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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. Tech - COMPUTER SCIENCE & ENGINEERING with Specialization

INTERNET OF THINGS (IoT)

(Applicable for batches admitted from 2020-2021)

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COURSE STRUCTURE

I Year – I SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1	BS1101	Mathematics - I	3	0	0	3
2	BS1104	Applied Physics	3	0	0	3
3	HS1101	English	3	0	0	3
4	ES1101	Computer Engineering Workshop	1	0	4	3
5	ES1102	Problem Solving Using C	3	0	0	3
6	HS1102	Communication skills Lab	0	0	3	1.5
7	BS1105	Applied Physics Lab	0	0	3	1.5
8	ES1103	Problem Solving Using C Lab	0	0	3	1.5
Total Credits						**19.5**

I Year – II SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1	BS1202	Mathematics – II	3	0	0	3
2	BS1206	Applied Chemistry	3	0	0	3
3	ES1204	Problem Solving Using Python	3	0	0	3
4	ES1205	Basic Electrical& Electronics Engineering	3	0	0	3
5	ES1206	Digital Logic Design	3	0	0	3
6	ES1207	Problem Solving Using Python Lab	0	0	3	1.5
7	BS1207	Applied Chemistry Lab	0	0	3	1.5
8	ES1208	Digital Logic Design Lab	0	0	3	1.5
9	MC1203	Constitution of India	2	0	0	0
Total Credits						**19.5**

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - I Semester		L	T	P	C
		3	0	0	3
MATHEMATICS-I (BS1101)					

Course Objectives

- This course will illuminate the students in the concepts of calculus.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- 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.
- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- Apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5)

UNIT I: Sequences, Series and Mean value theorems: **(10 hrs)**

Sequences and Series: Convergences and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations of first order and first degree: **(10 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 – Orthogonal trajectories – Electrical circuits.

UNIT III: Linear differential equations of higher order: **(10 hrs)**

Non-homogeneous equations of higher order with constant coefficients – with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^nV(x) – Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT IV: Partial differentiation: **(10 hrs)**

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Mc Laurent's series expansion of functions of two variables. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

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UNIT V: Multiple integrals: **(8 hrs)**

Double and Triple integrals – Change of order of integration – Change of variables.

Applications: Finding Areas and Volumes.

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. **Joel Hass, Christopher Heil and Maurice D. Weir,** Thomas calculus, 14th Edition, Pearson.
3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press, 2013.
4. **Srimantha Pal, S C Bhunia,** Engineering Mathematics, Oxford University Press.

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I Year - I Semester		L	T	P	C
		3	0	0	3
APPLIED PHYSICS (BS1104)					

(For All Circuital Branches like ECE, EEE, CSE etc)

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

Interference: Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit, double slit - N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating(Qualitative).

Polarization: Introduction-Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit Outcomes:

The students will be able to

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

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

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping mechanisms – Ruby laser – He-Ne laser - Applications of lasers.

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

Unit Outcomes:

The students will be able to

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

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Unit III: Quantum Mechanics, Free Electron Theory and Band theory **10hrs**

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– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution- Density of states (3D) - Fermi energy.

Band theory of Solids: Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - V vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

Unit Outcomes:

The students will be able to

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

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

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility and Dielectric constant - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field- Clausius- Mossotti equation- Piezoelectricity.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Origin of permanent magnetic moment - Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials- Eddy currents- Engineering applications.

Unit Outcomes:

The students will be able to

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

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Unit – V: Semiconductors and Superconductors **10hrs**

Semiconductors: Introduction- Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – extrinsic semiconductors – density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation- Hall effect – Hall coefficient –Applications of Hall effect.
Superconductors: Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory (Qualitative) – Josephson effects (AC and DC) – SQUIDs
– High T_c superconductors – Applications of superconductors.

Unit Outcomes:

The students will be able to

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

Text books:

1. M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S.Chand Publications, 11th Edition 2019.
2. Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, 1st edition, Oxford press, 2015.
3. Applied Physics by P.K.Palanisamy 3rd edition, SciTech publications, 2013.

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker,10th edition, John Wiley &Sons, 2013.
2. Engineering Physics by M.R.Srinivasan, New Age international publishers, 2009.
3. Shatendra Sharma, Jyotsna Sharma, " Engineering Physics", 1st edition, Pearson Education, 2018.
4. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, 1st edition, University Press, 2010.
5. Semiconductor physics and devices- Basic principle – Donald A, Neamen, 3rd edition, Mc Graw Hill, 2003.
6. B.K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning, 2013.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - I Semester		L	T	P	C
		3	0	0	3
ENGLISH (HS1101)					

Course Objectives

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

Learning Outcomes

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

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

Unit 1:

Lesson-1: A Drawer full of happiness from "**Infotech English**", Maruthi Publications

Lesson-2: Deliverance by Premchand from "**The Individual Society",** Pearson Publications. (Non-detailed)

Listening: Listening to short audio texts and identifying the topic. Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introductions and introducing others.

