KRISHNA UNIVERSITY:: MACHILIPATNAM
(Established by Govt. of A.P., ACT No.30 of 2008)
MACHILIPATNAM – 521 003 (A.P) INDIA

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Proposed Course Structure (R20)
Computer Science & Engineering

Induction Program – 3 weeks

Semester - 1 (Theory - 4, Lab - 5)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A54101T	Linear Algebra and Multivariate Calculus	BS	3-0-0	3
2.	20A51101T	Chemistry	BS	3-0-0	3
3.	20A05201T	Problem Solving and C Programming	ES	3-0-0	3
4.	20A04101T	Basic Electrical and Electronics Engineering	ES	3-0-0	3
5.	20A03202P	Engineering Workshop	LC	0-0-3	1
6.	20A05202P	Computer Engineering Workshop	LC	0-0-3	2
7.	20A51101P	Chemistry Lab	BS	0-0-3	1.5
8.	20A05201P	Problem Solving and C Programming Lab	ES	0-0-3	1.5
9.	20A04101P	Basic Electrical and Electronics Engineering Lab	ES	0-0-2	1.5
				Total	**19.5**

Semester – 2 (Theory – 6, Lab – 4)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A54202T	Differential Equations & Vector Calculus	BS	3-0-0	3
2.	20A56201T	Applied Physics	BS	3-0-0	3
3.	20A52101T	Communicative English	HS	3-0-0	3
4.	20A05101T	Python Programming	ES	3-0-0	3
5.	20A03101T	Engineering Drawing	ES	1-0-2	2
6.	20A03101P	Engineering Drawing Lab	ES	0-0-2	1
7.	20A52101P	Communicative English Lab	ES	0-0-3	1.5
8.	20A56201P	Applied Physics Lab	BS	0-0-3	1.5
9.	20A05101P	Python Programming Lab	ES	0-0-3	1.5
10	20A52201	Universal Human Values	MC	3-0-0	0.0
				Total	**19.5**

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – I Sem

L	T	P	C
3	0	0	3

(20A54101) Linear Algebra & Multivariate Calculus

(Common to all branches of Engineering)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit 1:Matrices **10hrs**

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigenvectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, quadratic forms.

Learning Outcomes:

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

- solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigen vectors (L3).
- identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit 2: Mean Value Theorems **6hrs**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof),related problems.

Learning Outcomes:

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

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- analyze the behaviour of functions by using mean value theorems (L3)

Unit 3:Multivariable calculus **6hrs**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

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

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit 4:Multiple Integrals 12hrs

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit 5:Beta and Gamma functions 6 hrs

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

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

- understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
5. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
6. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
7. R.L. GargNishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
8. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education
9. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.

10. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech –I Sem	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

(20A51101T) Chemistry

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

Unit 1: Polymer Chemistry: (10 hrs)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, Fibre Reinforced Plastics poly dispersity index.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, polypyrroles – mechanism of conduction and applications.

Learning Outcomes:

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

- explain the different types of polymers and their applications (L2)
- list the differences between thermoplastics and thermosettings resins (L1)
- explain the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibres (L2)
- describe the mechanism of conduction in conducting polymers (L2)
- discuss Buna-S and Buna-N elastomers and their applications (L2)

Unit 2: Electrochemistry and Applications: (10 hrs)

Introduction to electro chemistry, electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries-working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol - oxygen fuel cells – applications of batteries and fuel cells.

Learning Outcomes:

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

- Apply Nernst equation for calculating electrode and cell potentials (L3)
- Differentiate between primary and secondary batteries (L2)
- Recall working and importance of fuel cells(L1)
- Explain the theory of construction of battery and fuel cells (L2)
- Solve problems based on cell potential (L3)

Unit 3:Corrosion: (10 hrs)
Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry corrosion, Pilling Bedworth rule and Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Learning Outcomes:
At the end of this unit, the students will be able to

- **apply** Pillingbedworth rule for measuring the intensity of oxidation corrosion (L3)
- Recall working and importance of cathodic and anodic protection(L1)
- **apply** Pilling Bedworth rule for corrosion and corrosion prevention (L3)
- **demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
- **compare** wet and dry corrosion (L2)

Unit 4: Modern Engineering materials: (10 hrs)
i). Understanding of materials: Crystal field theory – salient features – splitting in octahedral and tetrahedral geometry. Properties of coordination compounds-Oxidation state, coordination, magnetic and colour.
ii). Semiconductor materials, super conductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures.
iii). Supercapacitors: Introduction, Basic concept-Classification – Applications.
iv). Nanochemistry: Introduction, classification of nanometerials, properties and applications of Fullerenes, carbon nanotubes and Graphene nanoparticles.

Learning Outcomes:
At the end of this unit, the students will be able to

- Explain splitting in octahedral and tetrahedral geometry of complexes (L2).
- Discuss the magnetic behaviour and colour of coordination compounds (L3).
- Explain the band theory of solids for conductors, semiconductors and insulators (L2)
- Demonstrate the application of Fullerenes, carbon nano tubes and Graphines nanoparticles (L2).

