

SCHOOL OF ENGINEERING
ACADMIC YEAR - 2021-2022

PROGRAM: B.Tech. - Electrical Engineering
SEMESTER - I (BATCH: 2021-2025)

DEFINATION OF ONE CREDIT: 1. Lecture (L): 1 hour/week /semester, 2. Practical (P): 2 hour/week/semester 3. Tutorial(T): 2 hour/week/semester

TEACHING SCHEME										
Course Code	Course Name	Teaching Hours			SSH	Credits	Audit course	CIE	PSEE	Remarks if any
		Lecture	Tutorial	Practical						
APS101	Calculus	4	0	0	2.5	4	N	Y	N	-
ESLB2A	English As a Second Language-Intermediate Level-I	3	0	0	2	3	N	Y	N	-
CE106	Logic Building Techniques and Practices	3	0	0	1	3	N	Y	N	-
ME125	Engineering Drawing	2	0	2	3	3	N	Y	Y	-
EL105	Fundamentals of Electrical Engineering	3	0	2	2	4	N	Y	Y	-
APS121	Applied Science	3	0	2	1	4	N	Y	Y	-
WP101	Workshop Practice-I	0	0	4	2	2	N	Y	Y	-
MEN201	Mentoring	0	0	1	0	-	N	N	N	-
XXXX	University Elective-I	0	0	1	-	1	N	N	Y	-
	Total	18	0	12	13.5	24				-
	Total Teaching Hours	30								-

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University Electives-I										
Course Code	Course Name	Teaching Hours			SSH	Credits	Audit course	CIE	PSEE	Remarks if any
		Lecture	Tutorial	Practical						
NSS101	National Service Scheme-I*	0	0	1	-	1	N	N	Y	-
YOG101	YOGA-I*	0	0	1	-	1	N	N	Y	-
<p>N- No Y - Yes</p> <p>CIE - Continuous internal evaluation PSEE - Practical semester end examination including ITD, Dissertation, Industrial project, Industrial training etc.</p> <p>SSH - Self-study hours per week</p> <p>Remarks: *Students are required to undergo 15 hrs. training / field visit / workshop in relevant field during semester.</p>										

Course Title	CALCULUS
Course Code	APS101
Course Credit	Lecture : 04
	Practical : 00
	Tutorial : 00
	Total : 04

Course Learning Outcomes:

After Successful completion of the above course, students will be able to:

- Understand the basic knowledge of mathematical principles, methods, results and gain clear perception of modeling, solving and analyzing the data.
- Understand key theories, concepts and methods in calculus including techniques and application.
- Apply differential and integral calculus for solving problems.
- Solve problems using appropriate technology, translating problems from one form to another form by using various problem-solving strategies.

Detailed Syllabus

Sr. No.	Contents	Hours Allotted
SECTION - I		
1.	Infinite Series Definition, Series of positive terms, Geometric series, The integral test, Comparison test, D' Alembert's ratio test, Cauchy's root test, Alternating series, Power series.	06
2.	Indeterminate Forms Different types of indeterminate forms and L' Hospital rule.	04
3.	Differential Calculus Successive differentiation, Roll's theorem, Langrage's Mean Value theorem, Cauchy's Mean Value theorem, Curvature, Expansion of function, Taylor's series, Maclaurin's series.	06
4.	Partial Differentiation Function of two or more variables, Partial derivative of first order, Geometric interpretation of partial derivative, Partial derivative of higher order, Differentiation of composite function, Homogeneous function, Euler's theorem on homogeneous function, Chain rule, Differentiation of implicit function, Total derivative.	08
5.	Applications of Partial Differentiation	04

