



Estd:1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)

UG Programmes CE,CSE,ECE,EEE,IT & ME are Accredited by NBA

CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

Regulation: R20		I / IV - B.Tech. I - Semester							
CSE (IoT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2022-23 admitted Batch onwards)									
Course Code	Course Name	Category	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20HS1101	English	HS	3	3	0	0	30	70	100
B20BS1101	Mathematics -I	BS	3	3	0	0	30	70	100
B20BS1102	Applied Physics	BS	3	3	0	0	30	70	100
B20CS1101	Programming for Problem Solving Using C	ES	3	3	0	0	30	70	100
B20AM1101	Computer Engineering Workshop	ES	3	1	0	4	15	35	50
B20CS1103	Programming for Problem Solving Using C Lab	ES	1.5	0	0	3	15	35	50
B20BS1107	Applied Physics Lab	BS	1.5	0	0	3	15	35	50
B20HS1103	Communication Skills Lab	HS	1.5	0	0	3	15	35	50
TOTAL			19.5	13	0	13	180	420	600

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20HS1101	HS	3	--	--	3	30	70	3Hrs

ENGLISH

(Common to AIDS, CE, CIC, CSE, ECE, EEE, IT, ME, AIML & CSG)

Introduction:

The course is designed to train students in receptive as well as productive skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as GRE, GMAT, IELTS, TOEFL and BEC besides being able to handle the writing tasks and verbal ability components of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives:

1.	To facilitate effective listening skills for better comprehension of varied accents spoken at national and global levels.
2.	To focus on appropriate reading strategies for better comprehension of multiple texts and authentic materials.
3.	To improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations.
4.	To impart effective strategies for good writing and demonstrate the same in both summarizing and analyzing; writing well-organized essays, letters, e-mails, CV's and reports.
5.	To provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Course Outcomes: At the end of the Course the students will be able to

S.No	Outcome	Knowledge Level
1.	Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.	K3
2.	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information.	K3
3.	Build confidence and adapt themselves to the social and public discourses, discussions and presentations.	K3
4.	Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication.	K3
5.	Construct sentences using proper grammatical structures and correct word forms.	K4

SYLLABUS

UNIT-I (8 Hrs)	<p>Lesson: A Drawer full of happiness from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.</p> <p>Speaking: Self- introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.</p> <p>Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.</p> <p>Reading for Writing: Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.</p> <p>Grammar: Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.</p>
UNIT-II (8 Hrs)	<p>Lesson-: Nehru's letter to his daughter, Indira on her birthday from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.</p> <p>Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.</p> <p>Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.</p> <p>Reading for Writing: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.</p> <p>Grammar: Articles, prepositions, conjunctions, use of synonyms and antonyms.</p>
UNIT-III (8 Hrs)	<p>Lesson: Stephen Hawking- Positivity 'Benchmark' from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Listening for global comprehension and summarizing what is listened to both in speaking and writing.</p> <p>Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: complaining and apologizing.</p> <p>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.</p> <p>Reading for Writing: Letter writing- types, format and principles of letter writing,</p>

	<p>E-mail etiquette, writing a Resume/CV and covering letter.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, word applications, sequencing of words.</p> <p>Grammar: Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).</p>
<p>UNIT-IV (8 Hrs)</p>	<p>Lesson: Liking a Tree, Unbowed: Wangari Maathai biography from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.</p> <p>Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.</p> <p>Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.</p> <p>Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.</p> <p>Grammar: Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.</p>
<p>UNIT-V (8 Hrs)</p>	<p>Lesson: Stay Hungry–Stay Foolish from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.</p> <p>Speaking: Formal oral presentations on topics from academic contexts– with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.</p> <p>Reading: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.</p> <p>Reading for Writing: Report writing, writing academic proposals- writing research articles: format and style.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.</p> <p>Grammar: Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).</p>