Unit 5: Instrumental Methods and Applications (10 hrs)
Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law, UV-Visible **,** IR Spectroscopies – selection rules, principle and applications. Introduction to Chromatography, Solid-Liquid Chromatography–TLC, retardation factor.

Learning outcomes:
After completion of Unit IV, students will be able to:

- Explain the different types of spectral series in electromagnetic spectrum (L2)
- Find retardation factor in TLC (L1**)**
- Understand the principles of different analytical instruments (L2)
- **Apply** Beer-Lambert's law for absorption studies (L3)
- Explain the different applications of analytical instruments (L2)

Text Books:
1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020

Reference Books:

1.Prasanta Rath, B. Ramadevi, Ch. Venkata Ramana Reddy and Subhendu Chakroborty, Engineering Chemistry, Cengage Publications, 2019.
2. S.S.Dara and S.S.Umare, Engineering Chemistry, S Chand & Co Ltd, 2019.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. E.R.Nagarajan and S. Ramalingam, Wiley's Engineering chemistry, Wiley India Pvt. Ltd.2020

Course Outcomes:

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

- Compare the materials of construction for battery and electrochemical sensors (l2)
- Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers& conducting polymers. (l2)
- Explain the principles of spectrometry, slc in separation of solid and liquid mixtures (l2)
- Apply the principle of Band diagrams in application of conductors and semiconductors (L3)

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – I Sem

L	T	P	C
3	0	0	3

(20A05201T) Problem Solving and C Programming

Course Objectives:

- Introduce the internal parts of a computer, and peripherals.
- Introduce the Concept of Algorithm and use it to solve computational problems.
- Identify the computational and non-computational problems.
- Teach the syntax and semantics of a C Programming language.
- Demonstrate the use of Control structures of C Programming language.
- Illustrate the methodology for solving Computational problems.

Unit-1

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts.

At the end of the Unit, students should be able to:

- Identify the different peripherals, ports and connecting cables in a PC (L2)
- Illustrate the working of a Computer (L3)
- Select the components of a Computer in the market and assemble a computer (L4)
- Solve complex problems using language independent notations (L3)

Unit – 2

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

At the end of the Unit, students should be able to:

- Solve Computational problems (L3)
- Apply Algorithmic approach to solving problems (L3)
- Analyze the algorithms (L4)

Unit-3

Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Do-while, break and continue, Goto and labels.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables. Scope rules, Header files, Static Variables.

At the end of the Unit, students should be able to:

- Recognize the programming elements of C Programming language (L1)
- Select the control structure for solving the problem (L4)
- Apply modular approach for solving the problem (L3)

Unit – 4

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the k^{th} smallest element

At the end of the Unit, students should be able to:

- Solve mathematical problems using C Programming language (L3)
- Structure the individual data elements to simplify the solutions (L6)
- Facilitate efficient memory utilization (L6)

Unit-5

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, typedef, unions, bit-fields.

File in C: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Direct File Input and Output, Files of records.

At the end of the Unit, students should be able to:

- Select sorting algorithm based on the type of the data (L4)
- Organize heterogeneous data (L6)
- Design a sorting algorithm (L6)
- Organize data in the form of Files (L6)

Text Books:

1. Pradip Dey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson.

Reference Books:

1. P.Chenna Reddy, " Computer Fundamentals and C Programming" 2018, BS Publications
2. RS Bichkar " Programming with C", 2012, Universities Press.
3. Pelin Aksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.

Course Outcomes:

1. Assemble a computer using parts (L6).
2. Recognize the importance of programming language independent constructs (L2)
3. Solve computational problems (L3)
4. Select the features of C language appropriate for solving a problem (L4)
5. Design computer programs for real world problems (L6)
6. Organize the data which is more appropriated for solving a problem (L6)

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I B.Tech – I Sem **L T P C**
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(20A04101T) Basic Electrical & Electronics Engineering

Course Objectives:

- To introduce basics of electrical circuits
- To teach DC and AC electrical circuit analysis
- To explain working principles of transformers and electrical machines
- To familiarize with the theory, construction, operation & applications of electronic devices.
- To provide exposure to Operational Amplifiers& its applications

UNIT -1

DC Circuits: Introduction - Role and importance of circuits in Engineering, concept of fields, charge, current, voltage, energy and their interrelationships. ideal voltage and ideal current sources, passive circuit components, Kirchoff's laws, node voltage and mesh current methods (only with independent sources); Delta-star and star delta conversion.

Learning Outcomes:

- Recall Kirchoff Voltage and Current laws (L1)
- Analyze simple electric circuits with dc excitation (L3)

UNIT -2

AC Circuits: Generation of sinusoidal voltage- definition of average value, root mean square value, form factor and peak factor of sinusoidal voltage and current and phasor representation of alternating quantities; real power, reactive power, apparent power and power factor. Introduction to three phase systems.Transformers: Single Phase Transformer: Construction, principle of operation, EMF Equation. Regulation and Efficiency of a Transformer.