	Jacobian, Taylor's series, Maclaurin's series, Errors and Approximation, Maxima & Minima of function, Tangent plane and Normal line to a surface.	
	TOTAL	28
SECTION – II		
6.	Complex Numbers Geometric representation of a complex numbers, Polar form, De-Moivre's theorem, Roots of a complex number, Exponential form, Hyperbolic function, Relation between circular and hyperbolic function, Inverse hyperbolic function Logarithm of a complex number.	08
7.	Curve Tracing Tracing of cartesian curve, Tracing of polar curve, Tracing of parametric curve, Well known curves and their characteristics.	04
8.	Integral Calculus Reduction formula, Applications of integration, Length of plane curve, Area, Volume (Using single integration)	06
9.	First Order Differential Equations Order and degree of a differential equation, Formation of a differential equation, Solution of differential equation by variable separable method, Homogeneous differential equation, Exact differential equation, Linear differential equation, Bernoulli's equation, Clairaut's equation, Orthogonal trajectories, Interval of validity and direction fields.	06
10.	Applications of First Order Differential Equations and Mathematical Modeling Circuit problem, Bending beam problem, Spring problem	04
	TOTAL	28

Instructional Method and Pedagogy:

- Main Instructional method will be conducted by usage of Black-board and Chalk-duster.
- Application based learning
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes will be conducted.
- The course includes tutorials, where students have an opportunity to practice the examples for the concepts being taught in lectures.

Reference Books:

1. Dr. R. C. Shah, "Calculus", Books India Publications – 7th edition.
2. Dr. K. R. Kachot, "Calculus", Mahajan Publishing house - 15th edition.
3. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication Co. Ltd., New Delhi – 39th edition.
4. Thomas George, B. weir Maurice, D. Hass Joel Giordano Frank, Prajapati Jyotindra, "Calculus", Pearson Education, Delhi – 1st edition.
5. Erwin Kreysing, "Higher Engineering Mathematics", Wiley India Publications – 8th edition.

Additional Resources :

- <https://nptel.ac.in/course.php>
- <https://www.britannica.com/science/calculus-mathematics>
- <https://nptel.ac.in/courses/111103021/>
- <https://ocw.mit.edu/courses/mathematics/18-01sc-single-variable-calculus-fall-2010/unit-3-the-definite-integral-and-its-applications/>
- <https://www.khanacademy.org/math/algebra2/introduction-to-complex-numbers-algebra-2>

Course Title	ENGLISH AS A SECOND LANGUAGE - Preliminary Level-I
Course Code	ESLB2A
Course Credit	Lecture : 03
	Practical : 00
	Tutorial : 00
	Total : 03
Course offered to	UG Programs Semester-I
Course Learning Outcomes	
<p>At end of the course, students will be able to -</p> <ol style="list-style-type: none"> 1. Identify key words and infer the exact meaning of reading texts while using paraphrasing skills. 2. Articulate a short message and or express opinions through a short mesage, letter or a story. 3. Summarize and coorelate the audios with related texts and messages. 4. Sketch, develop and articulate their opinions, ideas & descriptions on a given topic. 	
Detailed Syllabus	

SR No	UNITS	GRAMMAR	LISTENING	SPEAKING	READING	WRITING
1	A question of sport	Present simple / to be + frequency adverbs	--	Part 1 Give information about yourself	Part 1 Multiple-choice questions about five short texts	--
2	I'm a friendly person	like/enjoy + -ing; want / would like + to; to be + a(n) + occupation	Part 3 Six gaps (one main speaker)	--	--	Part 1 & 2 A short message, rewriting sentences
3	Let's go out	Preposition of time; present continuous for future plants	Part 1 Seven multiple choice (picture questions)	--	--	Part 2 A short mesdage

4	Wheels and wings	need; countable and uncountable nouns; expressions of quantity	--	--	Part 2 Match five descriptions of people to eight short texts.	--
5	Let's Celebrate	Present perfect simple; just, already, yet	--	--	--	Part 2 A short message
6	How do you feel?	Short answers in the present perfect	--	Part 2 The Speaking have a discussion together about a situation	Part 4 Five multiple-choice	--
7	I look forward to hearing from you	Present perfect Ans past simple; ago, for, since, in; been and gone; have you ever...?	Part 1 Seven multiple choice (picture questions)	--	--	--
8	A good read	Past continuous; past continuous vs. past simple; while/when + past continuous	--	Part 1 Give information about yourself	--	--
9	A place of my own	Modal (probability and possibility): it could/might/must/can't be; prepositions of place	--	--	Part 2 Match five descriptions of people to eight short texts.	--
10	What's in fashion?	used to; too and enough with adjectives; adjective order	--	--	--	Part 2 A short message
11	Risk!	Modal (probability and possibility): can, can't; have to, don't have to; had to and didn't have	--	--	Part 1 Multiple-choice question	--