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Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs;

nouns: countables and uncountables; singular and plural basic sentence structures; simple question form - wh-questions; word order in sentences.

Pronunciation: Vowels, Consonants, Plural markers and their realizations

Unit 2:

Lesson-1: Nehru's letter to his daughter Indira on her birthday from "**Infotech English**", Maruthi Publications

Lesson-2: Bosom Friend by HiraBansode from "**The Individual Society",** Pearson Publications. (Non-detailed)

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks.

Functional English: Greetings and leave takings.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word applications)

Grammar: Use of articles and zero article; prepositions.

Pronunciation: Past tense markers, word stress-di-syllabic words

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Unit 3:

Lesson-1: Stephen Hawking-Positivity 'Benchmark' from "**Infotech English**", Maruthi Publications

Lesson-2: Shakespeare's Sister by Virginia Woolf from "**The Individual Society",** Pearson Publications. (Non-detailed)

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Functional English: Complaining and Apologizing.

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Letter writing-types, format and principles of letter writing. E-mail etiquette, Writing CV's.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words

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

Pronunciation: word stress-poly-syllabic words

Unit 4:

Lesson-1: Liking a Tree, Unbowed: WangariMaathai-biography from "**Infotech English**", Maruthi Publications

Lesson-2: Telephone Conversation-Wole Soyinka from "**The Individual Society",** Pearson Publications**.** (Non-detailed)

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio); listening to audio-visual texts.

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Speaking: Role plays for practice of conversational English in academic contexts (formal and informal)

- asking for and giving information/directions. Functional English: Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Writing SOP, writing for media.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters.

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Pronunciation: Contrastive Stress

Unit 5:

Lesson-1: Stay Hungry-Stay foolish from "**Infotech English**", Maruthi Publications

Lesson-2: Still I Rise by Maya Angelou from **"The Individual Society",** Pearson Publications. (Non-detailed)

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.

Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques.

Reading for Writing: Writing academic proposals- writing research articles: format and style.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, matching emotions.

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

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Pronunciation: Stress in compound words

Prescribed text books for theory:

1. "**Infotech English**", Maruthi Publications. (Detailed)
2. "**The Individual Society",** Pearson Publications. (Non-detailed)

Reference books:

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.

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I Year - I Semester		L	T	P	C
		1	0	4	3
COMPUTER ENGINEERING WORKSHOP (ES1101)					

Course Objectives:

- To make the students aware of the basic hardware components of a computer and installation of operating system.
- To introduce Raptor Tool for flowchart creation.
- To introduce programming through Visual Programming tool using scratch.
- To get knowledge in awareness of cyber hygiene that is protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks.
- To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools.

UNIT I

Simple Computer System: Central processing unit, the further need of secondary storage, Types of memory, Hardware, Software and people. Peripheral Devices: Input, Output and storage, Data Preparation, Factors affecting input, Input devices, Output devices, Secondary devices, Communication between the CPU and Input/ Output devices.

TASK 1: PC Hardware: PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered.

Every student should 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. Every student should disassemble and assemble the PC back to working condition.

TASK 2: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

UNIT II

Problem Solving and Programming: Algorithm development, Flowcharts, Looping, some programming features, Pseudo code, the one-zero game, some structured programming concepts, documents. Programming Languages: Machine Language and assembly language, high -level and low level languages, Assemblers, Compilers, and Interpreters

TASK 3: Drawing flowcharts (Raptor Tool)

1. Create flowcharts for take-off landing of an Aeroplane.
2. Create a flowchart to validate an email id entered by user.
3. Create flowchart to print first 50 prime numbers.

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TASK 4: Productivity tool:LaTeX and Microsoft (MS) office: Importance of MS office, Details of the three tasks and features that should be covered in each, MS word, Power Point, Excel.

UNIT III

Operating systems: Introduction, Evolution of operating systems, , Command Interpreter, Popular operating systems- Microsoft DOS, Microsoft Windows, UNIX and Linux.
Introduction to Unix Shell Commands, directory management commands, file operations, users commands, Time and Date commands.

TASK 5: Operating System Installation: Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.
TASK 6: Basic Commands: Unix Shell Commands, directory management commands, file operations, users commands, Time and Date commands.