Text Books:	
1	<i>Infotech English</i> , Maruthi Publications.
Reference Books:	
1.	Bailey, Stephen. <i>Academic writing: A Handbook for International Students</i> . Routledge,2014.
2.	Chase. Becky Tarver. <i>Pathways: Listening, Speaking and Critical Thinking</i> . Heinley ELT;2nd Edition, 2018.
3.	Skilful Level 2 Reading & Writing Student’s Book Pack (B1). Macmillan Educational.
4.	Hewing, Martin. <i>Cambridge Academic English (B2)</i> . CUP, 2012.
E-Resources:	
Grammar/Listening/Writing	
	1-language.com
	http://www.5minuteenglish.com/
	https://www.englishpractice.com/
Grammar/Vocabulary	
	English Language Learning Online
	http://www.bbc.co.uk/learningenglish/
	http://www.better-english.com/
	http://www.nonstopenglish.com/
	https://www.vocabulary.com/
	BBC Vocabulary Games
	Free Rice Vocabulary Game
Reading	
	https://www.usingenglish.com/comprehension/
	https://www.englishclub.com/reading/short-stories.htm
	https://www.english-online.at/
Listening	
	https://learningenglish.voanews.com/z/3613
	http://www.englishmedialab.com/listening.html
Speaking	
	https://www.talkenglish.com/
	BBC Learning English – Pronunciation tips
	Merriam-Webster – Perfect pronunciation Exercises
All Skills	
	https://www.englishclub.com/
	http://www.world-english.org/
	http://learnenglish.britishcouncil.org/
	Online Dictionaries
	Cambridge dictionary online
	MacMillan dictionary
	Oxford learner’s dictionaries

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1101	BS	3	--	--	3	30	70	3 Hrs.
MATHEMATICS-I								
(LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS)								
(Common to AIDS, CE, CIC, CSE, ECE, EEE, IT, ME, AIML & CSG)								
Pre-requisites: Calculus of functions of a single variable and Matrices.								
Course Objectives: Students are expected to learn								
1.	Concepts of linear algebra and methods of solution of linear simultaneous algebraic equations.							
2.	Eigen values, Eigen vectors and quadratic forms.							
3.	First order ordinary differential equations and some simple geometrical and physical applications.							
4.	Orthogonal trajectories, Simple electrical circuits and Newton's law of cooling.							
5.	Methods of solution of linear higher order ordinary differential equations.							
6.	Concepts of Laplace transforms and their applications for solving ODE.							
Course Outcomes: At the end of the course the student will be able to								
S.No	Outcome							Knowledge Level
1.	Solve a given system of linear algebraic equations							K3
2.	Determine Eigen values and Eigen vectors of a system represented by a matrix.							K3
3.	Solve ordinary differential equations of first order and first degree.							K3
4.	Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits							K3
5.	Solve linear ordinary differential equations of second order and higher order.							K3
6.	Determine Laplace transform, inverse Laplace transform and solve linear ODE							K3
SYLLABUS								
UNIT-I (10 Hrs)	Linear systems of equations: Rank, Echelon form, Normal form, consistency of system of linear equations, Solution of linear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.							
UNIT-II (10 Hrs)	Eigen values - Eigen vectors and Quadratic forms: Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms, Reduction of a Quadratic form to Canonical form.							
UNIT-III (10 Hrs)	Differential equations of first order and first degree: Linear, Bernoulli, Exact, Reducible to exact types. Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)							

UNIT-IV (8 Hrs)	Linear differential equations of higher order: Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $x V(x)$. Simultaneous differential equations with constant coefficients, Method of Variation of parameters.
UNIT-V (12 Hrs)	Laplace transformation: Laplace transforms of standard functions, properties, transforms of $tf(t)$, $f(t)/t$, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function; Inverse Laplace transforms, convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.
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.
3.	N.P.Bali&Manish Goyal, Engineering Mathematics, Lakshmi Publications.
Reference Books:	
1.	V. Ravindranath&P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House.
2.	Erwin Kreyszig, Advanced Engineering Mathematics, 10 th Edition, Wiley-India.
3.	Michael Greenberg, Advanced Engineering Mathematics, 9 th edition, Pearson.
4.	Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
5.	Peter O'Neil, Advanced Engineering Mathematics, Cengage Learning.
6.	Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
7.	Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1102	BS	3	--	--	3	30	70	3 Hrs.