		to; adverbs			about five short text	
12	Next week's episode	will future; will vs. going to; everyone, no one, someone, anyone	--	--	Part 4 Five multiple-choice	--
13	shooting a film	Past perfect; past perfect vs. past simple	Part 3 Six haps one main speaker	--	--	Part 2 A short message
14	So you think you've got talent?	Comparison of adverbs; so and such; connectives	Part 1 Seven multiple choice picture questions	--	--	--
15	Strange but true?	Reported speech	--	--	--	Part 1 Rewriting sentences
16	Best friends?	Relative clauses; adjectives + prepositions	--	Part 2 The Speaking have a discussion together about a situation	Part 1 Multiple-choice question about five short text	--
17	Persuading people	First conditional; unless; if and when	--	Part 1 & Part 2 Give information About yourself & Discussing together about a situation	--	--
18	Traveller's tales	Adverbs at the beginning of a sentence; reflexive pronouns: my self, yourself, etc; every ,each, all; using the passive	--	--	Part 2 Match five descriptions of people to eight short texts.	--
	What would you	Second conditional	Part 2 Six multiple			Part 1 Rewriting

19	do?		choice one speaker or an interviewer	--	--	sentences
20	What's on the menu?	So do I, Neither / Not do I; polite question forms	--	--	Part 4 Five multiple-choice	--

Note

Cambridge PET exam comprises of LSRW, each skill consists of several parts that are as follows - Listening - 4 parts, Speaking - 4 parts, Reading - 5 parts, Writing - 3 parts.

The above-mentioned parts will be covered under different units as specified in the syllabus.

Reference Books -

1	Objective KET Student's Book Student Edition
2	Objective KET Teacher's Book Paperback – Teacher's Edition by Annette Capel (Author)
3	Objective KET Workbook Workbook Edition by Annette Capel (Author), Wendy Sharp (Author)
4	Cambridge Grammar for PET Book with Answers and Audio CD: Self-Study Grammar Reference and Practice
5	(Cambridge Books for Cambridge Exams) Pap/Com Edition Louise Hashemi (Author), Barbara Thomas (Author)
6	Practice Tests for the Preliminary English Test (PET) 1 Student's Book
7	Cambridge Preliminary English Test Extra Self Study
8	Cambridge Vocabulary for PET Student Book with Answers and Audio

Course Title	Logic Building Techniques and Practices
Course Code	CE106
Course Credit	Lecture : 03
	Practical : 00
	Tutorial : 00
	Total : 03

Course Learning Outcomes:

After Successful completion of the above course, students will be able to:

- To understand basic concepts of computer system and programming.
- To develop logic to solve problems using different paradigm.
- To understand concepts like layout of program variables, decisions, looping.
- To arrange variables in different formats of arrays.
- To understand the concepts of different types of files and mechanism to handle them.

Detailed Syllabus

Sr. No.	Contents	Hours Allotted
SECTION – 1		
1.	Introduction to Computer System & Programming Basic Terminologies: Program, Software, Operating System, I/O Devices, Process. Brief about computer systems: Block diagram, Basics of Number System. Basic structure of simple program (Input, Process & Output).	4
2.	Basics of Algorithm Introduction. Algorithm, Characteristic of Algorithm, Algorithm Notation, Merits & Demerits of Algorithms.	4
3.	Basics of Flowchart Introduction, Flowchart, Symbols, Rules of Flowchart, Merits & Demerits of flowchart.	4
4.	Design Tools Variable, Rules for naming variable, Variable types, Basic Operators, Basics to pseudo code, merits and demerits for pseudo code.	4
5.	Decision Structures Sequential execution, Boolean logic and the selection structure, Simple selection, Multiple selection and Nested selection mechanism, using the relational comparison operators, working with AND, OR & NOT logic, making selection within ranges, understanding precedence.	5
TOTAL		21
SECTION – 2		