Learning Outcomes:

- Analyze single phase AC circuits with phasor diagrams (L3)
- Determine losses, efficiency, and voltage regulation of a transformer under specific operating conditions (L3)

UNIT – 3

DC Motor: Construction, principle of operation, Different types of DC motors, Voltage equation of a motor, significance of back emf, Speed, Torque, Torque-Speed characteristics, Output Power and Efficiency. Induction Machine: Three Phase Induction Motor - Construction and Principle of Operation, Slip and Torque, Speed Characteristics. (Elementary treatment only)

Learning Outcomes:

- Understand the principle of operation and characteristics of DC motor and induction motor
- Determine losses and efficiency of electrical machines

UNIT-4

PN Junction diodes, V-I Characteristics, Rectifiers: Half wave, Full wave, Bridge. Zener Diode-characteristics, Optoelectronic devices -LED, Photodiode. Working principle & characteristics of BJT and MOSFET, application of BJT and MOSFET as a switch and an amplifier.

Learning outcomes:

- Understand the principle of operation and basic characteristics of various Electronic devices (L1)
- Explain applications of BJT & MOSFET as a switch and an amplifier. (L3)

UNIT – 5

Operational amplifier – electrical equivalent circuit, ideal characteristics, non-ideal characteristics of op-amp – offset voltages; bias current; offset current; Slew rate; CMRR and bandwidth, Inverting and non-inverting amplifier, Concept of virtual ground, Applications of op-amp – summing amplifier; differential amplifier; voltage follower, basic differentiator and an integrator

Learning outcomes:

- Describe operation of Op-Amp and its characteristics (L2)
- Analyze Op-Amp based amplifier, differentiator and integrator circuits (L3)

Text Books:

1. Edward Hughe "Electrical and Electronic Technology", 10th Edition, Pearson Education Asia, 2019.
2. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
3. P. Malvino, "Electronic Principles", 7th Edition, Tata McGraw Hill, 2007.

Reference Books:

1. S. K. Bhattcharya, "Basic Electrical and Electronics Engineering", Pearson, 2012.
2. Vincent Del Toro, "Electrical Engineering Fundamentals", Prentice Hall of India Private Limited, 2nd Edition, 2003.
3. David Bell, "Electronic Devices and Circuits", 5th Edition, Oxford University Press, 2008.
4. Michael Tooley A., "Electronic circuits: Fundamentals and Applications", 3rd Edition, Elsevier Limited, 2006.

Course Outcomes:

- Apply concepts of KVL/KCL in solving electrical circuits (L2)
- Analyze behavior of AC electrical circuits (L4)
- Illustrate working principles of electrical machines (L2)
- Explain the operation & characteristics of electronic devices (L3)
- Analyze behavior of opamp as an amplifier, integrator & differentiator (L4)

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I B.Tech – I Sem

L	**T**	**P**	**C**
0	**0**	3	1

(20A03202) Engineering Workshop

Course Objective:

To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following joints

Half – Lap joint

Mortise and Tenon joint

Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray b) Conical funnel

c) Elbow pipe d) Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fit b) Dovetail fit c) Semi-circular fit

d) Bicycle tire puncture and change of two wheeler tyre

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series b) Two way switch c) Godown lighting d) Tube light

e) Three phase motor f) Soldering of wires

Course Outcomes:

After completion of this lab the student will be able to

- Apply wood working skills in real world applications. (l3)
- Build different objects with metal sheets in real world applications. (l3)
- Apply fitting operations in various applications. (l3)
- Apply different types of basic electric circuit connections. (l3)
- Use soldering and brazing techniques. (l2)

Note: In each section a minimum of three exercises are to be carried out.

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I B.Tech – I Sem

L	T	P	C
0	**0**	3	2

(20A05202) Computer Engineering Workshop

Note: Use open source tools for implementation of the following exercises.

Course Objectives:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations and LAteX
- To learn about Networking of computers and use Internet facility for Browsing and Searching
- To learn about Google Forms and Google Sites

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered, Image Manipulation tools.

Task 9: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 10: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet

Task 11: LateX: Introduction to Latex and its installation and different IDEs. Creating first document using Latex, using content into sections using article and book class of LaTeX. Styling Pages: reviewing and customizing different paper sizes and formats. Formatting text (styles, size, alignment, colors and adding bullets and numbered items, inserting mathematical symbols, and images, etc.). Creating basic tables, adding simple and dashed borders, merging rows and columns. Referencing and Indexing: cross-referencing (refer to sections, table, images), bibliography (references).

Task 12: Google Forms and Google Sites: Create a Google Form, Add Questions, Edit Questions, Preview and Send Form, Analyze Form Responses. Create a Website using Google Sites. Update, Share and Publish a website.

Sample Programs: Create a Feedback Survey form and download the Responses, Create Online Quiz and Analyze Responses, Create and Publish "Student Profile Website".

Task 13: Fundamentals of web programming: HTML, DHTML, and JAVA Script.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs, Bigelows, TMH
6. Lamport L. LATEX: a document preparation system: user's guide and reference manual. Addison-wesley; 1994.
7. https://support.google.com/a/users/answer/9991170
8. https://support.google.com/a/users/answer/9282722

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors and Prepare spread sheets for calculations .using excel and also the documents using LAteX.
- Prepare Slide presentations using the presentation tool.
- Interconnect two or more computers for information sharing.
- Access the Internet and Browse it to obtain the required information.

