



**SVR ENGINEERING COLLEGE NANDYAL
(AUTONOMOUS)**

B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year 2024- 25 onwards)

Electrical & Electronics Engineering

I YEAR COURSE STRUCTURE AND SYLLABUS

B.TECH. – ELECTRICAL & ELECTRONICS ENGINEERING- COURSE STRUCTURE &**SYLLABUS – R24****(Applicable from the academic year 2024-25 onwards)****Electrical & Electronics Engineering**

B.Tech. – I Year I Semester						
S.No.	Course code	Title	L	T	P	Credits
1	24EN1001/24EN2001	Communicative English	2	0	0	2
2	24CH1001/24CH2001	Chemistry	3	0	0	3
3	24MA1001	Linear Algebra & Calculus	3	0	0	3
4	24CE1001/24CE2001	Basic Civil & Mechanical Engineering	3	0	0	3
5	24CS1001	Introduction to Programming	3	0	0	3
6	24EN1002/24EN2002	Communicative English Lab	0	0	2	1
7	24CH1002/24CH2002	Chemistry Lab	0	0	2	1
8	24ME1002/24ME2002	Engineering Workshop	0	0	3	1.5
9	24CS1003	Computer Programming Lab	0	0	3	1.5
10	24NA1002/24NA2002	Health and wellness, Yoga and Sports	-	-	1	0.5
Total			14	0	11	19.5

B.Tech. – I Year II Semester						
S.No.	Course code	Title	L/D	T	P	Credits
1	24PH1001/24PH2001	Engineering Physics	3	0	0	3
2	24MA2001	Differential Equations & Vector Calculus	3	0	0	3
3	24EE1001/24EE2001	Basic Electrical & Electronics Engineering	3	0	0	3
4	24ME1001/24ME2001	Engineering Graphics	1	0	4	3
5	24CS1002/24CS2002	IT Workshop	0	0	2	1
6	24EE2003	Electrical Circuit Analysis-I	3	0	0	3
7	24PH1002/24PH2002	Engineering Physics Lab	0	0	2	1
8	24EE1002/24EE2002	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	24EE2004	Electrical Circuit Analysis-I Lab	0	0	3	1.5
10	24NA1001/24NA2001	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
Total			13	0	15	20.5



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COMMUNICATIVE ENGLISH			
Subject Code: 24EN1001/24EN2001			
Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	2
Course Type	Theory	L-T-P-C	2-0-0-2
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

The main objective of introducing this course, Communicative English is to facilitate effective Listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry-ready

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.

CO2: Apply grammatical structures to formulate sentences and correct word forms.

CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.

CO4: Evaluate reading/listening texts and to write summaries based on global comprehension of the texts.

CO5: Create a coherent paragraph, essay, and resume.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3		2	2	1			2	1	2	1		3	1
CO2		2	1	1		1	2	1				1	2	
CO3		2		2	2		1			1				1
CO4	2		1	2	1	2	2		2		2		2	
CO5	3	2	2			2		2		1				1

UNIT-I:-

HUMAN VALUES

Lecture Hrs: 8

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



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<p>information. Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences. Grammar: Parts of Speech, Basic Sentence Structures-Forming questions Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.</p>		
UNIT: II	NATURE: The Brook by Alfred Tennyson (Poem)	Lecture Hrs: 9
<p>Listening: Answering a series of questions about main ideas 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: Structure of a paragraph - Paragraph writing Types (Expository ,Narrative , Descriptive , Persuasive and other types compare and contrast) Grammar: Cohesive devices- linkers use of articles and zero articles; prepositions Vocabulary; Homonyms, homophones, homographs</p>		
UNIT: III	BIOGRAPHY: Elon Musk Listening	Lecture Hrs: 09
<p>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, Note-making, paraphrasing Grammar: Verbs - tenses; subject-verb agreement; Vocabulary: Compound words, Collocations</p>		
UNIT: IV	INSPIRATION:	Lecture Hrs: 10
<p>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: Academic Writing (Letter Writing, Letter writing, creative writing, critical thinking) Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice Vocabulary: Words often confused</p>		
UNIT: V	MOTIVATION: The Power of Intrapersonal Communication (An Essay)	Lecture Hrs: 10
<p>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 Reading: Reading</p>		



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comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical and specific Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient BlackSwan, 2023 (Units 1,2 &3)
2. Empowering with Language by Cen gage Publications, 2023 (Units 4 & 5)
3. THE CAMBRIDGE ENGLISH IELTS BOOK (series 1---12) 4. Barron’s TOEFL IBT “17th edition

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Rout ledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.
5. Ashraf Rizvi, Effective Technical Communication 2 Edition

Web Resources:

GRAMMAR:

1. www.bbc.co.uk/learningenglish/
2. <https://dictionary.cambridge.org/grammar/british-grammar/>
3. www.eslpod.com/index.html
4. <https://www.learngrammar.net/>
5. <https://english4today.com/english-grammar-online-with-quizzes/>
6. <https://www.talkenglish.com/grammar/grammar.aspx>

VOCABULARY

1. <https://www.youtube.com/c/DailyVideoVocabulary/videos>
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA/

CHEMISTRY

Subject Code: 24CH1001/24CH2001

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3



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Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

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

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: To study the fundamentals of quantum mechanics.

