shooting and Maintenance of Electronics Equipments", McGraw Hill Education
[T3] Jerry C. Whitaker, "Electronic Systems Maintenance Handbook", Second Edition CRC press

Reference Book(s):

[R1] Homer L. Davidson, "Consumer Electronics Troubleshooting and Repair Handbook", McGraw-Hill

ENVIRONMENTAL SCIENCE
(Common To All Disciplines)

	L	T/P	C
Paper Code: ETVEN-502			
Paper: Environmental Science	**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: *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.

[T1], [R3] [No. of hrs. 12]

UNIT-II

Natural Resources: problems and prospects

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. 11]

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.

[T1], [R3] [No. of hrs. 11]

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

Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, Wasteland reclamation. Population growth, problems of urbanization, Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and
Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management, system standards-ISO 14000 series.

[T1] [No. of hrs. 11]

Text Book(s):

[T1] E. Barucha, Textbook of Environmental Studies for Undergraduate Courses, Universities Press (India) Pvt. Ltd., 2005.

[T2] S. Chawla, A Textbook of Environmental Studies, McGraw Hill Education Private Limited, 2012

References Books:

[R1] G. T. Miller, Environmental Science, Thomas Learning, 2012

[R2] W. Cunningham and M. A. Cunningham, Principles of Environment Science: Enquiry and Applications, Tata McGraw Hill Publication, N. Delhi, 2003.

[R3] R. Rajagopalan, Environmental Studies: From Crisis to Cure, 2nd Edition, Oxford University Press, 2011.

[R4] A.K. De, Environmental Chemistry, New Age Int. Publ. 2012,,

[R5] A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age International Publishers, 2013

[R6] Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd. New Delhi, 2010.

ELECTRIC MACHINES
(Open Elective–II)

Paper Code: ETVCE-506	**L**	**T/P**	**C**
Paper: Electric Machines	**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 12.5marks.

Objectives: *To introduce the principles of electromechanical energy conversion. To study the working principles of electrical machines using the concepts of electromechanical energy conversion principles and derive expressions for generated voltage and torque developed in all Electrical Machines. To study the working principles of DC machines as Generator and Motor, types, determination of their no load/load characteristics, starting and methods of speed control of motors.*

Pre-requisites: *Basics of electrical Engineering.*

UNIT-I

Transformers: Single Phase Transformer: Working principle, Construction, types, EMF equation, Transformer on no load and on load, vector diagram, exact and approximate equivalent circuit, O.C & S. C. test on transformer, regulation of transformer, losses &efficiency, condition for maximum efficiency, All day efficiency, Efficiency curve, Sumpner's test, Auto transformer, Saving of conductor material, Parallel operation, Conditions, Parallel with equal and unequal voltage ratio.

3 Phase transformers: Construction, connections, Scott connection, V-V Connection, Instrument transformers, Current transformers and potential transformers.

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

UNIT-II

DC Machines: DC Generator: Construction features, emf equation of dc generator, methods of excitation, losses condition for maximum efficiency, armature reaction, interpoles and compensating winding, commutation, methods of improving commutation, characteristics of separately excited and self excited dc generator. DC Motor: Working principle, voltage equation, condition for maximum power, characteristics, operating characteristics of dc motor, torque developed, starting ,3 point and 4 point starter, speed control methods, swinburn's and break test of dc shunt motor.

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

UNIT-III

Induction Machines: 3 Phase induction motor: Construction, types, rotating magnetic field, principle of operation, slip, frequency of rotor current, rotor emf, rotor current, expression for torque, conditions for maximum torque, torque slip characteristics, starting torque in squirrel cage and slip ring motors, effect of change in supply voltage on torque, slip and speed, relation between full load torque and maximum torque, Power stages in induction motor, vector diagram and equivalent circuit, circle diagram, construction and calculation, speed control of 3 phase motor, starting methods for 3 phase induction motor.

Single phase motor: Double revolving field theory, starting methods, no load and block rotor test, equivalent circuit, types of single phase motor.

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

UNIT-IV

Synchronous Machine: Alternator, Basic principle, construction, pitch factor, distribution factor, emf equation, alternator on load, voltage regulation, synchronous impedance method, mmf method, ZPF method, parallel operation, synchronization of alternator. Synchronous motor: Basic principle, methods of starting, application.

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

Reference Books:

[R1] B. L. Theraja & A. K. Theraja, Text of Electrical Technology, Vol -2, S. Chand Publication
[R2] Ashfaq Hussain, "Electrical Machines", Dhanpatrai and Co
[R3] J. B. Gupta, "Principles of Electrical Power Systems",
[R4]] P. S. Bhimra, "Generalised Theory of Rotating Machines",

SENSORS AND TRANSDUCERS
(Open Elective-II)

Paper Code: ETVCE-508	**L**	**T/P**	**C**
Paper: Sensors and Transducers	**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 12.5marks.