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – I Sem	**L**	**T**	**P**	**C**
	0	**0**	3	1.5

(20A51101P) Chemistry Lab

Course Objectives:

- Verify the fundamental concepts with experiments

List of Experiments:

1. Conducto metric titration of strong acid vs. strong base.
2. Conducto metric titration of weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Determination of Strength of an acid in Pb-Acid battery
5. Preparation of a Bakelite and measurement of its mechanical properties (strength.).
6. Verify Lambert-Beer's law
7. Thin layer chromatography
8. Identification of simple organic compounds by IR.
9. Preparation of nanomaterial's by precipitation
10. Estimation of Ferrous Iron by Dichrometry.
11. Estimation of Copper by colrimetry
12. Estimation of Iron by Colorimetry.

Course Outcomes:

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

- Determine the cell constant and conductance of solutions (L3)
- Prepare advanced polymer Bakelite materials (L2)
- **Find** conductivity of acid and base (L1)
- Measure the strength of an acid present in secondary batteries (L3)
- Analysethe IR of some organic compounds (L3)

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – I Sem	**L**	**T**	**P**	**C**
	0	**0**	3	1.5

(20A05201P) Problem Solving and C Programming Lab

Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using C programming language
- To understand the fundamentals of C programming concepts and its applications.

List of Programs

1. Design a C program which reverses the number.
2. Design a C program which finds the second maximum number among the given list of numbers.
3. Construct a program which finds the kth smallest number among the given list of numbers.
4. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
5. Implement the C program which computes the sum of the first n terms of the series
   Sum = 1 – 3 + 5 -7 + 9
6. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
7. Design an algorithm and implement using a C program which finds the sum of the infinite series
   $1 - x^2/2! + x^4/4! - x^6/6! + ...$
8. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
9. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
10. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.
11. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
12. Design a C program which reverses the elements of the array.
13. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.
14. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort d.. Partitioning sort.
15. Illustrate the use of auto, static, register and external variables.
16. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
17. Design a C program which sorts the strings using array of pointers.
18. File operations
19. Indexing of a file

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – I Sem

L	T	P	C
0	**0**	2	1.5

(20A04101P) Basic Electrical and Electronics Engineering Lab

Course Objectives:

- To verify Kirchoff's laws
- To apply mesh & nodal analysis for solving electrical circuits practically
- To determine performance characteristics of DC Machines.
- To explainthe characteristics & applications of basic electronic devices
- To provide exposure to Opamps and its applications

Part A: List of experiments:

- Basic safety precautions

1. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors
2. Verification of Kirchhoff's laws
3. Apply Mesh & Nodal Analysis techniques for solving electrical circuits
4. Measurement of Active and Reactive powers for AC circuits
5. Speed control of DC Motor.
6. OC & SC test of 1 – Phase Transformer.
7. Determine performance characteristics of 3-phase Induction motor

Part B: List of Experiments:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half wave &Full Wave Rectifier
4. Input & Output characteristics of BJT in CE Configuration
5. Output & Transfer characteristics of MOSFET in CS configuration
6. BJT & MOSFET as a Switch and an Amplifier
7. Inverting and Non-inverting amplifiers using Opamps.
8. Differentiator and Integrator using OPamps.

Course Outcomes:

- Understand usage of common measuring instruments (L21
- Apply various circuit laws and verify practically(L2)
- Analyze performance characteristics of electrical machines (L4)
- Plot characteristics of basic electronic devices (L1)
- Analyze opamp as an amplifier, integrator and differentiator (L4)

Note: Minimum Six Experiments to be performed in each section

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

(20A54202) Differential Equations and Vector Calculus

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT 1: Linear differential equations of higher order (Constant Coefficients) **10hrs**

Definitions, homogenous and non-homogenous, complimentaryfunction, generalsolution, particular integral,Wronskean, method of variation of parameters.Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Learning Outcomes:

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

- identify the essential characteristics of linear differential equations with constant coefficients (L3)
- solve the linear differential equations with constant coefficients by appropriate method (L3)
- classify and interpret the solutions of linear differential equations (L3)
- formulate and solve the higher order differential equation by analyzing physical situations (L3)

UNIT 2: Partial Differential Equations **8hrs**

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method.