CO2: Apply the principle of Band diagrams in the application of conductors and semiconductors.

CO3: Compare the materials of construction for battery and electro chemical sensors.

CO4: Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.

CO5: Explain the principles of spectrometry, Solid liquid chromatography in separation of solid and liquid mixtures. Summarize the concepts of Instrumental methods

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	1	2	1	2	1	2	1		3	2
CO2	3	2	1	1	2	1	2	1				1	2	
CO3	2	2	2	2	2	1	1			1	1	2		2
CO4	2	3	1	2	1	2	2		1	2			2	
CO5	3	2	2	3	3	2		2		1	2	3	1	2

UNIT-I:-

STRUCTURE AND BONDING MODELS

Lecture Hrs: 14

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory –bonding in homo-and hetero nuclear diatomic molecules – energy level diagrams of O₂ and CO, etc. π -molecular orbital's of butadiene and benzene, calculation of bond order.

UNIT: II

MODERN ENGINEERING MATERIALS

Lecture Hrs: 10

Semiconductors – Introduction, basic concept, applications in Everyday life, Industrial **Super conductors** - Introduction basic concept, applications in Energy storage, Quantum computing & Magnetic resonance imaging (MRI).

Super capacitors - Introduction, Basic Concept - Classification – Applications in Industrial, Transportation & Renewable energy

Nano materials - Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nano particles.



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UNIT: III	ELECTROCHEMISTRY AND APPLICATIONS	Lecture Hrs: 14
<p>Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, Potentiometer - potentiometric titrations (Redox titrations), concept of conductivity, conductivity cell, Conduct metric titrations (acid-base titrations).</p> <p>Electrochemical sensors – Potentiometric sensors with examples, Amperometric sensors with examples.</p> <p>Primary cells –Zinc-air battery - working of the batteries including cell reactions; Secondary cells –lithium-ion batteries-working of the batteries including cell reactions; Fuel cells: hydrogen – oxygen fuel cell–working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).</p>		
UNIT: IV	POLYMER CHEMISTRY	Lecture Hrs: 12
<p>Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.</p> <p>Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.</p> <p>Elastomers – Buna-S, Buna-N–preparation, properties and applications.</p> <p>Conducting polymers – poly acetylene, poly aniline – Mechanism of conduction and applications.</p> <p>Bio - Degradable polymers - Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA)</p>		
UNIT: V	INSTRUMENTAL METHODS AND APPLICATIONS	Lecture Hrs: 10
<p>Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation IR spectroscopy, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification, HPLC: Principle, Instrumentation and Applications</p>		
<p>Textbooks:</p> <ol style="list-style-type: none">1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.2. Peter Atkins, Juliode Paula and James Keeler, Atkins' Physical Chemistry,10/e, Oxford University Press, 2010.		
<p>Reference Books:</p> <ol style="list-style-type: none">1. Skoog and West, Principles of Instrumental Analysis,6/e,Thomson,2007.2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.20083. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition, 2007		



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LINEAR ALGEBRA & CALCULUS			
Subject Code: 24MA1001			
Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	Mechanical Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

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.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Develop and use of matrix algebra techniques that are needed by engineers for the practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in optimization.

CO4: Learn important tools of calculus in higher dimensions.

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	2	2					3	2	2	2	3
CO2	2	2	3	3		2	2	1				3	2	
CO3	2	3	2	3	2		1			3				2
CO4	2	2	2	2	2	2	3		3		3	3	2	
CO5	3	3	2	3		2				3	2			3

UNIT-I:-

Matrices

Lecture Hrs: 10

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Nonsingular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT: II

Eigen values, Eigen vectors and Orthogonal Transformation

Lecture Hrs: 08

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-



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Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT: III	Calculus	Lecture Hrs: 10
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.		

UNIT: IV	Partial differentiation and Applications (Multi variable calculus)	Lecture Hrs: 10
Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers		

UNIT: V	Multiple Integrals (Multi variable Calculus)	Lecture Hrs: 10
Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).		

Textbooks:

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R.K. Jain and S.R.K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Michael Greenberg, Pearson publishers, 9th edition.
5. Higher Engineering Mathematics, H. K. Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021).



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BASIC CIVIL & MECHANICAL ENGINEERING			
Subject Code: 24CE1001/24CE2001			
Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.

CO4: Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.

CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3		2	2	1			2	2	2	2		3	1
CO2		2	1	1		1	2	1				2	2	
CO3		2		2	2		1			1				1
CO4	2		1	2	1	2	2		1		1		2	
CO5	3	2	2			2		2		1				2



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PART A: BASIC CIVIL ENGINEERING

UNIT-I:-		Lecture Hrs: 08
<p>Basics of Civil Engineering Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials- Cement - Aggregate Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.</p>		
UNIT: II		Lecture Hrs: 08
<p>Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling - Simple problems on levelling and bearings-Contour mapping.</p>		
UNIT: III		Lecture Hrs: 08
<p>Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering. Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).</p>		
Textbooks:		
<p>Quantum Mechanics: Dual nature of matter – Heisenberg’s Uncertainty Principle – Significance and properties of wave function – Schrodinger’s time independent and dependent wave equations– Particle in a one-dimensional infinite potential well. Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits)–Quantum free electron theory – Electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy</p>		
Reference Books:		
<ol style="list-style-type: none"> 1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition. 2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016 		



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3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
1. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition.
2. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

Textbooks:

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives:

The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able

CO1: Understand the different manufacturing processes.