UNIT IV

Computer Networks: Introduction to computer Networks, Network topologies-Bus topology, star topology, Ring topology, Mesh topology, Hybrid topology, Types of Networks: Local area Network, Wide Area Networks, Metropolitan Networks, Campus/ Corporate Area Network, Personal Area Network, Network Devices- Hub, Repeater, Switch, Bridge, Router, Gateway, Network interface Card, Basic Networking Commands.

TASK 7: 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 how to access the websites and email.
TASK 8: Networking Commands:

ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget,route

UNIT V

Introduction to HTML : Basics in Web Design, Brief History of Internet ,World Wide Web Why create a web site ,Web Standards, HTML Documents ,Basic structure of an HTML document Creating an HTML document ,Mark up Tags ,Heading-Paragraphs ,Line Breaks ,HTML Tags.

Elements of HTML: Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia ,Working with Forms and controls.

TASK 9: Basic HTML tags

1.Head Section and Elements of Head Section, Paragraphs, Formatting Styles.
2. Colour tags, Creating Hyperlinks, Images, Tables, lists
3. HTML Forms, Form Attributes, Form Elements.

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TASK 10: 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. Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.
TASK 11: Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Text Books:

1. Fundamentals of Computers –ReemaThareja-Oxford higher education
2. Computer Fundamentals, Anita Goel, Pearson Education, 2017
3. PC Hardware Trouble Shooting Made Easy, TMH
4. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.

Reference Books:

1) An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning, 2003.
2) An Introduction to Computer studies –Noel Kalicharan-Cambridge

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I Year - I Semester		L	T	P	C
		3	0	0	3
PROBLEM SOLVING USING C (ES1102)					

Course Objectives

The objectives of Programming for Problem Solving Using C are

1) To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
2) To gain knowledge of the operators, selection, control statements and repetition in C
3) To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.
4) To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
5) To assimilate about File I/O and significance of functions

UNIT I

Introduction to Computers: Creating and running Programs, Computer Numbering System, Storing Integers, Storing Real Numbers

Introduction to the C Language: Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

Structure of a C Program: Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

UNIT II

Bitwise Operators: Exact Size Integer Types, Logical Bitwise Operators, Shift Operators.

Selection & Making Decisions: Logical Data and Operators, Two Way Selection, Multiway Selection, More Standard Functions

Repetition: Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

UNIT III

Arrays: Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

Strings: String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

Enumerated, Structure, and Union: The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application

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UNIT IV

Pointers: Introduction, Pointers to pointers, Compatibility, L value and R value

Pointer Applications: Arrays, and Pointers, Pointer Arithmetic and Arrays, Memory Allocation Function, Array of Pointers, Programming Application

Processor Commands: Processor Commands

UNIT V

Functions: Designing, Structured Programs, Function in C, User Defined Functions, Inter-Function Communication, Standard Functions, Passing Array to Functions, Passing Pointers to Functions, Recursion

Text Input / Output: Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

Binary Input / Output: Text versus Binary Streams, Standard Library, Functions for Files, Converting File Type.

COURSE OUTCOMES:

Upon the completion of the course the student will learn

1) To write algorithms and to draw flowcharts for solving problems
2) To convert flowcharts/algorithms to C Programs, compile and debug programs
3) To use different operators, data types and write programs that use two-way/ multi-way selection
4) To select the best loop construct for a given problem
5) To design and implement programs to analyze the different pointer applications
6) To decompose a problem into functions and to develop modular reusable code

   To apply File I/O operations

TEXT BOOKS:

1. Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE
2. The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson

REFERENCES:

1. Computer Fundamentals and Programming, Sumithabha Das, Mc Graw Hill
2. Programming in C, Ashok N. Kamthane, Amit Kamthane, Pearson
3. Computer Fundamentals and Programming in C, PradipDey, Manas Ghosh, OXFORD

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I Year - I Semester		L	T	P	C
		0	0	3	1.5
COMMUNICATION SKILLS LAB (HS1102)					

UNIT I:

Vowels, Consonants, Pronunciation, Phonetic Transcription

UNIT II:

Past tense markers, word stress-di-syllabic words, Poly-Syllabic words

UNIT III:

Rhythm & Intonation

UNIT IV:

Contrastive Stress (Homographs)

UNIT V:

Word Stress: Weak and Strong forms

Stress in compound words

References books:

1. Infotech English, Maruthi Publications (with Compact Disc).
2. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
3. English Pronunciation in use- Mark Hancock, Cambridge University Press.
4. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
5. English Pronunciation in use- Mark Hewings, Cambridge University Press.
6. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
7. English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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I Year - I Semester		L	T	P	C
		0	0	3	1.5
APPLIED PHYSIC LAB (BS1105)					

(For All Circuital Branches like CSE, ECE, EEE etc.)