Learning Outcomes:

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

- apply a range of techniques to find solutions of standard PDEs (L3)
- outline the basic properties of standard PDEs (L2)

UNIT 3: Applications of Partial Differential Equations **10hrs**

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

Learning Outcomes:

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

- calcify the PDE (L3)
- learn the applications of PDEs(L2)

UNIT4: Vector differentiation **6hrs**

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Learning Outcomes:

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

- apply del to Scalar and vector point functions (L3)
- illustrate the physical interpretation of Gradient, Divergence and Curl (L3)

UNIT 5: Vector integration **8hrs**

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Learning Outcomes:

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

- find the work done in moving a particle along the path over a force field (L4)
- evaluate the rates of fluid flow along and across curves (L4)
- apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
3. George B.Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
6. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
7. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
8. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
9. R.L. GargNishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
10. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
11. H. k Das, Er. RajnishVerma, Higher Engineering Mathematics, S. Chand.
12. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- solve the differential equations related to various engineering fields (L6)
- Identify solution methods for partial differential equations that model physical processes (L3)
- interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- estimate the work done against a field, circulation and flux using vector calculus (L6)

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

L	**T**	**P**	**C**
3	**0**	0	3

(20A56201T) Applied Physics

PREAMBLE

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. This helped to the discovery of new phenomena in macro, micro and nano scale device technologies. The laws of physics play a key role in the development of science, engineering and technology. Sound knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments in the field of engineering.

To keep in pace with the recent scientific advancements in the areas of emerging technologies, the syllabi of applied physics has been thoroughly revised keeping in view of the basic needs of engineering branches like ECE, EEE, CSE and other IT related branches by including the topics like optics, quantum mechanics, free electron theory. Also new phenomenon, properties and device applications of semiconducting, dielectric, magnetic and superconducting materials along with their modern device applications have been introduced.

COURSE OBJECTIVES	
1	To make a bridge between the physics in school and engineering courses.
2	To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3	To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
4	To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
5	To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
6.	Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Unit-I: Wave Optics **12hrs**

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Unit Outcomes:

The students will be able to

- Explain the need of coherent sources and the conditions for sustained interference (L2)
- Identify engineering applications of interference (L3)
- Analyze the differences between interference and diffraction with applications (L4)
- Illustrate the concept of polarization of light and its applications (L2)
- Classify ordinary polarized light and extraordinary polarized light (L2)

Unit-II: Lasers and Fiber optics **8hrs**

Lasers- Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping schemes – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics- Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

Unit Outcomes:

The students will be able to

- Understand the basic concepts of LASER light Sources (L2)
- Apply the concepts to learn the types of lasers (L3)
- Identifies the Engineering applications of lasers (L2)
- Explain the working principle of optical fibers (L2)
- Classify optical fibers based on refractive index profile and mode of propagation (L2)
- Identify the applications of optical fibers in various fields (L2)

Unit-III: Dielectric and Magnetic Materials **8hrs**

Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic and Ionic (quantitative), Orientational and space charge polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation – applications of dielectric materials.

Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro-Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magnetic materials. – applications of magnetic materials

Unit Outcomes:

The students will be able to

- Explain the concept of dielectric constant and polarization in dielectric materials (L2)
- Summarize various types of polarization of dielectrics (L2)
- Interpret Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- Classify the magnetic materials based on susceptibility and their temperature dependence (L2)
- Explain the applications of dielectric and magnetic materials (L2)
- Apply the concept of magnetism to magnetic devices (L3)

Unit IV: Quantum Mechanics, Free Electron Theory and Band theory of Solids 10hrs

Quantum Mechanics- Dual nature of matter – de Broglie hypothesis - Significance of wave function - Schrodinger's time independent wave equation – Particle in a one-dimensional infinite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states and Fermi energy (quantitative).

Band theory of Solids- Bloch's Theorem (Qualitative) – Kronig-Penney model (Qualitative) – E vs k diagram – Classification of crystalline solids – Effective mass of electron – m^* vs k diagram – concept of hole.

Unit Outcomes:

The students will be able to

- Explain the concept of dual nature of matter (L2)
- Understand the significance of wave function (L2)
- Interpret the concepts of classical and quantum free electron theories (L2)
- Explain the importance of K-P model
- Classify the materials based on band theory (L2)
- Apply the concept of effective mass of electron (L3)

Unit – V: Semiconductors and Superconductors 10hrs

Semiconductors- Introduction – Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

Unit Outcomes:

The students will be able to

- Classify the energy bands of semiconductors (L2)
- Interpret the direct and indirect band gap semiconductors (L2)
- Identify the type of semiconductor using Hall effect (L2)
- Identify applications of semiconductors in electronic devices (L2)
- Explain how electrical resistivity of solids changes with temperature (L2)
- Classify superconductors based on Meissner's effect (L2)
- Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning.

Reference Books:

1. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
2. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
4. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill.

COURSE OUTCOMES	
CO1	**Study** the different realms of physics and their applications in both scientific and technological systems through physical optics. (L2)
CO2	**Identify** the wave properties of light and the interaction of energy with the matter (L3). **Asses** the electromagnetic wave propagation and its power in different media (L5).
CO3	**Understands** the response of dielectric and magnetic materials to the applied electric and magnetic fields. (L3)
CO4	**Study** the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory. (L2)
CO5	**Elaborate** the physical properties exhibited by materials through the understanding of properties of semiconductors and superconductors. (L5)

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

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3	**0**	0	3

(20A52101T) COMMUNICATIVE ENGLISH

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. Component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

COURSE OBJECTIVES	
1	Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
2	Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
3	Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
4	Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
5	Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

COURSE OUTCOMES	
CO1	Retrieve the knowledge of basic grammatical concepts
CO2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO3	Apply grammatical structures to formulate sentences and correct word forms
CO4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO6	Create a coherent paragraph interpreting a figure/graph/chart/table