CO2: Explain the basics of thermal engineering and its applications.

CO3: Describe the working of different mechanical power transmission systems and power plants. **CO4:** Describe the basics of robotics and its applications.

UNIT I

Lecture Hrs: 08

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Lecture Hrs: 08

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicle

UNIT III

Lecture Hrs: 08

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject).

Textbooks:



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1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications(India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications,(India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis,Cengage learning India Pvt. Ltd.

Reference Books:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak MPandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India)Pvt. Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the M Engineering,Tata McGraw Hill publications (India) Pvt. Ltd.

Online Learning Resources:

Online Learning Resources:

<https://nptel.ac.in/courses/112103019>
<https://nptel.ac.in/courses/112105294>

INTRODUCTION TO PROGRAMMING

Subject Code: 24CS1001

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.



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- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.

CO2: Analyse a problem and develop an algorithm to solve it.

CO3: Implement various algorithms using the C programming language.

CO4: Understand more advanced features of C language.

CO5: Develop problem-solving skills and the ability to debug and optimize the code.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	3	2					3	2	3	3	3
CO2	2	2	3	3		2	2	1				2	2	
CO3	3	2	3	2	2		1			2				3
CO4	3	2	3	2	2	2	3		2		3	3	2	
CO5	2	2	2	3		2				3	2			2

UNIT-I:-

Introduction to Programming and Problem Solving

Lecture Hrs: 11

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program Algorithms,

Flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output Operations, Operators, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT: II

Control Structures

Lecture Hrs: 07

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT: III

Arrays and Strings

Lecture Hrs: 10

Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT: IV

Pointers & User Defined Data types

Lecture Hrs: 11

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions



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UNIT: V	Functions & File Handling	Lecture Hrs: 12
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Storage classes – auto, register, static, extern, Command line arguments. Basics of File Handling		
Note: The syllabus is designed with C Language as the fundamental language of implementation.		
Textbooks:		
1. The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, PrenticeHall, 1988 2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996 3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE,		
Reference Books:		
1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008. 2. Programming in C, Rema Theraja, Oxford, 2016, 2 nd edition		
Online Learning Resources:		
1. https://onlinecourses.nptel.ac.in/noc24_cs02/preview 2. https://www.w3schools.com/c/ 3. https://www.tutorialspoint.com/cprogramming/c_useful_resources.htm 4. https://www.geeksforgeeks.org/c-programming-language/		

COMMUNICATIVE ENGLISH LAB			
Subject Code: 24EN1002/24EN2002			
Year & Semester	I-Year, I-Semester	Year & Semester	B.Tech
Course Category	EEE Department	Course Category	1
Course Type	Lab	Course Type	0-0-2-1
Regulations	R24	Regulations	30 70 100

COURSE OBJECTIVES:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language



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learning. The students will get trained in the basic communication skills and also make them ready

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRWskills.

CO2: 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.

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.

CO5: Create effective resume and prepare themselves to face interviews in future.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	2	1	2			1		1	2	3	1
CO2			1	1		1		1				1	2	2
CO3	3	3	2	2	2	1	1			1			2	1
CO4		3	1	2		2			2		2	2	2	2
CO5	3	2	2	2		2		2		1			3	1

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules/Syllable division
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP(Statement of Purpose)
7. Group Discussions-Methods & Practice
8. Debates - Methods & Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden InfoTech
- Young India Films
- K-Van Solutions

Reference Books:

1. Raman Meenakshi , Sangeeta-Sharma. Technical Communication. Oxford Press.2018. .
2. Taylor Grant: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. J.Sethi & P.V.Dhamija. A Course in Phonetics and Spoken English,(2nd Ed)Kindle, 2013



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Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. <https://www.britishcouncil.in/english/online>
5. <http://www.letstalkpodcast.com/>
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. <https://www.youtube.com/c/ArnelsEverydayEnglish/featured>
8. <https://www.youtube.com/c/engvidAdam/featured>
9. <https://www.youtube.com/c/EnglishClass101/featured>
10. <https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists>
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw
12. <https://www.bbc.co.uk/learningenglish/>
13. https://www.talkenglish.com/speaking/basics/speaking_basics_ii.aspx
14. <https://www.englishclub.com/speaking/>

Voice & Accent:

1. <https://www.youtube.com/user/letstalkaccent/videos>
2. <https://www.youtube.com/c/EngLanguageClub/featured>
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

CHEMISTRY LAB

Subject Code: 24CH1002/24CH2002

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	2
Course Type	Lab	L-T-P-C	0-0-2-1
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

To verify the fundamental concepts with experiments.

COURSE OUTCOMES: A student after completion of the course will be able to



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CO1: Determine the cell constant and conductance of solution.

CO2: Prepare advanced polymer Bakelite materials.