(Any 10 of the following listed experiments)

List of Applied Physics Experiments

1. Determination of thickness of thin object by wedge method.
2. Determination of radius of curvature of a given plano convex lens by Newton's rings.
3. Determination of wavelengths of different spectral lines in mercury spectrumusing diffraction grating in normal incidence configuration.
4. Determination of dispersive power of the prism.
5. Determination of dielectric constant using charging and discharging method.
6. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
7. Determination of numerical aperture and acceptance angle of an optical fiber.
8. Determination of wavelength of Laser light using diffraction grating.
9. Estimation of Planck's constant using photoelectric effect.
10. Determination of the resistivity of semiconductor by four probe method.
11. To determine the energy gap of a semiconductor using p-n junction diode.
12. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method
13. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect .
14. Measurement of resistance of a semiconductor with varying temperature.
15. Resistivity of a Superconductor using four probe method & Meissner effect.

References:

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

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - I Semester		L	T	P	C
		0	0	3	1.5
PROBLEM SOLVING USING C LAB (ES1103)					

Course Objectives:

- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers & functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

By the end of the Lab, the student

- Gains Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.
- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

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Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

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Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( ) function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name.
3. Write a program in C to remove a file from the disk.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		3	0	0	3
MATHEMATICS - II (BS1202)					

Course Objectives

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- 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: At the end of the course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- Evaluate approximating the roots of polynomial and transcendental equations by different algorithms (L5)
- Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations (L3)

Unit I: Solving systems of linear equations, Eigen values and Eigen vectors:(10 hrs)
Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non-homogeneous equations linear equations – Gauss Elimination for solving system of equations – Eigen values and Eigen vectors and their properties.

Unit-II: Cayley-Hamilton theorem and Quadratic forms: (10 hrs)
Cayley- Hamilton theorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms –Reduction of quadratic form to canonical forms by orthogonal transformation. Singular values of a matrix, singular value decomposition (Ref. Book – 1).

UNIT III: Iterative methods: (8 hrs)
Introduction – Bisection method – Secant method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations) – Jacobi and Gauss-Seidel methods for solving system of equations.

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UNIT IV: Interpolation: (10 hrs)
Introduction – Errors in polynomial interpolation – Finite differences – Forward differences – Backward differences – Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula – Newton's divide difference formula.

UNIT V: Numerical integration and solution of ordinary differential equations: (10 hrs)
Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rule – Solution of ordinary differential equations by Taylor's series – Picard's method of successive approximations – Euler's method – Runge-Kutta method (second and fourth order).

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 43^{rd} Edition, Khanna Publishers.
2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. David Poole, Linear Algebra- A modern introduction, 4^{th} Edition, Cengage.
2. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.
3. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
4. Lawrence Turyn, Advanced Engineering Mathematics, CRC Press.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		3	0	0	3
APPLIED CHEMISTRY (BS1206)					

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

COURSE OBJECTIVES

- ***Importance*** of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- ***Outline*** the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- ***Explain*** the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- ***Recall*** the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- ***Outline*** the basics of computational chemistry and molecular switches

UNIT I: POLYMER TECHNOLOGY **8 hrs**

Polymerisation:- Introduction, methods of polymerization (emulsion and suspension), mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets, recycling of e-plastic waste (waste to wealth).

Elastomers:- Introduction, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics, conducting polymers, biodegradable polymers, biopolymers, biomedical polymers.

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

- ***Analyze*** the different types of composite plastic materials and ***interpret*** the mechanism of conduction in conducting polymers.

UNIT II: ELECTROCHEMICAL CELLS AND CORROSION **10 hrs**

Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode, calomel electrode, construction of glass electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Corrosion:-Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (proper designing and cathodic protection), Protective coatings (surface preparation, cathodic coatings, anodic coatings, electroplating and electroless plating

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[nickel]), Paints (constituents, functions and special paints).

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

- ***Utilize*** the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and c***ategorize*** the reasons for corrosion and study methods to control corrosion.

UNIT III: MATERIAL CHEMISTRY **10 hrs**

Part I ***: Non-elemental semiconducting materials***:- Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Insulators & magnetic materials: electrical insulators-ferro and ferri magnetism-Hall effect and its applications.

Part II:

Nano materials:- Introduction, sol-gel method, characterization by (Brunauer Emmet Teller [BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]), applications of graphene and fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals:- Introduction-types-applications.