6.	Repetition Programming and Modularization Introduction, Understanding the advantages of looping, Different looping structures: DO WHILE structure and REPEAT...UNTIL Structure, Nested loop control structures. Concept of modular programming, Merits and Demerits of Modular programming, use of modularization into a problem solving.	8
7.	Advanced Variable Types Arrays, Arrays and variables, Pseudo code for common array operations, Single dimensional array, Multi-dimensional array, searching an array for a range match, understanding array bounds, using loop to process array.	8
8.	Working with Files Basics of computer files, working on different file operations (read, write & append), understanding of access of files: sequential access & random access.	5
TOTAL		21

Instructional Method and Pedagogy:

- Lectures will be conducted with the help of multimedia projector, blackboard, discussion of group.
- Lectures will be follow few of active learning strategies to discuss certain problems to understand and design solutions.

Reference Books:

1. Title: "Principles & Techniques of Programming", Galgotia Publications
Author(s): T. M. Ramachandran
2. Title: "Programming Logic and Design", Course Technology
Author(s): Joyce Farrell
3. Title: "Principles of Logic and Logic Programming", Elsevier
Author(s): George Metakides, Anil Nerode

Additional Resources:

- http://www.tutorialspoint.com/computer_programming/computer_programming_overview.htm
- <http://revolution.byu.edu/programmingconcepts/controlstruct.php>
- <http://holowczak.com/programming-concepts-tutorial-programmers/2/>
- <http://users.ecs.soton.ac.uk/mal/publications/phd.pdf>

Course Title	ENGINEERING DRAWING
Course Code	ME125
Course Credit	Theory :02
	Practical :01
	Tutorial :00
	Credits :03

Course Learning Outcomes:

After successful completion of the course, students will be able to:

- Recognize the dimensions, units and annotate two-dimensional engineering drawing.
- Identify the application of Loci of points and engineering curves in the field of engineering.
- Identify the need of development of lateral surfaces and apply the same in engineering drawing.
- Sketch orthographic projections into isometric projections and vice versa for complicated geometries.
- Illustrate the projections of points and lines, planes, solids and section of solids.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
SECTION-I		
1.	Introduction to Engineering Drawing: Introduction, Drawing instruments and accessories, BIS - SP46, Types of lines and its applications, Dimensioning methods, Geometrical constructions, Use of Plane scales, Diagonal scale, Vernier Scale, Scale of chord.	4*
2.	Loci of Points: Introduction, Path of the points moving on simple arrangements and simple mechanisms, Slider cranks mechanism, Four bar chain mechanism, Oscillating link, Rotating Links etc.	7
3.	Engineering Curves: Introduction, Classification of engineering curves, Construction of Conics, Cycloid, Involute and Spirals.	7

4.	Orthographic Projections: Introduction, Principle of projection, Introduction of Principal planes, Projections from the pictorial view of the object on the principal planes for View from Front, View from Top and View from Side using first angle projection method and third angle projection method, Full Sectional View.	10*
5	Isometric Projections and Isometric View or Drawing: Introduction, Isometric Scale, Isometric view or drawing and projection, Conversion of orthographic views into isometric projection/drawing.	10*
6.	Projections of Points and Lines: Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane, True length of the line.	3
7.	Projections of Planes: Introduction, Concept of different planes, Projections of planes with its inclination to one reference.	3
8.	Projections of Solids Introduction, Classification of solids, Projections of solids like Cylinder, Cone, Pyramid and Prism with its inclination to one reference,	3
9.	Development of Lateral Surfaces: Introduction, Concept of development of the different surfaces, Parallel line development and Radial line development.	5
Total		28

Instructional method and Pedagogy:

- At the beginning of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regularly.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- Minimum five drawing sheets have to be submitted as term-work in laboratory based on course contents.
- Minimum twelve tutorials and two assignments are to be submitted as term-work in laboratory related to course contents.
- * Chapter No: 1, 4 and 5 will be covered in laboratory hours.
- **Final Theory Semester End Examination will be of 50 Marks.**