Objectives: *To enable the students to select and design suitable instruments to meet the requirements of industrial applications and various transducers used for the measurement of various physical quantities The student learn about commonly used electronic instruments and their usage. The student also learn about how to measure physical parameters and various display devices and data recording*

Prerequisites: *must have basic knowledge about electronic devices. Must have done course on basic electronics.*

UNIT-I

Measurements and Instrumentation of Transducers: Measurements, Basic method of measurement, Generalized scheme for measurement systems, Units and standards, Errors, Classification of errors, error analysis, Statistical methods, Sensor, Transducer, Classification of transducers, Basic requirement of transducers.

Static characteristics, Dynamic characteristics, Mathematical model of transducer, Zero, first order and second order transducers, Response to impulse, step, ramp and sinusoidal inputs.

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

UNIT-II

Resistive Transducers: Potentiometer, Loading effect, Strain gauge, Theory, types, temperature compensation, Applications, Torque measurement, Proving Ring, Load Cell, Resistance thermometer, Thermistors materials, Constructions and Characteristics of Hot wire anemometer.

Inductive and Capacitive Transducer: Self inductive transducer, Mutual inductive transducers, Linear Variable Differential Transformer, LVDT Accelerometer, RVDT, Synchros, Microsyn, Capacitive transducer, Variable Area Type, Variable Air Gap type, Variable Permittivity type, Capacitor microphone.

[T1, T2][No. of Hrs. 15]

UNIT-III

Active Electrical Transducer: Piezoelectric transducer, Magnetostrictive Transducer, Hall Effect transducers, Photo-electric transducer, Ionisation transducer, Digital transducers, electro Chemical Transducers.

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

UNIT-IV

Sensors: Semiconductor sensor, Smart sensor, Micro sensor, IR radiation sensor, Ultrasonic sensor, Fibre optic sensor, Chemical sensors.

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

Text Book(s);

[T1] Sawhney. A.K, "A Course in Electrical and Electronics Measurements and Instrumentation", 18th Edition, Dhanpat Rai & Company Private Limited, 2007.
[T2] Renganathan. S,"Transducer Engineering", Allied Publishers, Chennai, 2003.
[T3] Murthy.D.V.S, "Transducers and Instrumentation", Prentice Hall of India, 2001

Reference Book(s);

[R1] Doebelin. E.A, "Measurement Systems – Applications and Design", Tata McGraw Hill, New York, 2000.
[R2] Patranabis. D, "Sensors and Transducers", Prentice Hall of India, 1999.
[R3] John. P, Bentley, "Principles of Measurement Systems", III Edition, Pearson Education, 2000.

DATA COMMUNICATION AND NETWORKING
(Open Elective-II)

Paper Code: ETVCE-510	**L**	**T/P**	**C**
Paper: Data Communication and Networking	**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 12.5marks.

ELECTRIC MACHINES LAB
(Open Elective-II)

	L	T/P	C
Paper Code: ETVCE-556			
Paper: Electric Machines Lab	**0**	**2**	**2**

List of Experiments:

1. To operate two single phase transformers of different ratings in parallel and plot the variation of currents shared by each transformer versus load current.
2. To perform Open Circuit and Short circuit Test on a transformer and find its efficient and regulation.
3. Speed control of DC Shunt Motor using a) Armature control and b) field control methods
4. To obtain Magnetizing Characteristics, Internal & External Characteristic of Self Excited DC Shunt Generator. Also obtain the critical filed resistance of the machine from magnetizing Characteristics.
5. To conduct direct load test on a D.C. compound generator with a) Shunt field alone b) Cumulative and differential compounding for short and long shunt connections.
6. To obtain Speed-Torque characteristics of DC Series Motor 7. To obtain Speed-Torque characteristics of DC Shunt Motor.
7. To study different starters of D. C. motor.
8. To study different starters of three phase induction motor
9. To perform No load and Block rotor test on induction motor and plot equivalent circuit
10. To Study the effect of Inserting resistance on rotor of Slip ring induction motor. 12. To draw the V curves for synchronous machine
11. To find the voltage regulation of synchronous machine 14. To study capacitor start and capacitor run induction motor.

SENSORS AND TRANSDUCERS LAB
(Open Elective-II)

Paper Code: ETVCE-558	**L**	**T/P**	**C**
Paper: Sensors and Transducers	**0**	**2**	**2**

List of Experiments:

1. Determine the characteristics of Strain gauge
2. Determine the characteristics of load cell
3. Determine the characteristics of thermistor
4. Determine the characteristics of RTD
5. Determine the characteristics of Thermocouple
6. Determine the characteristics of LDR
7. Loading effect of Potentiometer
8. Determine the characteristics of Synchros
9. Determine the characteristics of LVDT
10. Determine the characteristics of Piezo-electric transducer
11. Determine the characteristics of Hall-effect transducer
12. Study of smart transducers
13. Study of selection of transducer for various industrial applications

DATA COMMUNICATION AND NETWORKING LAB
(Open Elective-II)

Paper Code: ETVCE-560	**L**	**T/P**	**C**
Paper: Data Communication and Networking Lab	**0**	**2**	**2**

List of Experiments:

1. Identification of various network components
    a. -Connections, BNC, RJ-45, I/O Box, Rosette box, Crimping tools.
    b. -Cables, Co-axial, twisted pair, UTP, fiber Optics.
    c. -NIC (Network interface card)
    d. -Switch, Hub, Router,
2. Sketch wiring diagram of network considering a computer lab of 20 systems
3. Interfacing with the network card (Ethernet)
4. Preparing of network cables-cross cables, straight cables
5. Use of protocols in establishing LAN via TCPlP, NETBUI.
6. Installation of networks (Peer to Peer networking client server interconnection)
7. Use/Installation of Proxy server
8. Trouble shooting networks
9. To obtain all amplitude modulated wave and measure its modulation index.
10. To demodulate an AM signal and compare with it with original signal.
11. To obtain F.M. wave and find maximum deviation.
12. To detect F.M. signal and compare it with the original Signal.
13. To obtain a P.C.M. signal and observe the effect of quantization.
14. To obtain a multiplexed signal of two given signals
15. Study of a given modem and its working.
16. Study of T.D.R. method of detecting fault.
17. Study of F.S.K signal.
18. Socket programming through C to transfer TCP and UDP segments and datagrams
19. Installation of fax machine, MODEM
20. Installation of LAN.

MICROPROCESSORS & MICROCONTROLLER LAB

Paper Code: ETVCE-552	**L**	**T/P**	**C**
Paper: Microprocessors & Microcontroller Lab	**0**	**3**	**3**

List of Experiments:

1. Write a 8085 program to add two 8 bit nos and store result in suitable location Write a 8085 program to add two 16 bit nos and store result in suitable location.
2. Write a 8085 program to add 10 consecutive eight bit numbers in memory and store result in suitable location.
3. Write a 8085 program to find smallest of 10 eight bit numbers and store result in n suitable location.
4. Write a 8085 program to arrange 10 numbers in ascending order.
5. Write 8051 program to add two 8 bit numbers in internal RAM and save in internal RAM.
6. Write 8051 program to add two 8 bit numbers in external RAM and save in external RAM.
7. Write a 8051 program to multiply two 8 bit nos and store result in suitable location.
8. Write a 8051 program to divide two 8 bit nos and store result in suitable location.
9. Interface 8 LEDs in port 1 and turn on and off alternate LED.
10. Interface seven segment displays in Port1 and display 0 to 9 with suitable delay in between.
11. Interface LCD with 8051 and display a two line string of characters.
12. Interface a stepper motor with 8051 and rotate it in clockwise and anticlockwise direction.
13. Interface DC motor using H Bridge and reverse the direction of motor after every minute.

TROUBLE SHOOTING & MAINTENANCE OF ELECTRONIC EQUIPMENTS LAB

Paper Code: ETVCE-554	**L**	**T/P**	**C**
Paper: Trouble Shooting & Maintenance of Electronic Equipments Lab	**0**	**3**	**3**

List of Experiments:

1. Test OPAMP (like 741) , Regulator IC(like 78XX series)for fault
2. Test Digital ICs , Micro processors and Microcontrollers using Universal IC Tester
3. Detect Fault in a regulated Power supply and correct it
4. Detect fault in AM radio receiver and rectify it
5. Detect fault in FM radio receiver and rectify it
6. Study various sections of a colour TV .Detect fault in Colour TV receiver and rectify it
7. Perform Preventive maintenance of electric/ microwave Owen
8. Perform Preventive maintenance of automatic washing machine
9. Detect fault in CRO and rectify

ENVIRONMENTAL SCIENCE LAB/ FIELD WORK
(Common to All Disciplines)

Paper Code: ETVEN-552	**L**	**T/P**	**C**
Paper: Environmental Science Lab/ Field Work	**0**	**2**	**2**

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.
9. Determination of ammonia 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.
12. Determination of the molecular weight of polystyrene sample using viscometer method.
13. Base catalyzed aldol condensation by Green Methodology.
14. Acetylation of primary amines using eco-friendly method.
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:

[T1] A. I. Vogel, G. H. Jeffery, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5th Edition, 1989.

[T2] dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).

[T3] S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3rd Edition, 2008.

[T4] S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2nd Edition, 2003.

[T5] W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.

[T6] A. Kaushik and C. P. Kaushik, *Perspectives in Environment Studies*, 4th Edition, New Age International Publishers, 2013.

Note:- Any 10-12 Experiments out of the list may be chosen.

VOCATIONAL WORKSHOP-II
(Implementation of Electronic Circuits)

	L	T/P	C
Paper Code: ETVEC-564			
Paper: Vocational Workshop-II (Implementation of Electronic Circuits)	**0**	**3**	**3**

List of Experiments:

Perform any one of the following

1. Construct a high power Hi Fi Audio amplifier and test its performance. Construct suitable cabinet with proper front panel controls
2. Construct microcontroller based LED display board to display 4 Characters and display characters and roll up/down and shift left/right
3. Construct a remote controller using microcontroller and use it to control the direction and speed of motor
4. Construct a microcontroller based temperature control system. Temperature should be displayed in LCD and maintained within set limits
5. Construct a microcontroller based light intensity control system. Light intensity should be displayed in LCD and maintained within set limits
6. Construct a micro controller based multi meter with LCD display
7. Construct a sine wave inverter and test its performance
8. Construct a function generator design suitable cabinet with proper front panel controls.