Super conductors:-Type –I, Type II-characteristics and applications

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

- ***Synthesize*** nanomaterials for modern advances of engineering technology.
- ***Summarize the*** preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

UNIT IV: SPECTROSCOPIC TECHNIQUES & NON-CONVENTIONAL ENERGY SOURCES **10 hrs**

Part A: SPECTROSCOPIC TECHNIQUES

Electromagnetic spectrum-UV (laws of absorption, instrumentation, theory of electronic spectroscopy, Frank-condon principle, chromophores and auxochromes, intensity shifts, applications), FT-IR [instrumentation and differentiation of sp, sp^2, sp^3 and IR stretching of functional groups (alcohols, carbonyls, amines) applications], magnetic resonance imaging and CT scan (procedure & applications).

Part B: NON-CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

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

- ***Analyze*** the principles of different analytical instruments and their applications.
- ***Design*** models for energy by different natural sources.

UNIT V: ADVANCED CONCEPTS/TOPICS IN CHEMISTRY **8 hrs**

Computational chemistry: Introduction to computational chemistry, molecular modelling and docking studies

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***Molecular switches*:** characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor

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

- ***Obtain*** the knowledge of computational chemistry and molecular machines

Standard Books:

1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition).
2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019).
3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand & Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).

Reference:

1. K. Sesha Maheshwaramma and Mridula Chugh, "**Engineering Chemistry**", Pearson India Edn.
2. O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009).
3. CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, "**Textbook of Nanoscience and Nanotechnology**", University press (latest edition)

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year – II Semester		L	T	P	C
		3	0	0	3
PROBLEM SOLVING USING PYTHON (ES1204)					

Course Objectives:

The Objectives of Python Programming are

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with universal computer programming concepts like data types, containers
- To be familiarized with general computer programming concepts like conditional execution, loops & functions
- To be familiarized with general coding techniques and object-oriented programming

Course Outcomes:

- Develop essential programming skills in computer programming concepts like data types, containers
- Apply the basics of programming in the Python language
- Solve coding tasks related conditional execution, loops
- Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

UNIT I

Introduction: Introduction to Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, Operators. Type conversions, Expressions, More about Data Output.

Data Types, and Expression: Strings Assignment, and Comment, Numeric Data Types and Character Sets, Using functions and Modules.

Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

UNIT II

Control Statement: Definite iteration for Loop Formatting Text for output, Selection if and if else Statement Conditional Iteration The While Loop

Strings and Text Files: Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods Text Files.

UNIT III

List and Dictionaries: Lists, Defining Simple Functions, Dictionaries

Design with Function: Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System, Managing a Program's Namespace, Higher Order Function.

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Modules: Modules, Standard Modules, Packages.

UNIT IV

File Operations: Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, Programming using file operations

Object Oriented Programming: Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance , overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support

Design with Classes: Objects and Classes, Data modeling Examples, Case Study An ATM, Structuring Classes with Inheritance and Polymorphism

UNIT V

Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Redefined Clean-up Actions.

Graphical User Interfaces: The Behavior of Terminal Based Programs and GUI -Based, Programs, Coding Simple GUI-Based Programs, Other Useful GUI Resources.

Programming: Introduction to Programming Concepts with Scratch.

Text Books

1) Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage.
2) Python Programming: A Modern Approach, VamsiKurama, Pearson.

Reference Books:

1) Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press.
2) Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

e-Resources:

1) https://www.tutorialspoint.com/python3/python_tutorial.pdf

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I Year - II Semester		L	T	P	C
		3	0	0	3
BASIC ELECTRICAL & ELETRONICS ENGINEERING (ES1205)					

This course introduces the student, the fundamentals of electrical engineering concepts needed for future courses to be learned. The first three units cover the electric circuit laws, theorems and electrical machines. The next two units cover the principles of Electro static and electromechanical conversions, measurement of electrical quantities, electrical safety and batteries.

Course Objectives:

- Study the basic DC and AC networks used in electrical circuits.
- Study the basic concepts of electrical engineering.
- Demonstrate the concepts of electrical wiring and safety.
- To understand the principle of operation and construction details of DC machines & Transformers.
- To understand the principle of operation and construction details of alternator and 3-Phase Inductionmotor.

UNIT I

Introduction: Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work, power and energy.

Series – Parallel Circuits – Inductive & Capacitive networks.

UNIT II

DC Circuits: Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem), Superposition theorem. Simplifications of networks using series-parallel, Star/Delta transformation.

AC Circuits: AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor.

UNIT III

Dc Machines:

Principle of operation of DC generator – EMF equation - Types of DC machine – Torque equation – Applications.