Course Outcomes
At the end of the course, the learners will be able to

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
- Create a coherent paragraph interpreting a figure/graph/chart/table

Unit 1

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Reading for Writing :**Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

- Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- Ask and answer general questions on familiar topics and introduce oneself/others
- Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- Form sentences using proper grammatical structures and correct word forms

Unit 2

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

- Comprehend short talks on general topics
- Participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
- Understand the use of cohesive devices for better reading comprehension
- Write well structured paragraphs on specific topics
- Identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension. **Writing:** Summarizing, Paragraph Writing **Grammar and**

Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes
At the end of the module, the learners will be able to

- Comprehend short talks and summarize the content with clarity and precision
- Participate in informal discussions and report what is discussed
- Infer meanings of unfamiliar words using contextual clues
- Write summaries based on global comprehension of reading/listening texts
- Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit4
Lesson: Innovation: Muhammad Yunus
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Letter Writing: Official Letters/Report Writing **Grammar and Vocabulary:** Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes
At the end of the module, the learners will be able to

- Infer and predict about content of spoken discourse
- Understand verbal and non-verbal features of communication and hold formal/informal conversations
- Interpret graphic elements used in academic texts
- Produce a coherent paragraph interpreting a figure/graph/chart/table
- Use language appropriate for description and interpretation of graphical elements

Unit 5

Lesson: Politics and the English Language: George Orwell
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Reading: Reading for comprehension. Writing: Writing structured essays on specific topics using suitable claims and evidences. Grammar and Vocabulary: Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes
At the end of the module, the learners will be able to

- Take notes while listening to a talk/lecture and make use of them to answer questions
- Make formal oral presentations using effective strategies
- Comprehend, discuss and respond to academic texts orally and in writing

- Produce a well-organized essay with adequate support and detail
- Edit short texts by correcting common errors

Prescribed Text:

Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan

Reference Books

- Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
- Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
- Raymond Murphy's English Grammar in Use Fourth Edition (2012) E-book
- Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
- Oxford Learners Dictionary, 12th Edition, 2011
- Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary (2014)
- Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler

Web links

www.englishclub.com
www.easyworldofenglish.com
www.languageguide.org/english/
www.bbc.co.uk/learningenglish
www.eslpod.com/index.html
www.myenglishpages.com

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

L	T	P	C
3	**0**	0	3

(20A05101T) PYTHON PROGRAMMING

Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Pythonprogramming concepts and itsapplications.
- Practical understanding of building different types of models and their evaluation

Unit 1

Basics of Python Programming-Features of Python, History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

Unit 2

Decision Control Statements-Conditional Branching Statements, Basic Loop Structures, Nested Loops, The break statement, The continue statement, The pass statement. The else statement used with loops.

Functions and Modules- Function Definition, Function Call, Variable Scope and Lifetime, The return statement, More on Defining Functions, Recursive functions, Modules, Packages in Python, Standard Library Modules.

Unit 3

Python Strings Revisited-Concatenating, Appending and Multiplying Strings, String formatting operator, Built in String Methods and Functions, Comparing Strings, Regular Expressions.

Data Structures- Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.

Unit 4

Classes and Objects- Classes and Objects, Class Method and self Argument, Class variables and Object Variables, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built-in Class Attributes, Class Methods, Static Methods.

Unit 5

Inheritance- Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces.

Error and Exception Handling- Introduction to Errors and Exceptions, Handling Exceptions, Raising Exceptions, Built- in and User defined Exceptions

Operator Overloading- Concept of Operator Overloading, Advantage of Operator Overloading, Implementing Operator Overloading.

Text books

	Author	Title	Publisher
1	Reema Thareja	Python Programming Using Problem Solving Approach	Oxford University Press

Reference books

	Author	Title	Publisher
1	Wesley Chun	Core Python Programming	Prentice Hall

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem	**L**	**T**	**P**	**C**
	1	**0**	2	2

(20A03101T) Engineering Drawing

Course Objectives:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Unit: I

Introduction to Engineering Drawing: Principles of Engineering Drawing and its Significance-Conventions in drawing-lettering - BIS conventions.

a)Conic sections including the rectangular hyperbola- general method only,

b) Cycloid, epicycloids and hypocycloid c) Involutes

Unit: II

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Unit: III

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

Unit: IV

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Unit: V

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Text Books:

1. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
3. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013

5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids. (L3)

Additional Sources

1. Youtube: http-sewor, Carleton. cag,kardos/88403/drawings.html conic sections-online, red woods.edu

Note: The distribution of marks shall be 30 for internal evaluation and 70 for end examination conducted by the University. In the Internal evaluation 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the submissions prepared in the class. Further, there shall be two midterm exams in a Semester evenly distributed over the syllabi for 15 marks. Total internal marks for midterm exams will be evaluated by giving 80% weightage to the better mid exam and 20% to the other mid examination. The sum of day to day evaluation and the internal test marks will be the final internal marks for the subject.

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem	**L**	**T**	**P**	**C**
	0	**0**	2	1

(20A03101P) Engineering Drawing Lab

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.

Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Text Books:

1. K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2. Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

Reference Books:

1. T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3. Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- use computers as a drafting tool. (L2)
- draw isometric and orthographic drawings using CAD packages. (L3)

Additional Sources

1. Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

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(20A52101P) COMMUNICATIVE ENGLISH LAB

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

- students will be exposed to a variety of self instructional, learner friendly modes of language learning
- students will learn better pronunciation through stress, intonation and rhythm
- students will be trained to use language effectively to face interviews, group discussions, public speaking
- students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

Course Outcomes

- CO1: Listening and repeating the sounds of English Language
- CO2: Understand the different aspects of the English language
- proficiency with emphasis on LSRW skills
- CO3: Apply communication skills through various language learning activities
- CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable
- division for better listening and speaking comprehension.
- CO5: Evaluate and exhibit acceptable etiquette essential in social and professional
- settings
- CO6: Create awareness on mother tongue influence and neutralize it in order to
- improve fluency in spoken English.

Unit 1

- Phonetics
- Reading comprehension
- Describing objects/places/persons

Learning Outcomes

At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit 2

- Role Play or Conversational Practice
- JAM
- Etiquettes of Telephonic Communication

Learning Outcomes
At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit 3

- Information Transfer
- Note Making and Note Taking
- E-mail Writing

Learning Outcomes
At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit4

- Group Discussions-1
- Resume Writing
- Debates

Learning Outcomes
At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit 5

- Oral Presentations
- Poster Presentation
- Interviews Skills-1

Learning Outcomes
At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors

Suggested Software

- Orell
- Walden Infotech
- Young India Films

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

www.esl-lab.com
www.englishmedialab.com
www.englishinteractive.net

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

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(20A56201P) Applied Physics Lab

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Note: In the following list, out of 15 experiments, any 10 experiments must be performed in a semester

List of Applied Physics Experiments

1. Determine the thickness of the wire using wedge shape method
   Experimental outcomes:
   Operates optical instrument like travelling microscope. (L2)
   Estimate the thickness of the wire using wedge shape method (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
2. Determination of the radius of curvature of the lens by Newton's ring method
   Experimental outcomes:
   Operates optical instrument like travelling microscope. (L2)
   Estimate the radius of curvature of the lens (L2)
   Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
   Plots the square of the diameter of a ring with no. of rings (L3)
3. Determination of wavelength by plane diffraction grating method
   Experimental outcomes:
   Operates optical instrument like spectrometer. (L2)
   Estimate the wavelength of the given source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)
4. Determination of dispersive power of prism.
   Experimental outcomes:
   Operates optical instrument like spectrometer. (L2)
   Estimate the refractive index and dispersive power of the given prism (L2)
   Identifies the formation of spectrum due to dispersion. (L2)
5. Determination of wavelength of LASER light using diffraction grating.
   Experimental outcomes:
   Operates various instrument (L2)
   Estimate the wavelength of laser source (L2)
   Identifies the formation of grating spectrum due diffraction. (L2)
6. Determination of particle size using LASER.

Experimental outcomes:
Operates various instrument (L2)
Estimate the Particles size using laser (L2)
Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)
Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)
8. Determination of dielectric constant by charging and discharging method.
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate thedielectric constantof the given substance. (L2)
Identifies the significance of dielectric constant in various devices. (L2)
9. Magnetic field along the axis of a circular coil carrying current –Stewart Gee's method.
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the magnetic field along the axis of a circular coil carrying current. (L2)
Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)
10. Measurement of magnetic susceptibility by Gouy's method
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the magnetic susceptibility of the given material. (L2)
Identifies the significance of magnetic susceptibility in various engineering applications. (L2)
11. Study the variation of B versus H by magnetizing the magnetic material (B-H curve)
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material. (L2)
Classifies the soft and hard magnetic material based on B-H curve. (L2)
Plots the magnetic field H and flux density B (L3)
12. To determine the resistivity of semiconductor by Four probe method
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the resistivity of a semiconductor. (L2)
Identifies the importance of four probe method in finding the resistivity of semiconductor. (L3)
13. To determine the energy gap of a semiconductor
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the energy gap of a semiconductor. (L2)
Illustrates the engineering applications of energy gap. (L3)
Plots 1/T with log R (L3)
14. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect.
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the charge carrier concentration and mobility in a semiconductor. (L2)

Illustrates the applications of Hall Effect. (L3)
Plots the voltage with current and voltage with magnetic field (L3)

15. Measurement of resistance with varying temperature - Thermistor.
Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the resistance with varying temperature. (L2)
Plots resistance R with temperature T (L3)

Course Outcomes:
The students will be able to

- Operate optical instruments like microscope and spectrometer (L2)
- Determine thickness of a hair/paper with the concept of interference (L2)
- Estimate the wavelength of different colors using diffraction grating and resolving power (L2)
- Plot the intensity of the magnetic field of circular coil carrying current with distance (L3)
- Evaluate the acceptance angle of an optical fiber and numerical aperture (L3)
- Determine the resistivity of the given semiconductor using four probe method (L3)
- Identify the type of semiconductor i.e., n-type or p-type using hall effect (L3)
- Calculate the band gap of a given semiconductor (L3)

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

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I B.Tech – II Sem	**L**	**T**	**P**	**C**
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(20A05101P) PYTHON PROGRAMMING LAB

Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- Practical understanding of building different types of models and their evaluation

List of Programs

1. Write Python Program to reverse a number and also find the Sum of digits in the reversed number.Prompt the user for input.