Reference Books:

- P.J.Shah, "A Text Book of Engineering Graphics", S.Chand & Company Ltd.
- Sham Tickoo, "AutoCAD 2009", CENGAGE learning Indian Edition.
- N. D. Bhatt, "Engineering drawing", Charottar publication.
- Arunoday Kumar, "Engineering Graphics", Tech – Max Publication, Pune.
- T. Jeyapoovan, "Engineering Drawing & Graphics using Auto CAD 2000", Vikas Publishing House Pvt. Ltd., New Delhi
- P.S.Gill, "A text book of Engineering Drawing", S.K. Kataria & sons, Delhi.
- D.A.Jolhe, "Engineering Drawing with an Introduction to Auto CAD", Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
- R.K.Dhawan, "A text book of Engineering Drawing", S.Chand & Company Ltd., New Delhi.

Additional Resources

- BIS – SP46.
- Power point presentation of engineering Drawing.
- <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
- <http://pioneer.netserv.chula.ac.th/~kjrapon/self-practice.html>
- <http://www.engineeringdrawing.org/>

Course Title	Fundamentals of Electrical Engineering
Course Code	EL105
Course Credit	Theory :03
	Practical :01
	Tutorial :00
	Credits :04

Course Learning Outcomes:

At the end of the course students will be able to

- Understand the basic concepts of magnetic circuits, AC & DC circuits.
- Predict the behaviour of simple electric and magnetic circuits.
- Analyse DC and AC electric circuits.
- Apply the knowledge of relevant laws and principles for solving circuit problems.
- Demonstrate Knowledge of single-phase and three-phase circuits and power measurement.
- Understand the necessity of safety and able to discriminate between MCB & ELCB.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
SECTION-I		
1	DC Circuits Difference between Electrical and Electronic systems, Define resistance, Effect of temperature upon resistance, solutions of series and parallel, star-delta conversion, Basic laws, Ohm's Law, KVL, KCL, and a few important circuit theorems.	05
2	Electrostatics & Capacitance Definitions, types of capacitors, series parallel combinations, charging discharging, energy stored by capacitors.	06
3	Electromagnetic Magnetic circuits, series parallel combinations, Hysteresis and eddy current loss, and Induced emf- statically, dynamically. Coefficient of self and mutual induction, coefficient of coupling, rise and decay of current in inductive circuit, force experienced by current carrying conductor.	08
4	Batteries and Cables	02

	Battery, Life of batteries, Charging & discharging of battery, Cables, 2, 21/2, 3 and 4 cores, armoured & unarmoured cables.	
Total		21
SECTION-II		
5.	Single Phase A.C. Circuits Generation of Alternating Voltages & Currents, Definitions of R.M.S. And Average Values, Vector Representation of Alternating Quantities, Addition and Subtraction of Vectors, Complex Algebra, Pure R, L and C circuits, A.C. Series and Parallel Circuits, Power And Power Factor, Resonance In Series And Parallel Circuits. Biot savart law, Ampere Law.	10
6.	Poly phase Circuits Generation of Poly phase Voltages , 3-Phase System, Inter Connection of 3 Phases, Voltage, Current And Power, Relationships In Balanced Three Phase Circuits, Power Measurement In Single Phase and 3 Phase Circuits	05
7.	Safety & protection Safety, electric shock, First aid for electric shock other hazards of electrical laboratories & safety rules, Grounding, Importance of grounding, Equipment of grounding for safety, Circuit protection devices, Fuses, MCB, ELCB & relays.	04
Total		21
Instructional method and Pedagogy:		
<ul style="list-style-type: none"> • Lectures will be conducted with the aid of multi-media projector, black board, OHP etc. • Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regularly. • urprise tests/Quizzes/Seminar/Tutorials will be conducted. . • Minimum ten experiments shall be there in the laboratory • The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. 		
Reference Books:		
<ol style="list-style-type: none"> 1. D.P.Kothari& I J Nagrath, "<i>Basic Electrical Engineering</i>" 3rdEdition , Tata McGraw Hill Publication, ISBN no. 9780070146112, 2009. 2. Theraja B. L. Theraja A. K. Tarnekar S. G. <i>Electrical technology</i> (Volume - I), 1st edition, ISBN:81-219-2440-5, 2005. 3. J.N. Swamy and N.V.Sinha "<i>Elements of Electrical Engineering</i>" 3rd Edition, Mahajan Publication, ISBN: 9788189050986, 2009. 4. S.K. Sahadev "<i>Fundamentals of Electrical Engineering</i>".Dhanpatrai&Co.2009 		