CO3: Measure the strength of an acid present in secondary batteries.

CO4: Analyze the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb – Acid battery.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	3	3	2	2	1	2			2		1	2	3	1
CO2	2	2	3	1		1		2					2	2
CO3	3	3	2	2	2	1	2			1		3	2	1
CO4	2	3	3	2		2			2		2	2	2	2
CO5	3	2	2	2	3	2		2		1			3	2

List of Experiments:

1. Measurement of 10Dq by Spectro photometric method.
2. Conductometric Titration of Strong acid Vs Strong base.
3. Conductometric Titration of Weak acid vs. Strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometer - determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb - Acid battery.
7. Preparation of Bakelite.
8. Verify Lambert-Beer's law.
9. Wavelength measurement of sample through UV-Visible Spectroscopy.
10. Preparation of nano material's by precipitation method.
11. Estimation of Ferrous Iron by Dichrometry.
12. Identification of simple organic compounds by IR.

Note: Any TEN of the listed experiments are to be conducted.

References:

"Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes M.Thomas and B. Sivasankar, 2009

ENGINEERING WORKSHOP

Subject Code: 24ME1002/24ME2002

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1.5
Course Type	Lab	L-T-P-C	0-0-3-1.5



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Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

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

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Identify workshop tools and their operational capabilities.

CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, and foundry and welding.

CO3: Apply fitting operations in various applications.

CO4: Apply basic electrical engineering knowledge for House Wiring Practice

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	2	3	1	2			2		1	2	1	
CO2	1	1	1	1		1		1			2	1	2	2
CO3	3	3	2	2	2	1	1			3	1	1	2	
CO4	2	3	1	1	2	2			2		2	2	2	2
CO5	3	2	2	3		2		2	1	1	1		1	3

Syllabus

- Demonstration: Safety practices and precautions to be observed in workshop.
- Wood Working: Familiarity with different types of woods and tools used in wood working and make following joints.
 - Half – Lap joint
 - Mortise and Ten on 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.
 - Tapered tray
 - Conical funnel
 - Elbow pipe
 - Brazing
- Fitting: Familiarity with different types of tools used in fitting and do the following fitting exercises.
 - V-fit
 - Dovetail fit
 - Semi-circular fit
 - Bicycle tire puncture and change of two-wheeler tyre
- Electrical Wiring: Familiarity with different types of basic electrical circuits and makes the following connections.
 - Parallel and series
 - Two-way switch
 - God own lighting
 - Tube light
 - Three phase motor
 - Soldering of wires
- Foundry Trade: Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.



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7. Welding Shop: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.

8. Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published, 2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition.
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakashan, 2021-22.

Online Learning Resources:

<https://nptel.ac.in/courses/112104526>

COMPUTER PROGRAMMING LAB

Subject Code: 24CS1003

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1.5
Course Type	Lab	L-T-P-C	0-0-3-1.5
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.



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COURSE OUTCOMES: A student after completion of the course will be able to
CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyse a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	3	3	3	3	3		2	3	2	3	2	3
CO2	2	2	2	3	3	2			2	3	3	2	2	2
CO3	2	3	3	2	3	3			3	3	2	3	2	3
CO4	3	3	3	2	3	3	2		2	2	3	2	2	2
CO5	3	3	2	2	2	2		1	3	3	3	3	3	2

UNIT-I:-

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Lab1: Familiarization with programming environment

- i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- ii) Exposure to Turbo C, gcc
- iii) Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities: Tutorial 2: Problem-solving using Algorithms and Flow charts.

Lab 1: Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

- i) Sum and average of 3 numbers
- ii) Conversion of Fahrenheit to Celsius and vice versa
- iii) Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.



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- i) Finding the square root of a given number
- ii) Finding compound interest
- iii) Area of a triangle using heron's formulae
- iv) Distance travelled by an object

UNIT: II

WEEK 4

Objective:

Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial 4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity

i) Evaluate the following expressions.

a. $A+B*C+(D*E) + F*G$

b. $A/B*C-B+A*D/3$

c. $A+++B-- A$ d. $J= (i++) + (++i)$

ii) Find the maximum of three numbers using conditional operator

iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5

Objective:

Explore the full scope of different variants of “if construct” namely if-else, nullelse, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for “if construct”.

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: Problems involving if-then-else structures.

- i) Write a C program to find the max and min of four numbers using if-else.
- ii) Write a C program to generate electricity bill.
- iii) Find the roots of the quadratic equation.
- iv) Write a C program to simulate a calculator using switch case.
- v) Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: Iterative problems e.g., the sum of series

- i) Find the factorial of given number using any loop.
- ii) Find the given number is a prime or not.
- iii) Compute sine and cos series
- iv) Checking a number palindrome v) Construct a pyramid of numbers.