APPLIED PHYSICS

(Common to AIDS, CE, CIC, EEE & ME)

Course Objectives:

1.	Impart the knowledge in basic concepts of wave optics through the Phenomena of interference and diffraction, basic concepts and properties of dielectric and magnetic materials and semiconductors.
2.	Familiarize the student with modern technologies like lasers, optical fibers and ultrasonics with an understanding of the science behind.
3.	Impart the elementary concepts of nanomaterials and their significance in different engineering branches.

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

S.No	Outcome	Knowledge Level
1.	Interpret the behavior of light radiation in interference and diffraction Phenomena and their applications.	K3
2.	Explain the classification and properties of dielectric and magnetic materials suitable for engineering applications.	K3
3.	Understand the basics of modern optical technologies like lasers and optical fibers and their utility in various fields.	K3
4.	Explain the important aspects of semiconductors and electrical conductivity in them.	K3
5.	Understand the basics of technology of Ultrasonics in various fields and demonstrate the synthesis and applications of nanomaterials.	K3

SYLLABUS

UNIT-I (10 Hrs)	WAVE OPTICS
	<p>Interference: Principle of super position. Interference of light, interference in thin films (reflected light) – Wedge film and Newton`s rings – Applications</p> <p>Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit, Diffraction grating, grating spectrum. Missing order, Resolving power, Rayleigh`s Criterion, Resolving power of Grating</p>

UNIT-II (10 Hrs)	<p>DIELECTRICS AND MAGNETICS</p> <p>Dielectrics: Introduction to dielectrics, Electric Polarization, Dielectric polarizability, Susceptibility, Dielectric constant, Types of Polarization, Frequency dependence of Polarization, Internal field in a dielectric, Claussius and Mosotti equation, Applications of dielectrics.</p> <p>Magnetics: Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials (Dia , Para, Ferro, Antiferro and ferri), Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications.</p>
UNIT-III (10 Hrs)	<p>LASERS AND FIBER OPTICS</p> <p>Lasers: Introduction, Interaction of radiation with matter, condition for light amplification, Einstein’s relations. Requirements of lasers device Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.</p> <p>Fiber Optics: Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.</p>
UNIT-IV (9 Hrs)	<p>SEMICONDUCTORS</p> <p>Introduction, intrinsic semi conductors, density of charge carries, Fermi energy, Electrical conductivity – Extrinsic semi conductors – P-type and N-type, Density of charge carriers, dependence of Fermi energy on carrier concentration and temperature, direct and indirect band – gap semi conductors, Hall effect, Applications of Hall effect. Drift and diffusion currents, Continuity equation, applications of semi conductors.</p>
UNIT-V (9 Hrs)	<p>ULTRASONICS AND NANOMATERIALS</p> <p>Ultrasonics: Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating – determination of wavelength and velocity of ultrasonics, applications of ultrasonics.</p> <p>Nanomaterials: Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemical Vapour Deposition and Sol – Gel methods, Characterization techniques for nano materials – The scanning tunneling microscopy (STM) and The atomic force microscopy (AFM), Carbon nanotubes (CNTS), Applications of Nano materials.</p>
Text Books:	
1.	A text Book of Engineering Physics – M.N. Avadhanulu and P.G.Kshirasagar.-S.Chand Publications 2017
2.	Engineering Physics by HK Malik and A.K.Singh. McGrawhill Publishing Company Ltd.
3.	Engineering Physics by V.Rajendran. McGrawhill Education (India)Pvt Ltd.
Reference Books:	
1.	Introduction to Solid State Physics by Charles Kittel , Wiley Publications 2011