5. S. K. Bhattacharya "*Electrical Technology*" New Age International Publication, 2008.
6. Abhijit Chakrabarti "*Basic Electrical Engineering*", Tata McGraw Hill Publication, ISBN no. 9780070669307, 2009.
7. J.B. Tiwari "*Basic Electrical Engineering*", New Age International Publisher, ISBN no. 8124414745, 2003.

Additional Resources

- <http://www.jee.ro>
- <http://www.pdf-search-engine.net/basic-electrical-engineering-pdf.html>
- <http://nptel.ac.in/courses/108108076/>

Course Title	APPLIED SCIENCE
Course Code	APS121
Branches	Mech. / Civil / Ele. / Agri. / CE / IT
Course Credit	Lecture : 03
	Tutorial : 00
	Practical : 01
	Total : 04

Course Learning Outcomes

After Successful completion of the above course, students will be able to:

- Understand the physical quantities and their units in Engineering.
- Understand basics of electrochemical process
- Illustrate the role of Physics & Chemistry in science and society to observe the connections between current science events and physical phenomena.
- Apply the basic laws of physics & Chemistry in various areas of Engineering.
- Analyze principles of Physics & Chemistry for new and unfamiliar problems of engineering.

Detailed Syllabus

Sr. No	Name of chapter & Details	Hours Allotted
SECTION-I		
1	Waves Classification of Waves: Transverse waves (electromagnetic waves) and longitudinal waves (sound waves). Classification of Sound. Characteristics of Sound. Weber-Fechner law: Loudness, Intensity, Intensity Level, Decibel. Architectural acoustics of building: Absorption coefficient. Reverberation. Reverberation time Sabine's formula. Factors affecting acoustic of building and their remedies Ultrasonic waves: Introduction. Properties, production and detection of ultrasonic waves. Determination of velocity of ultrasonic waves in liquids & Applications.	6
2	Crystal Structure Introduction. Classification of Solids. Crystal systems, Bravais lattices. Cubic lattice: Number of atoms, Atomic Radius, Atomic Packing Factor. Miller indices, Miller planes in cubic structure. Relation between interplanar distance and cubic edge. Bragg's Law. X-ray Diffraction methods	5

3	<p>Thermal and Electrical Conduction</p> <p>Introduction to thermal Conduction, convection and radiation. Conduction through compound media. Specific Heat- Newton's law of cooling. Classical Physics: Classical free electron theory of metals. Electrical conductivity. Thermal conductivity. Wiedemann-Franz law. Success and drawbacks of classical free electron theory.</p>	3
4	<p>Modern Physics</p> <p>Quantum Mechanics: Origin (Brief history) and development of quantum theory. Wave function: Normalization condition. Schrodinger's equation. Applications. X-rays: Origin of x-ray, production, properties and application of X-ray. Introduction to LASER: Absorption, spontaneous and stimulated emission. Population inversion, pumping. Properties of LASER. Relation between Einstein coefficients. Types of Laser according to laser medium. Semiconductor laser, Nd-YAG laser, He-Ne laser and CO2 laser. Applications of laser</p>	7
SECTION-II		
5	<p>Superconductors</p> <p>Introduction. Properties of superconductors. Type-I and Type-II superconductors. High Temperature super conductors. Applications, Numerical.</p>	3
6	<p>Advanced Engineering Materials</p> <p>Introduction to metallic glasses. Properties, types, preparation and applications. Nano-materials: Introduction about nano-technology, properties, preparation methods and applications. Shape Memory Alloys: Shape memory effect, Pseudo-elasticity, applications.</p>	4
7	<p>Electrochemistry</p> <p>Introduction, Types of Cell, Half-cell, Reversible and irreversible cell, Convention sign, Types of Electrodes, Standard Electrode Potential, Electrolytic Cell, Galvanic Cell, Emf series, Representation of Cell, Relation between G,H and K, Nernst Equation and its applications</p>	8
8	<p>Photochemistry</p> <p>Laws of Photochemistry: Grothus-Drapper law; Lambert-Beers law; Stark-Einstein's law (i.e. law of photochemical equivalence), Quantum efficiency and Factors affecting quantum efficiency, Reasons for low and high quantum yield, Photo sensitization, Fluorescence, Phosphorescence, Chemiluminescence, Overview of Polymer</p>	6