Transformers:

Principle of operation and construction of single phase transformers – EMF equation – Losses.

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UNIT IV

AC Rotating Machines:

Principle of operation and construction of alternators– Types of alternators – Principle of operation ofsynchronous motor - Principle of operation of 3-Phase induction motor – Slip-torque characteristics - Efficiency –Applications.

Unit V

Rectifiers & Linear ICs:

PN junction diodes - Diode applications(Half wave and bridge rectifiers).Characteristics of operation amplifiers(OP-AMP) - application of OP-AMPs (inverting, non-inverting, integrator and differentiator).

Transistors:PNP and NPN junction transistor, transistor as an amplifier- Transistor amplifier - Frequency response of CEamplifier - Concepts of feedback amplifier.

Text Book(s)

1. B. L. Theraja, A Textbook of Electrical Technology, (vol. I), 1/e, Chand and Company Ltd., New Delhi, 2005.
2. V. K. Mehta, Basic Electrical Engineering, 6/e, S. Chand and Company Ltd., New Delhi, 2012.
3. J. Nagrath and Kothari, Theory and problems of Basic Electrical Engineering, 2/e, Prentice Hall of India Pvt. Ltd., 2017.
4. Electrical Technology by Surinder Pal Bali, Pearson Publications.
5. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.

References

1. T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, 2/e, Oxford University Press, 2011.
2. Smarjith Ghosh, Fundamentals of Electrical and Electronics Engineering, 1/e, Prentice Hall (India) Pvt. Ltd., 2004.
3.Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group
4. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications
5.Basic Electrical Engineering by Nagsarkar,Sukhija, Oxford Publications,2nd edition
6.Industrial Electronics by G.K. Mittal, PHI

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		3	0	0	3
DIGITAL LOGIC DESIGN (ES1206)					

Course Objective

- To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, theory of Boolean algebra and map method for minimization of switching functions.
- To introduce the basic tools for design of combinational and sequential digital logic.
- To learn simple digital circuits in preparation for computer engineering.

UNIT- I: Digital Systems and Binary Numbers
Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction, 4-bit codes: BCD, EXCESS 3, alphanumeric codes, 9's complement, 2421, etc..

UNIT -II: Concept of Boolean algebra
Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms.
Gate level Minimization
Map Method, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

UNIT- III:Combinational Logic
Introduction, Analysis Procedure, Binary Adder–Subtractor, Binary Multiplier, Decoders, Encoders, Multiplexers, Demultiplexers, Priority Encoder, Code Converters, Magnitude Comparator, HDL Models of Combinational Circuits.
Realization of Switching Functions Using PROM, PAL and PLA.

UNIT- IV: Synchronous Sequential Logic
Introduction to Sequential Circuits, Storage Elements: Latches, Flip-Flops, RS- Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D Flip Flops, Truth and Excitation Tables, Conversion of Flip Flops.

UNIT -V: Registers and Counters
Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter.

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OUTCOMES:

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

- An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
- An ability to understand the different switching algebra theorems and apply them forlogic functions.
- An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
- Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
- Students will be able to design various sequential circuits starting from flip-flop to registers and counters.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH.
3. Modern Digital Electronics, R.P. Jain, TMH.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		0	0	3	1.5
PROBLEM SOLVING USING PYTHON LAB (ES1207)					

Course Objectives:

The aim of Python Programming Lab is

- To acquire programming skills in core Python.
- To acquire Object Oriented Skills in Python
- To develop the skill of designing Graphical user Interfaces in Python
- To develop the ability to write database applications in Python

Course Outcomes:

By the end of this lab, the student is able to

- Write, Test and Debug Python Programs
- Use Conditionals and Loops for Python Programs
- Use functions and represent Compound data using Lists, Tuples and Dictionaries
- Use various applications using python

1)

2) Write a program that asks the user for a weight in kilograms and converts it to pounds. There are 2.2 pounds in a kilogram.

3) Write a program that asks the user to enter three numbers (use three separate input statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average.

4) Write a program that uses a *for* loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89.

5) Write a program that asks the user for their name and how many times to print it. The program should print out the user's name the specified number of times.

6) Use a *for* loop to print a triangle like the one below. Allow the user to specify how high the triangle should be.

```
*
**
***
****
```

6) Generate a random number between 1 and 10. Ask the user to guess the number and print a message based on whether they get it right or not.

7) Write a program that asks the user for two numbers and prints *Close* if the numbers are within .001 of each other and Not close otherwise.

8) Write a program that asks the user to enter a word and prints out whether that word contains any vowels.