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UNIT: III	
WEEK 7: Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search. Suggested Experiments/Activities: Tutorial 7: 1 D Arrays: searching. Lab 7: 1D Array manipulation, linear search i) Find the min and max of a 1-D integer array. ii) Perform linear search on 1D array. iii) The reverse of a 1D integer array iv) Find 2's complement of the given binary number. v) Eliminate duplicate elements in an array.	
WEEK 8: Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays. Suggested Experiments/Activities: Tutorial 8: 2 D arrays, sorting and Strings. Lab 8: Matrix problems, String operations, Bubble sort i) Addition of two matrices ii) Multiplication two matrices iii) Determinant of matrix iv) Sort array elements using bubble sort v) Concatenate two strings without built-in functions vi) Reverse a string using built-in and without built-in string functions	
UNIT: IV	
WEEK9: Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C Tutorial 9: Pointers, structures and dynamic memory allocation Lab 9: Pointers and structures, memory dereference. i) Write a C program to find the sum of a 1D array using malloc() ii) Write a C program to find the total, average of n students using structures iii) Enter n students data using calloc() and display failed students list iv) Read student name and marks from the command line and display the student details along with the total. v) Write a C program to implement realloc()	



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WEEK 10:

Objective:

Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:

Tutorial 10: Bitfields, Self-Referential Structures, Linked lists

Lab10 : Bitfields, linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

- i) Create and display a singly linked list using self-referential structure.
- ii) Demonstrate the differences between structures and unions using a C program.
- iii) Write a C program to shift/rotate using bit fields.
- iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT: V

WEEK11:

Objective:

Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration Suggested Experiments/Activities:

Tutorial 11: Functions, call by value, scope and extent,

Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

- i) Write a C function to calculate NCR value.
- ii) Write a C function to find the length of a string.
- iii) Write a C function to transpose of a matrix.
- iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method
- v) illustrate the use of auto, static, register and external variables.

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial 12: Recursion, the structure of recursive calls

Lab 12: Recursive functions

- i) Write a recursive function to generate Fibonacci series.
- ii) Write a recursive function to find the lcm of two numbers
- iii) Write a recursive function to find the factorial of a number.
- iv) Write a C Program to implement Ackermann function using recursion.
- v) Write a recursive function to find the sum of series

WEEK 13:

Objective:



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Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers

Lab 13: Simple functions using Call by reference, Dangling pointers.

- i) Write a C program to swap two numbers using call by reference.
- ii) Demonstrate Dangling pointer problem using a C program
- iii) Write a C program to copy one string into another using pointer.
- iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.
- v) Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.

WEEK14:

Objective:

To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:

Tutorial 14: File handling

Lab 14: File operations

- i) Write a C program to write and read text into a file.
- ii) Write a C program to write and read text into a binary file using fread() and fwrite()
- iii) Copy the contents of one file to another file.
- iv) Write a C program to merge two files into the third file using command-line arguments.
- v) Find no. of lines, words and characters in a file
- vi) Write a C program to print last n characters of a given file

Textbooks:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

1. The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, PrenticeHall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE,



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Reference Books:

3. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
4. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition

Online Learning Resources:

5. https://onlinecourses.nptel.ac.in/noc24_cs02/preview
6. <https://www.w3schools.com/c/>
7. https://www.tutorialspoint.com/cprogramming/c_useful_resources.htm
8. <https://www.geeksforgeeks.org/c-programming-language/>

HEALTH AND WELLNESS, YOGA AND SPORTS

Subject Code: 24NA1002/24NA2002

Year & Semester	I-Year, I-Semester	Course	B.Tech
Course Category	EEE Department	Credits	0.5
Course Type	Theory	L-T-P-C	0-0-0-1
Regulations	R24	Internal Eval	100

COURSE OBJECTIVES:

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.

CO2: Demonstrate an understanding of health-related fitness components. .

CO3: Compare and contrast various activities that help enhance their health.

CO4: Assess current personal fitness levels. **CO5:** Develop Positive Personality

UNIT-I:-

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity
Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

- i) Organizing health awareness programmes in community
- ii) Preparation of health profile
- iii) Preparation of chart for balance diet for all age groups



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UNIT: II		
<p>Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.</p> <p>Activities: Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar</p>		
UNIT: III		
<p>Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.</p> <p>Activities:</p> <ol style="list-style-type: none">Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobicsPracticing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.		
Reference Books:		
<ol style="list-style-type: none">Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022T.K.V.Desikachar. The Heart of Yoga: Developing a Personal PracticeArchie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014		
General Guidelines:		
<ol style="list-style-type: none">Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.Institutes are required to provide sports instructor / yoga teacher to mentor the students.		
Evaluation Guidelines:		
<ul style="list-style-type: none">Evaluated for a total of 100 marks.A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks. <p>A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.</p>		



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ENGINEERING PHYSICS			
Subject Code: 24PH1001/24PH2001			
Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction

CO2: Familiarize with the basics of crystals and their structures.

CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.

CO4: Summarize various types of polarization of dielectrics and classify the magnetic materials.

CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids.