2. Write Pythonic code to check if a given year is a leap year or not.

3. Write Pythonic code to check if a given year is a leap year or not.

4. Write Python code to determine whether the given string is a Palindrome or not using slicing.

5. Write Python program to add two matrices and also find the transpose of the resultant matrix.

6. Write Python program to swap two numbers without using Intermediate/Temporary variables. Prompt the user for input.

7. Consider a Rectangle Class and Create Two Rectangle Objects. Write Python program to Check Whether the Area of the First Rectangle is Greater than Second by Overloading > Operator.

8. Write Python program to count the number of times an item appears in the list.

9. Write Python program to convert uppercase letters to lowercase and vice versa.

10. Write Python program to perform a linear search for a given Key number in the list and report Success or Failure.

11. Write Python program to sort numbers in a list in ascending order using Bubble Sort by passing the list as an argument to the function call.

12. Write Python program to Calculate Area and Perimeter of different shapes using Polymorphism.

KRISHNA UNIVERSITY MACHILIPATNAM

I B.Tech – II Sem

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3	0	0	0

(20A52201) UNIVERSAL HUMAN VALUES

Introduction:

This course discusses the role of human values in one's family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course names as"H-102 Universal Human Values 2 : "Understanding Harmony" is designed which may be covered in their III or IV Semester.

In the Induction Program, students would get an initial exposure to human values through Universal Human Values–I. This exposure is to be augmented by this compulsory full semester foundation course.

Learning Objectives:

- Exposure to the value of life, society and harmony
- Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
- Bringing transition from the present state to Universal Human Order
- Instill commitment and courage to act.
- Know about appropriate technologies and management patterns

COURSE TOPICS:

Unit 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Universal Human Values-I - Self-Exploration - content and process; 'Natural Acceptance' and Experiential Validation - self-exploration - Continuous Happiness and Prosperity - Human Aspirations - current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Learning Objectives:

- Define Self-Exploration
- Understand content, process & natural acceptance
- Apply method to fulfill human aspirations
- Analyze continuous happiness and prosperity
- Evaluate current scenario
- Create experiential validation

Unit 2: Understanding Harmony in the Human Being - Harmony in Myself!

human being as a co-existence of the sentient 'I' and the material 'Body' - the needs - happiness and physical facility -the Body as an instrument of 'I' - the characteristics and activities of 'I' and harmony in 'I' - the harmony of I with the Body

Learning Objectives:

- State human being as co-existence of the sentient
- Understand 'I" and the material 'Body'
- Apply the needs for happiness and physical facility
- Analyze the body as an instrument of 'I"
- Evaluate the characteristics and activities of 'I'
- Develop the harmony of I with the body

Unit 3: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

Values in human relationship; meaning of Justice; Trust and Respect; Difference between intention and competence; the other salient values in relationship - the harmony in the society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Learning Objectives:

- Remember the values in human relationship
- Understand meaning of Justice, Trust and Respect
- Apply values in relationship
- Analyze the harmony in the society
- Evaluate comprehensive human goals
- Create Universal Order

Unit 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

The harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all- pervasive space - Holistic perception of harmony at all levels of existence.

Learning Objectives:

- Define harmony in the Nature
- Understand Interconnectedness and mutual fulfillment
- Apply recyclability and self-regulation
- Analyze harmony at all levels of existence
- Evaluate existence and co-existence
- Create pervasive space

Unit 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Humanistic Education - Competence in professional ethics: professional competence - people friendly and eco-friendly production systems - appropriate technologies and management patterns for above production systems. Individuals as socially and ecologically responsible engineers, technologists and managers

Learning Objectives:

- Define Humanistic Education
- Understand competence in professional ethics
- Apply eco-friendly production systems
- Analyze management patterns
- Evaluate Individuals' behavior
- Create ecologically responsible engineers and managers

Prescribed Text Book

A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

Teachers' Manual for *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

.**Jeevan Vidya: EkParichaya, ANagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999**
1. HumanValues, A.N.Tripathi, NewAgeIntl.Publishers, NewDelhi, 2004.
2. The Story of Stuff (Book).
3. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj – Pandit Sunderlal 9. Rediscovering India - byDharampal
4. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
5. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland (English)

OUTCOMES OF THE COURSE:

By the end of the course,

CO1: Define terms like Natural Acceptance, Happiness and Prosperity

CO2: Understand awareness of oneself, and ones surroundings (family, society, nature)

CO3: Apply what they have learnt to their own self in different day-to-day settings in real life

CO4: Relate human values with human relationship and human society.

CO5: Justify the need for universal human values and harmonious existence

CO6: Develop as socially and ecologically responsible engineers