2.	Semiconductors Devices – Physics and Technology by S.M.Sze , Wiley Publications 2008
3.	Text book of Nano Science and Nano technology by TataMcGrawhill 2013.
4.	Optical fiber communications by Gerd Keiser, Tata McGraw hill 2008.
e-Resources:	
1.	http://library.iiti.ac.in/
2.	https://onlinecourses.nptel.ac.in/



Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS1101	ES	3	--	--	3	30	70	3 Hrs.

PROGRAMMING FOR PROBLEM SOLVING USING C

(Common to AIDS, CIC, CSE, ECE, IT, AIML & CSG)

Course Objectives:

1.	To learn about the computer systems, computing environments, developing of a computer program, Structure of a C Program and to evaluate expressions
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 and their usage.
4.	To understand the concepts of pointers, dynamic memory allocation and know the significance of Preprocessor.
5.	To learn about various File I/O operations and significance of functions

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

S.No	Outcome	Knowledge Level
1.	Apply Precedence and Associativity rules to evaluate Expressions.	K3
2.	Make use of Decision Making and Looping statements to solve various problems in C	K3
3.	Illustrate the importance of Arrays and Strings and to apply various operations on them.	K2
4.	Solve various problems by making use of Structure and Union concepts	K3
5.	Design and implement programs to analyze the different pointer applications	K3
6.	Develop programs using Functions and Pointers.	K3

SYLLABUS

UNIT-I (10 Hrs)	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 (10 Hrs)	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 (10 Hrs)	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.
UNIT-IV (10 Hrs)	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 (10 Hrs)	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.
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
Reference Books:	
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, Pradip Dey, Manas Ghosh, OXFORD.
e-Resources: Estd. 1980 AUTONOMOUS	
1.	https://www.geeksforgeeks.org/c-programming-language/
2.	https://www.learn-c.org/
3.	https://www.w3resource.com/c-programming-exercises/

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1101	ES	1	--	4	3	15	35	3 Hrs.

COMPUTER ENGINEERING WORKSHOP

(Common AIML & CIC)

Course Objectives: Skills and knowledge provided by this subject are the following:

1.	PC Hardware: Identification of basic peripherals, Assembling a PC, Installation of system software like MS Windows, device drivers, etc. Troubleshooting of PC Hardware and Software issues.
2.	Internet & World Wide Web: Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums. Awareness of cyber hygiene (protecting the personal computer from getting infected with the viruses), worms and other cyber attacks.
3.	Productivity Tools: Understanding and practical approach of professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite office tools.

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

S.No	Outcome	Knowledge Level
1	Identify, assemble and update the components of a computer	K3
2	Configure, evaluate and select hardware platforms for the implementation and execution of computer applications, services and systems	K3
3	Make use of tools for converting pdf to word and vice versa	K3
4	Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTeX	K3

SYLLABUS

Note: Faculty to consolidate the workshop manuals using the textbook and references

List of Exercises:

Task 1	Identification of the peripherals of a computer – Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.
Task 2:	Practicing disassembling and assembling components of a PC
Task 3:	Installation of Device Drivers, MS Windows, Linux Operating systems and Disk Partitioning, dual booting with Windows and Linux
Task 4:	Introduction to Memory and Storage Devices, I/O Port, Assemblers, Compilers, Interpreters, Linkers and Loaders.
Task 5:	Demonstration of Hardware and Software Troubleshooting