CO6: Identify the type of semiconductor using Hall Effect.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	2	3					3	2	3	3	3
CO2	3	2	3	3		2	2	1				2	3	
CO3	3	3	3	2	3		1			2				2
CO4	2	3	3	2	2	3	3		2		3	3	3	
CO5	2	2	3	2		2				3	2			3



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UNIT-I:-	Wave Optics	Lecture Hrs: 10
<p>Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton’s Rings,Determination of wavelength and refractive index.</p> <p>Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and Resolving power of Grating (Qualitative).</p> <p>Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol’s Prism -Half wave and Quarter wave plates.</p>		
UNIT: II	Crystallography and X-ray diffraction	Lecture Hrs: 08
<p>Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – Crystal systems (3D) – Coordination number - Packing fraction of SC, BCC & FCC - Miller indices – Separation between successive (hkl) planes.</p> <p>X-Ray diffraction: Bragg’s law-X-ray Diffractometer–Crystal structure determination by Laue’s and Powder methods</p>		
UNIT: III	Dielectric and Magnetic Materials	Lecture Hrs: 10
<p>Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation – Complex dielectric constant – Frequency dependence of polarization – Dielectric loss</p> <p>Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, Para, Ferro, Anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - Soft and Hard magnetic materials.</p>		
UNIT: IV	Quantum Mechanics and Free electron Theory	Lecture Hrs: 10
<p>Quantum Mechanics: Dual nature of matter – Heisenberg’s Uncertainty Principle – Significance and properties of wave function – Schrodinger’s time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.</p> <p>Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits)–Quantum free electron theory – Electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy</p>		



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UNIT: V	Semiconductor	Lecture Hrs: 10
<p>Semiconductors: Formation of energy bands – Classification of crystalline solids - 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 –Hall effect and its applications.</p>		
Textbooks:		
<ol style="list-style-type: none"> 1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019. 2. Engineering Physics-D. K. Bhattacharya and Poonam Tandon, Oxfordpress 1st Edition Edition 3. Introduction to Quantum Mechanics - David J. Griffiths and Darrell F. Schroeter, 3rd Edition, Cambridge University Press, 2018. 		
Reference Books:		
<ol style="list-style-type: none"> 1. Engineering Physics - B. K. Pandeyand, S. Chaturvedi, Cengage Learning 2021. 2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018. 3. Engineering Physics – Sanjay D Jain, D. Sahasrabudhe and Girish, University Press. 2010 4. Engineering Physics - M. R. Srinivasan, New Ageinter national publishers (2009). 		
Online Learning Resources:		
https://www.loc.gov/rr/scitech/selected-internet/physics.html		

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

Subject Code: 24MA2001

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To enlighten the learners in the concept of differential equations and multivariable calculus.



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- 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.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Solve the differential equations related to various engineering fields.

CO2: Solve the higher order linear differential equations related to various engineering fields.

CO3: Identify solution methods for partial differential equations that model physical processes.

CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence.

CO5: Estimate the work done against a field, circulation and flux using vector calculus.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	2	2					3	2	2	2	3
CO2	2	2	3	3		2	2	1				3	2	
CO3	2	3	2	3	2		1			3				2
CO4	2	2	2	2	2	2	3		3		3	3	2	
CO5	3	3	2	3		2				3	2			3

UNIT-I:-

Differential equations of first order and first degree

Lecture Hrs:

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay

UNIT: II

Linear differential equations of higher order (Constant Coefficients)

Lecture Hrs:

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to Electrical circuits, L-C-R Circuit problems and Simple Harmonic motion

UNIT: III

Partial Differential Equations

Lecture Hrs:

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients



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UNIT: IV	Vector differentiation	Lecture Hrs:
Scalar and vector point functions, Vector differential operator to scalar point functions- Gradient, Directional derivative, Vector differential operator to vector point functions- Divergence and Curl, vector identities.		
UNIT: V	Vector integration	Lecture Hrs:
Linear 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 related		
Textbooks:		
1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44 th Edition 2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10 th Edition.		
Reference Books:		
1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14 th Edition. 2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018. 3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5 th Edition. 4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5 th Edition (9th reprint). 5. Higher Engineering Mathematics, B. V. Ramana, McGraw Hill Education, 2017		

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Subject Code: 24EE1001/24EE2001

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100



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Department of Electrical & Electronics Engineering.

PART A: BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

To expose to the field of electrical & electronics engineering, laws and principles of electrical / electronic engineering and to acquire fundamental knowledge in the relevant field.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.

CO2: Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.

CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.

CO4: Analyze different electrical circuits, performance of machines and measuring instruments.

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	2	3	3					3	2	3	3	3
CO2	2	2	3	3		2	2	1				2	3	
CO3	2	3	2	2	3		1			2				2
CO4	3	2	3	2	2	3	3		2		3	3	3	
CO5	3	3	2	3		2				3	2			3

UNIT-I:-

DC & AC Circuits

Lecture Hrs: 10

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT: II

Machines and Measuring Instruments

Lecture Hrs: 10

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone Bridge.