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9) Write a program that asks the user to enter two strings of the same length. The program should then check to see if the strings are of the same length. If they are not, the program should print an appropriate message and exit. If they are of the same length, the program should alternate the characters of the two strings. For example, if the user enters *abcde* and *ABCDE* the program should print out *AaBbCcDdEe*.
10) Write a program that asks the user for a large integer and inserts commas into it according to the standard American convention for commas in large numbers. For instance, if the user enters 1000000, the output should be 1,000,000.
11) In algebraic expressions, the symbol for multiplication is often left out, as in 3x+4y or 3(x+5). Computers prefer those expressions to include the multiplication symbol, like 3*x+4*y or 3*(x+5). Write a program that asks the user for an algebraic expression and then inserts multiplication symbols where appropriate.
12) Write a program that generates a list of 20 random numbers between 1 and 100.
    Print the list.
    Print the average of the elements in the list.
    Print the largest and smallest values in the list.
    Print the second largest and second smallest entries in the list
    Print how many even numbers are in the list.
13) Write a program that asks the user for an integer and creates a list that consists of the factors of that integer.
14) Write a program that generates 100 random integers that are either 0 or 1. Then find the longest run of zeros, the largest number of zeros in a row. For instance, the longest run of zeros in [1,0,1,1,0,0,0,0,1,0,0] is 4.
15) Write a program that removes any repeated items from a list so that each item appears at most once. For instance, the list [1,1,2,3,4,3,0,0] would become [1,2,3,4,0].
16) Write a program that asks the user to enter a length in feet. The program should then give the user the option to convert from feet into inches, yards, miles, millimeters, centimeters, meters, or kilometers. Say if the user enters a 1, then the program converts to inches, if they enter a 2, then the program converts to yards, etc. While this can be done with if statements,it is much shorter with lists and it is also easier to add new conversions if you use lists.
17) Write a function called *sum_digits* that is given an integer num and returns the sum of the digits of num.
18) Write a function called *first_diff* that is given two strings and returns the first location in which the strings differ. If the strings are identical, it should return -1.
19) Write a function called *number_of_factors* that takes an integer and returns how many factors the number has.
20) Write a function called *is_sorted* that is given a list and returns True if the list is sorted and False otherwise.

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21) Write a function called root that is given a number x and an integer n and returns $x^{1/n}$. In the function definition, set the default value of n to 2.
22) Write a function called primes that is given a number n and returns a list of the first n primes. Let the default value of n be 100.
23) Write a function called merge that takes two already sorted lists of possibly different lengths, and merges them into a single sorted list.

    Do this using the sort method. (b) Do this without using the sort method.
24) Write a program that asks the user for a word and finds all the smaller words that can be made from the letters of that word. The number of occurrences of a letter in a smaller word can't exceed the number of occurrences of the letter in the user's word.
25) Write a program that reads a file consisting of email addresses, each on its own line. Your program should print out a string consisting of those email addresses separated by semicolons.
26) Write a program that reads a list of temperatures from a file called *temps.txt*, converts those temperatures to Fahrenheit, and writes the results to a file called ftemps.txt.
27) Write a class called Product. The class should have fields called name, amount, and price, holding the product's name, the number of items of that product in stock, and the regular price of the product. There should be a method *get_price* that receives the number of items to be bought and returns a the cost of buying that many items, where the regular price is charged for orders of less than 10 items, a 10% discount is applied for orders of between 10 and 99 items, and a 20% discount is applied for orders of 100 or more items. There should also be a method called *make_purchase* that receives the number of items to be bought and decreases amount by that much.

28) Write a class called Time whose only field is a time in seconds. It should have a method called *convert_to_minutes* that returns a string of minutes and seconds formatted as in the following example: if seconds is 230, the method should return '5:50'. It should also have a method called *convert_to_hours* that returns a string of hours, minutes, and seconds formatted analogously to the previous method.

29) Write a class called Converter. The user will pass a length and a unit when declaring an object from the class—for example, c = Converter(9,'inches'). The possible units are inches, feet, yards, miles, kilometers, meters, centimeters, and millimeters. For each of these units there should be a method that returns the length converted into those units. For example, using the Converter object created above, the user could call c.feet() and should get 0.75 as the result.
30) Write a Python class to implement pow(x, n).
31) Write a Python class to reverse a string word by word.
32) Write a program that opens a file dialog that allows you to select a text file. The program then displays the contents of the file in a textbox.
33) Write a program to demonstrate Try/except/else.
34) Write a program to demonstrate try/finally and with/as.