Task 6:	Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL, and Dialup Connection.
Task 7	Surfing the Web using Web Browsers, Awareness of various threats on the Internet and its solutions, Search engines and usage of various search engines, Need of anti-virus, Installation of anti-virus, configuring personal firewall and windows update. (Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and pop up blockers)
Task 8:	Productivity Tools: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage, Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list. Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages,etc.,
Task 9:	Demonstration and Practice of various features of Microsoft Word Assignment: 1. Create a project certificate. 2. Creating a newsletter Features to be covered:-Formatting Fonts, Paragraphs, Text effects, Spacing, Borders and Colors, Header and Footer, Date and Time option, tables, Images, Bullets and Numbering, Table of Content, Newspaper columns, Drawing toolbar and Word Art and Mail Merge in word etc.,
Task 10:	Demonstration and Practice of various features MicrosoftExcel Assignment: 1. Creating a scheduler 2. CalculatingGPA 3. Calculating Total, average of marks invarious subjects and ranks of Students based on marks Features to be covered:- Format Cells, Summation, auto fill,Formatting Text, Cell Referencing, Formulae in excel, Charts, Renaming and Inserting worksheets,etc.,
Task 11:	Demonstration and Practice of various features Microsoft Power Point Features to be covered:- Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks Tables and Charts, Master Layouts, Types of views, Inserting – Background, textures, Design Templates, etc.,
Task 12:	Demonstration and Practice of various features LaTeX – document preparation, presentation (Features covered in Task 9 and Task 11 need to be explored in LaTeX)
Task 13:	Tools for converting word to pdf and pdf to word
Task14:	Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices.

Text Books:	
1	Computer Fundamentals, Anita Goel, Pearson India Education,2017
2	PC Hardware Trouble Shooting Made Easy,TMH
3	Introduction to Information Technology, IITL Education Solutions Limited,2 nd Edition, Perason, 2020
4	Upgrading and Repairing PCs, 18 th Edition, Scott Mueller, QUE, Pearson,2008
5	LaTeX Companion – Leslie Lamport,PHI/Pearson
6	Introducing HTML5, Bruce Lawson, Remy Sharp, 2 nd Edition, Pearson,2012
7	Teach yourself HTML in 24 hours, ByTechmedia
8	HTML 5 and CSS 3.0 to the Real World by Alexis Goldstein, Sitepointpublication.
9	Internet of Things, Technologies, Applications, Challenges and Solutions, B K Tripathy, J Anuradha, CRCPress
10	Comdex Information Technology Course Tool Kit, Vikas Gupta, Wiley Dreamtech.
11	IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme, CISCO Press, Pearson Education.
12	Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N. B. Venkateswarlu, S. Chand Publishers



Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS1103	ES	0	0	3	1.5	15	35	3 Hrs.

PROGRAMMING FOR PROBLEM SOLVING USING C LAB

(Common to AIDS, CIC, CSE, ECE, IT, AIML & CSG)

Course Objectives:

1.	Apply the principles of C language in problem solving.
2.	To design & develop of C programs using Arrays, Strings, Structures, Unions and Pointers
3.	To perform the file operations, preprocessor commands
4.	To solve various complex problem by applying modular programming skills

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

S.No	Outcome	Knowledge Level
1.	Write, Trace and Debug the programs and correct syntax and logical errors.	K4
2.	Solve various Problems by making use of Arrays, Strings, Structures, Unions and Pointers	K3
3.	Solve a complex problem by decomposing into several modules by using Functions	K4
4.	Apply various File I/O operations	K3

LIST OF PROGRAMS

1	<p>Exercise 1:</p> <ol style="list-style-type: none"> 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. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches. Write a C program to display multiple variables.
2	<p>Exercise 2:</p> <ol style="list-style-type: none"> Write a C program to calculate the distance between the two points. 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".
3	<p>Exercise 3:</p> <ol style="list-style-type: none"> Write a C program to convert a string to a long integer. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape. Write a C program to calculate the factorial of a given number.
4	<p>Exercise 4:</p> <ol style="list-style-type: none"> Write a program in C to display the n terms of even natural number and their sum. Write a program in C to display the n terms of harmonic series and their sum. $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} \dots \frac{1}{n}$ terms. Write a C program to check whether a given number is an Armstrong number or not.
5	Exercise 5:

	<ol style="list-style-type: none"> 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.
6	<p>Exercise 6:</p> <ol style="list-style-type: none"> 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.
7	<p>Exercise 7:</p> <ol style="list-style-type: none"> 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.
8	<p>Exercise 8:</p> <ol style="list-style-type: none"> 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.
9	<p>Exercise 9:</p> <ol style="list-style-type: none"> 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.
10	<p>Exercise 10:</p> <ol style="list-style-type: none"> 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
11	<p>Exercise 11:</p> <ol style="list-style-type: none"> 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
12	<p>Exercise 12:</p> <ol style="list-style-type: none"> 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.
13	<p>Exercise 13:</p> <ol style="list-style-type: none"> 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
14	<p>Exercise 14:</p> <ol style="list-style-type: none"> 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.
15	<p>Exercise 15:</p> <ol style="list-style-type: none"> 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.
16.	<p>Exercise 16:</p> <ol style="list-style-type: none"> 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.

Reference 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
e-Resources:	
1.	https://www.geeksforgeeks.org/c-programming-language/
2.	https://www.learn-c.org/
3.	https://www.tutorialspoint.com/cprogramming/index.html



Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1107	BS	--	--	3	1.5	15	35	3 Hrs.

APPLIED PHYSICS LAB

(Common to AIDS, CE, CIC, EEE & ME)

Course Objectives:

1. To impart hands-on experience to the students entering engineering / Technology education about handling sophisticated equipment / instruments.
2. To make the students understand the theoretical aspects of various phenomena experimentally.

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

S.No	Outcome	Knowledge Level
1.	Get hands on experience in setting up experiments and using the instruments / equipment individually.	K3
2.	Get introduced to using new / advanced technologies and understand their significance.	K3

LIST OF EXPERIMENTS

1	Determination of the Wavelength of light from a source – Diffraction Grating – Normal incidence.
2	Determination of radius of curvature of Plano convex lens – Newton's Rings.
3	Determination of the thickness of a thin spacer using interference – Air Wedge method.
4	Determination of Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus. Estd. 1980
5	Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
6	Determination of Temperature Coefficient of Resistance of a thermistor
7	To study the characteristics of PN Junction diode
8	To determine the Numerical aperture of a given optical fiber and hence to find its acceptance angle.
9	Determination of Planck constant
10	Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum.
11	Verification of the laws of vibrations in stretched stings - Sonometer.
12	Determination of the frequency of the AC supply – AC Sonometer.
13	To determine refractive indices (μ_o and μ_e) of a birefringent material (prism).

Reference Books:

1. Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan, Meerut

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20HS1103	HS	--	--	3	1.5	15	35	3Hrs
COMMUNICATION SKILLS LAB								
(For AIML & CIC)								
Course Objectives:								
1.	To expose to a variety of self-instructional, learner-friendly modes of language learning.							
2.	To familiarize the students with CALL (Computer Assisted Language Learning). Thus, providing them with the required facility to face computer-based competitive exams like GRE, TOEFL, GMAT etc.							
3.	To equip the students with necessary professional communication.							
4.	To build confidence in LSRW Skills.							
5.	To adapt the students by adopting the techniques of effective communication skills.							
Course Outcomes: At the end of the course students will be able to								
S.No	Outcome							Knowledge Level
1.	Apply their linguistic competence in all LSRW skills to professional and personal settings.							K3
2.	Apply communication skills learnt through various language learning activities to their advancement in academics and competitive examinations.							K3
3.	Draft job application letters, E-Mail messages and other writing discourses.							K3
4.	Adopt professional etiquette consistent with formal settings.							K3
5.	Improve fluency and clarity in both spoken and written English.							K3
SYLLABUS								
UNIT-I	A list of communicative expressions (Requests, Permissions, Asking/ giving directions, Thanking and Responding to Thanks, Clarifying, Inviting, Congratulating, Advising, Agreeing and disagreeing etc.,) Common Errors							
UNIT-II	Pronunciation Letters and Sounds The Sounds of English Stress and Intonation Phonetic Transcription							
UNIT-III	Group Discussions							
UNIT-IV	Presentation Skills							
UNIT-V	Interview Skills Resume/ Curriculum Vitae							