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of

each unit/topic and will be evaluated at regular interval.

- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course students will be able to

- Understand the general scientific concepts required for technology
- Apply the concepts in solving engineering problems.
- Apply the ideas of advance testing methods.
- Explain scientifically the new developments in engineering and technology.
- Get familiarized with the concepts, theories, and models behind many technological applications.

Text book:

1. Engineering Science-Edward Hughes & Christopher Hughes; Longman publication (British Gov.)
2. Engineering Physics- Abhijit Nayak; S.K. Kataria & Sons publication, New Delhi
3. Engineering Physics- G.Vijayakumari; Vikas Publishing House Pvt. Ltd., New Delhi
4. Elements of Physical Chemistry by Saumel Glasstone and D lewis
5. Fundamental of analytical chemistry by Skoog & West
6. Instrumental Method & Chemical Analysis by Chatwal Anand

Reference Books:

1. Concepts of Modern Physics - Arthur Beiser; Tata Mc-Graw Hill Co. Ltd
2. Optics - Ajoy Ghatak; Tata Mc-Graw Hill Co. Ltd
3. Optical Fibre & Laser - Anuradha; New Age publication
4. Fundamental of Physics – Halliday, Resnick & Walker; John Wiley & Sons, Inc.
5. Principles of Physics - R.A. Serway & J.W. Jewett; Thomson Asia Pvt. Ltd.
6. Elementary Solid State Physics- M. Ali Omar; Pearson Education Inc.
7. Oxford Physics Dictionary.

Additional Resources

- <http://www.physicsclassroom.com>
- <http://www.wikipedia.org>
- <http://www.cap.ca>
- <http://focus.aps.org/>
- N.P.T.E.L. Video Lecture Series
- N.I.T.T.I. Instructional Resources Videos.

Course Title	Workshop Practice - I
Course Code	WP101
Course Credit	Theory : 00
	Practical : 04
	Tutorial : 00
	Credits : 02

Course Learning Outcomes:

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

- Understand applications of hand tools and power tools.
- Understand the operations of machine tools.
- Identify and understand the importance of various electrical and electronics components.
- Understand basic construction and operation of various laboratory equipment.
- Perform basic maintenance and troubleshooting of household equipment, energy saving etc.
- Work on hardware and software of the computer.
- Understand computer system architecture, database and Networks.
- Learn and explore new IT techniques in various applications and to identify the issues related to security.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
SECTION-I		
1.	Different types of shops in mechanical Engineering workshop and their processes, workshop layouts, Methods of Safety. Demonstration of hand tools, power tools, machine tools.	04
2.	Basic measuring instruments, materials, Marking and measurement in Carpentry, Fitting.	04
3.	Smithy, Welding, Tin smithy, Plumbing and Machine shop.	12
4.	Introduction to CNC and Non-Conventional Machining Process.	08