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I Year - II Semester		L	T	P	C
		0	0	3	1.5

APPLIED CHEMISTRY LAB (BS1207)

Introduction to Chemistry laboratory – Molarity, normality, primary, secondary standard solutions,
volumetric titrations, quantitative analysis
Determination of HCl using standard Na_2CO_3 solution.

1. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
2. Determination of Mn^{+2} using standard oxalic acid solution.
3. Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.
4. Determination of Cu^{+2} using standard hypo solution.
5. Determination of temporary and permanent hardness of water using standard EDTA solution.
6. Determination of Fe^{+3} by a colorimetric method.
7. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
8. Determination of iso-electric point of amino acids using pH-metry method/conductometric method.
9. Determination of the concentration of strong acid vs strong base (by conductometric method).
10. Determination of strong acid vs strong base (by potentiometric method).
11. Determination of Mg^{+2} present in an antacid.
12. Determination of $CaCO_3$ present in an egg shell.
13. Estimation of Vitamin C.
14. Determination of phosphoric content in soft drinks.
15. Adsorption of acetic acid by charcoal.
16. Preparation of nylon-6, 6 and Bakelite (demonstration only).

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Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		1	0	4	1.5
DIGITAL LOGIC DESIGN LAB (ES1208)					

COURSE OBJECTIVES:

The objectives of this course are to:

- Introduce the concept of digital and binary systems.
- To know the concepts of Combinational circuits.
- Be able to design and analyze Sequential logic circuits.
- To understand the concepts of flip-flops, registers and counters.
- Students will learn and understand the basics of logic gates and circuits.

COURSE OUTCOMES:

- A student who successfully fulfils the course requirements will have demonstrated:
- CO1: To learn about the basics of gates.
- CO2: To understand, analyse and design the basic digital circuits and any digital design in real
- time applications.
- CO3: Construct basic combinational circuits and verify their functionalities.
- CO4: Apply the design procedures to design basic sequential circuits.
- CO5: An ability to measure and record the experimental data, analyse the results, and prepare

a formal laboratory report.

List of Experiments:

1. Verification of Basic Logic Gates.
2. Implementing all individual gates with Universal Gates NAND & NOR.
3. Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws.
4. Design a Combinational Logic circuit for 8x1 MUX and verify the truth table.
5. Verify the data read and data write operations for the IC 74189.
6. Construct Half Adder and Full Adder using Half Adder and verify the truth table.
7. Design a 4-bit Adder/Subtractor.
8. Design and realization of 4-bit comparator.
9. Design and implement a 3 to 8 decoder using gates.
10. Design and realization of a 4-bit Gray to Binary and Binary to Gray converter.
11. Implementation of Master Slave Flip-Flop with J-K Flip- Flop and verify the truth table for race around condition.

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12. Design a Decade Counter and verify the truth table.
13. Design and implement a 4-bit shift register using Flip flops.
14. Design and Verify the 4-bit synchronous.
15. Design and verify 4-bit ripple counter (Asynchronous).

TEXT BOOKS:

1. Digital Design ,4/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.
3. Digital Logic Design, Leach, Malvino, Saha,TMH.

REFERENCES:

1. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
2. Verilog HDL primer, Jaya Bhaskar, PEA.
3. Modern Digital Electronics, R.P. Jain, TMH.
4. Digital Fundamentals, Thomas L. Floyd, Pearson Education, ISBN:9788131734483.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

I Year - II Semester		L	T	P	C
		2	0	0	0
CONSTITUTION OF INDIA (MC1203)					

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court
- Controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative.

UNIT-I

Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Learning outcomes:

After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha, The Supreme Court and High Court: Powers and Functions;

Learning outcomes:-After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

Learning outcomes:-After completion of this unit student will

- Understand the structure of state government
- Analyze the role Governor and Chief Minister
- Explain the role of state Secretariat
- Differentiate between structure and functions of state secretariat

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: ZilaPanchayat, Elected officials and their roles, CEO ZilaPanchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

Learning outcomes:-After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration role and importance
- Analyze the role of Myer and elected representatives of Municipalities
- Evaluate Zillapanchayat block level organisation

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:,Functions of Commissions for the welfare of SC/ST/OBC and women

Learning outcomes:-After completion of this unit student will

- Know the role of Election Commission apply knowledge
- Contrast and compare the role of Chief Election commissioner and Commissiononerate
- Analyze role of state election commission
- Evaluate various commissions of viz SC/ST/OBC and women

References:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt.Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government andPolitics Hans
7. J. Raj IndianGovernment and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right),
   Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

Constitution Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of
- India.
- Analyze the decentralization of power between central, state and local self-government.

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DEPARTMENT OF CSE – INTERNET OF THINGS (IoT)

- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

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