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UNIT: III	Energy Resources, Electricity Bill & Safety Measures	Lecture Hrs: 10
<p>Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.</p> <p>Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of “unit” used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.</p> <p>Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.</p>		
<p>Textbooks:</p> <ol style="list-style-type: none">1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 20133. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third		
<p>Reference Books:</p> <ol style="list-style-type: none">1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 20203. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 20174. Basic Electrical and Electronics Engineering, S. K. Bhattacharya, Person Publications, 2018, Second Edition.		
<p>Web Resources:</p> <ol style="list-style-type: none">1. https://nptel.ac.in/courses/1081050532. https://nptel.ac.in/courses/108108076		
<h2>PART B: BASIC ELECTRONICS ENGINEERING</h2>		
<p>COURSE OBJECTIVES:</p> <p>This course provides the student with the fundamental skills to understand the principles of digital electronics, basics of semiconductor devices like diodes & transistors, characteristics and its applications.</p>		
<p>Course Outcomes: After the completion of the course students will be able to</p> <p>CO1: Apply the concept of science and mathematics to understand the working of diodes, transistors, and their applications.</p> <p>CO2: Explain the characteristics of diodes and transistors.</p> <p>CO3: Familiarize with the number systems, codes, Boolean algebra and logic gates.</p> <p>CO4: Understand the working mechanism of different combinational, sequential circuits and their role in the digital systems.</p>		



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Department of Electrical & Electronics Engineering.

UNIT: 1	SEMICONDUCTOR DEVICES	Lecture Hrs:
Introduction - Evolution of electronics – Vacuum tubes to Nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier. Introduction to MOSFET: Construction and V-I Characteristics.		
UNIT: II	BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION	Lecture Hrs:
Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple Zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system		
UNIT: III	DIGITAL ELECTRONICS	Lecture Hrs:
Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Simplification of Boolean functions using algebraic method, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only).		
Text books:		
1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021. 2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009		
Reference Books:		
1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010. 2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002. 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.		



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ENGINEERING GRAPHICS			
Subject Code: 24ME1001/24ME2001			
Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.

CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.

CO3: Understand and draw projection of solids in various positions in first quadrant.

CO4: Explain principles behind development of surfaces.

CO5: Prepare isometric and perspective sections of simple solids.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3		2	2	1			2	1	2	1		3	1
CO2		2	1	1		1	2	1				1	2	
CO3		2		2	2		1			1				1
CO4	2		1	2	1	2	2		2		2		2	
CO5	3	2	2			2		2		1				1



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UNIT-I:-		Lecture Hrs: 10
<p>Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods. Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involute, Normal and tangent to Curves.</p> <p>Scales: Plain scales, diagonal scales and vernier scales.</p>		
UNIT: II		Lecture Hrs: 08
<p>Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.</p> <p>Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes</p> <p>Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.</p>		
UNIT: III		Lecture Hrs: 10
<p>Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.</p>		
UNIT: IV		Lecture Hrs: 10
<p>Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.</p> <p>Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.</p>		
UNIT: V		Lecture Hrs: 10
<p>Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.</p> <p>Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD (Not for end examination).</p>		
Textbooks:		
1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.		
Reference Books:		
1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.		
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc, 2009.		
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, TataMcGraw Hill, 2017		



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Online Learning Resources:

<https://nptel.ac.in/courses/112103019>

<https://nptel.ac.in/courses/112105294>

IT WORKSHOP			
Subject Code: 24CS1002/24CS2002			
Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1
Course Type	Lab	L-T-P-C	0-0-2-1
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Perform Hardware troubleshooting.

CO2: Understand Hardware components and inter dependencies.

CO3: Safeguard computer systems from viruses/worms.

CO4: Document/ Presentation preparation.

CO5: Perform calculations using spreadsheets.

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO 11	PO 12	PS O1	PS O2
CO1	3	2	3	3	2	3	1		3	2	2	3	2	2
CO2	3	2	3	3	3	2			3		3	3		3
CO3	2	2	2	2	2	3			3	3	2	3	3	
CO4	3	2	3	3	3	3	2			2		2		3
CO5	2	2	3	2	2	2		2	2	2	2	3	2	



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PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to custom

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.



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Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint. **Task 2:** Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output



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to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Reference Books:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfinson and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, Pearson Education, 3rd edition.

ELECTRICAL CIRCUIT ANALYSIS-I

Subject Code: 24EE2003

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	3
Course Type	Theory	L-T-P-C	3-0-0-3
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

- To develop an understanding of the fundamental laws, elements of electrical circuits and to apply circuit analysis to DC and AC circuits.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Remembering the basic electrical elements and different fundamental laws.

CO2: Understand the network reduction techniques, transformations, concept of self inductance and mutual inductance, phasor diagrams, resonance and network theorems.

CO3: Apply the concepts to obtain various mathematical and graphical representations.

CO4: Analyse nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).

CO5: Evaluation of Network theorems, electrical, magnetic and single-phase circuits.



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COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO.1	3	3	2	2	1	2			1	2	1	2	3	1
CO.2	3	2	1	1		1		1		2		1	2	2
CO.3	3	3	2	2	2	1	1	2	2	2	2		2	1
CO.4	2	3	1	2	2	2	2	2	2	2	2	2	2	2
CO.5	3	2	2	2		2		2		1		1	3	1
UNIT-I:-	INTRODUCTION TO ELECTRICAL CIRCUITS											Lecture Hrs: 12		
Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources, node and mesh analysis.														
UNIT: II	MAGNETIC CIRCUITS											Lecture Hrs: 12		
Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction – concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.														
UNIT: III	SINGLE PHASE CIRCUITS											Lecture Hrs: 12		
Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of R, L and C circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit.														
UNIT: IV	RESONANCE AND LOCUS DIAGRAMS											Lecture Hrs: 10		
Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth; Locus diagram: RL, RC, RLC with R, L and C variables.														
UNIT: V	NETWORK THEOREMS (DC & AC EXCITATIONS)											Lecture Hrs: 12		
Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem														
Textbooks:														
1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.														