		Total	28
SECTION-II			
5.	Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Relays, Bread Boards, PCB's.		04
6.	Identification, Specifications and Testing of Active Devices: Diodes, BJTs, JFETs, MOSFETs, Power Transistors, LED's, LCD's, SCR, UJT.		04
7.	Study of Multimeters (Analog and Digital), Function Generator, Regulated Power Supply (RPS), CRO, IC tester, Solder practice.		04
8.	House Wiring: Parallel /Series connection of the bulbs, Stair case wiring, Florescent Lamp Fitting, Measurement of earth resistance.		02
9.	PC Hardware: Identification of basic peripherals, assembling a PC, installation of system software like MS Windows, device drivers. Troubleshooting Hardware and software (some tips and tricks)		04
10.	Internet & World Wide Web: Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums. Awareness of cyber hygiene (protecting the personal computer from getting infected with the viruses), worms and other cyber-attacks.		06
11.	Productivity tools: Crafting professional word documents; excel spreadsheets, power point presentations and personal web sites using various tools		04
		Total	28
Instructional method and Pedagogy:			

- Each topic is to be done in the laboratory only.
- At the beginning of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Attendance is compulsory in laboratory.
- Only group Practical/demo will be done/shown in practical time.
 - Fitting,
 - Carpentry,
 - Black Smithy,
 - Tin Smithy,
 - Plumbing,
 - Welding,
 - Machining,
 - VMC,
 - EDM.

Reference Books:

1. Hajra Choudhary, "Workshop Technology Vol. I", Media Promoters and Publishers Pvt. Ltd., Mumbai.
2. Hajra Choudhary, "Workshop Technology Vol. II", Media Promoters and Publishers Pvt. Ltd., Mumbai.
3. Raghuvanshi B.S., "Workshop Technology Vol. 1", Dhanpat Rai & Sons.
4. Raghuvanshi B.S., "Workshop Technology Vol. 2", Dhanpat Rai & Sons.
5. B J Black, "Workshop Practices and Materials", CRC Press.
6. Fundamentals of Maintenance of Electrical Equipments, K. B. Bhatia Khanna Publishers
7. Principles and Reliable Soldering Techniques, Sengupta R. New Age International (P) Ltd.
8. Computer Fundamentals, Anita Goel, Pearson
9. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
10. Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications.
11. Comdex Information Technology, Vikas Gupta, dreamtech.
12. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu.
13. PC Hardware trouble shooting made easy, TMH

Additional Resources

- <http://www.sme.org/fmp/>
- <http://www.olabs.edu.in/?pg=topMenu&id=40>
- https://www.ee.iitb.ac.in/~wel_iitb/
- <http://www.vlab.co.in/>

Course Title	National Service Scheme-I
Course Code	NSS101
Course Credit	Theory :00
	Practical :01
	Tutorial :00
	Credits :01

Course Learning Outcomes:

At the end of the course students will be able to gain knowledge about NSS and put the same into practice.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
SECTION-I		
1.	NATIONAL SERVICE SCHEME (NSS) A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.	14
Total		14

Instructional method and Pedagogy:

- An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

Reference Books:

- Vethathiri Maharishi.T, "Simplified Physical Exercises", Vethathiri Publishers, 1987.

Course Title	YOGA-I
Course Code	YOG101
Course Credit	Theory :00
	Practical :01
	Tutorial :00
	Credits :01

Course Learning Outcomes:

At the end of the course students will be able to gain knowledge about YOGA and put the same into practice.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
1.	YOGA Benefits of Agnai Meditation -Meditation - Agnai, Asanas, Kiriyaas, Bandas, Muthras. Benefits of santhi Meditation - Meditation Santhi Physical Exercises (I&II). Lecture & Practice - Kayakalpa Yoga Asanas, Kiriyaas, Bandas, Muthras. Analysis of Thought - Meditation Santhi Physical Exercises III & IV. Benefits of Thuriyam - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras. Attitude - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras. Importance of Arutkappy & Blessings - Meditation Thuriyam Kayakalpa Asanas, Kiriyaas, Bandas, Muthras. Benefits of Blessings - Meditation Santhi Kayakalpa Asanas, Kiriyaas, Bandas, Muthras	14
Total		14

Instructional method and Pedagogy:

- An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

Reference Books:

- Yogiraj Vethathiri Maharishi, "Yoga for Modern Age", Vethathiri Publishers, 1989