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2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

Reference Books:

1. Fundamentals of Electrical Circuits, Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India), 2013, Fifth Edition
2. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and K. Rao, Mc Graw Hill Education, 2017, Fifth Edition.
3. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.
4. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, Seventh Revised Edition.

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc23_ee81/preview
2. https://nptel.ac.in/courses/108104139_3
3. <https://nptel.ac.in/courses/108106172>
4. <https://nptel.ac.in/courses/117106108>

ENGINEERING PHYSICS LAB

Subject Code: 24PH1002/24PH2002

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1
Course Type	Lab	L-T-P-C	0-0-2-1
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Operate optical instruments like travelling microscope and spectrometer.

CO2: Estimate the wavelengths of different colours using diffraction grating.

CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.



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CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.

CO5: Calculate the band gap of a given semiconductor.

CO6: Identify the type of semiconductor using Hall Effect

COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	3	3	3	3	2		3	3	3	3	3	3
CO2	3	3	2	3	3	2			3	3	3	3	2	2
CO3	3	3	3	2	3	3			3	3	3	3	2	3
CO4	3	3	3	3	3	3	3		2	3	3	2	2	2
CO5	3	2	2	2	2	2		1	3	3	3	3	3	3

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photo electric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by nonuniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode



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References:
A Textbook of Practical Physics - S. Balasubramanian, M. N. Srinivasan, S. Chand Publishers, 2017.
Web Resources
www.vlab.co.in https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Subject Code: 24EE1002/24EE2002

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1.5
Course Type	Lab	L-T-P-C	0-0-3-1.5
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations

COURSE OUTCOMES: A student after completion of the course will be able to

- CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.
- CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.
- CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.
- CO4: Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.
- CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.



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COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	3	3	3	3	3	3	1		3	3	3	3	3	3
CO2	2	2	2	3	2	2			2	3	3	3	2	2
CO3	3	3	3	3	3	3			3	2	2	3	3	2
CO4	3	3	2	2	2	3	2		3	3	3	2	2	3
CO5	2	2	2	2	2	2		2	2	2	1	3	2	3

PART A: ELECTRICAL ENGINEERING LAB

List of Experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

References:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. . Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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

- CO1:** Identify & testing of various electronic components.
CO2: Understand the usage of electronic measuring instruments.
CO3: Plot and discuss the characteristics of various electron devices.
CO4: Explain the operation of a digital circuit

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations.
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied



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7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.

8. Verification of Truth Tables of S-R, J-K & D flip flops using respective ICs:

Tools / Equipment Required

DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

References:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software

ELECTRICAL CIRCUIT ANALYSIS-I LAB

Subject Code: 24EE2004

Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	1.5
Course Type	Lab	L-T-P-C	0-0-3-1.5
Regulations	R24	Continuous Eval	30
		Semester Eval	70
		Total Marks	100

COURSE OBJECTIVES:

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different condition

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.

CO2: Apply various theorems to compare practical results obtained with theoretical calculations.

CO3: Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.

CO4: Analyse different circuit characteristics with the help of fundamental laws and various configurations.

CO5: Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.



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COURSE OUTCOMES AND PROGRAM OUTCOMES MAPPING														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO.1	2	3	2	2	1	2	1		1	2	1	2	3	1
CO.2	3	2	1	3		1		1	1	1	1	1	2	2
CO.3	2	3	2	2	2	1	1	2	1	3	1	2	2	1
CO.4	3	3	3	2		2		2	2	2	2	2	1	1
CO.5	1	2	2	2	2	2	2	2	2	1		3	3	1

List of Experiments:

1. Verification of Kirchoff's circuit laws and node and mesh analysis.
2. Verification of network reduction techniques.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series and parallel resonance
7. Locus diagrams of R-L (L Variable) and R-C (C Variable) series circuits
8. Verification of Superposition theorem
9. Verification of Thevenin's and Norton's Theorems
10. Verification of Maximum power transfer theorem
11. Verification of Compensation theorem
12. Verification of Reciprocity and Millman's Theorems

Reference Books:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.
2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

HEALTH AND WELLNESS, YOGA AND SPORTS			
Subject Code: 24NA1002/24NA2002			
Year & Semester	I-Year, II-Semester	Course	B.Tech
Course Category	EEE Department	Credits	0.5
Course Type	Theory	L-T-P-C	0-0-0-1
Regulations	R24	Internal Eval	100



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COURSE OBJECTIVES:

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES: A student after completion of the course will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.

CO2: Demonstrate an understanding of health-related fitness components. .

CO3: Compare and contrast various activities that help enhance their health.

CO4: Assess current personal fitness levels.

CO5: Develop Positive Personality

UNIT-I:-

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

- iv) Organizing health awareness programmes in community
- v) Preparation of health profile
- vi) Preparation of chart for balance diet for all age groups

UNIT: II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT: III

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

- iii) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
- iv) Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014



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5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.

A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.