	Covering Letter FAQ's Telephonic Interviews/ Etiquette Mock Interviews
Text Books:	
1.	Interact – English Lab Manual for Undergraduate Students – Orient Black Swan
Reference Books:	
1.	Exercises in Spoken English Part 1,2,3,4, OUP and CIEFI.
2.	English Pronunciation in use- Mark Hancock, CUP.
3.	English Pronunciation in use- Mark Hewings, CUP.
4.	English Pronunciation Dictionary- Daniel Jones, CUP.
5.	English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications
6.	Technical Communication- Meenakshi Raman, Sangeeta Sharma, OUP.
7.	Technical Communication- Gajendra Singh Chauhan, Smita Kashiramka, cengage Publications





Estd:1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)

UG Programmes CE,CSE,ECE,EEE,IT & ME are Accredited by NBA

CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

Regulation: R20		I / IV - B.Tech. II - Semester							
CSE (IoT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2022-23 admitted Batch onwards)									
Course Code	Course Name	Category	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20BS1201	Mathematics-II	BS	3	3	0	0	30	70	100
B20BS1203	Applied Chemistry	BS	3	3	0	0	30	70	100
B20AM1201	Digital Logic Design	ES	3	3	0	0	30	70	100
B20AM1202	Python Programming	ES	3	3	0	0	30	70	100
B20AM1203	Data Structures	ES	3	3	0	0	30	70	100
B20BS1208	Applied Chemistry Lab	BS	1.5	0	0	3	15	35	50
B20AM1204	Python Programming Lab	ES	1.5	0	0	3	15	35	50
B20AM1205	Data Structures Lab	ES	1.5	0	0	3	15	35	50
B20MC1201	Environmental Science	MC	0	2	0	0	--	--	--
B20MC1203	National Service Scheme (NSS)	MC	0	0	0	2	--	--	--
TOTAL			19.5	17	0	11	195	455	650

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1201	BS	3	--	--	3	30	70	3 Hrs.
MATHEMATICS – II								
(FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS)								
(Common to AIDS, CE, CIC, CSE, ECE, EEE, IT, ME, AIML & CSG)								
Prerequisites: Calculus of functions of a single variable and Geometry								
Course Objectives: Students are expected to learn:								
1.	How to expand an aperiodic function in a Fourier series.							
2.	How to find Fourier transform for a given function and evaluate some real definite integrals.							
3.	Application of partial differentiation for determining maxima/ minima of functions.							
4.	Evaluation of real definite integrals.							
5.	Formation and solution of linear partial differential equations							
6.	Solution of one-dimensional wave equation and one-dimensional heat equation by the method of separation of variables.							
Course Outcomes: At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1.	Determine Fourier series and half range series of functions							K3
2.	Determine Fourier transforms of non-periodic functions and also use them to evaluate integrals.							K3
3.	Compute partial derivatives, total derivative and Jacobians.							K3
4.	Find maxima/minima of functions of two variables and evaluate some real definite integrals.							K3
5.	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.							K3
6.	Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation							K3
SYLLABUS								
UNIT-I (10 Hrs)	Fourier Series Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Change of interval. Even and odd functions, Half-range sine and cosine series.							
UNIT-II (12 Hrs)	Fourier Transforms Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, Finite Fourier transforms, properties, inverse transforms, Parseval's Identities.							
UNIT-III (10 Hrs)	Partial differentiation: Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.							

	Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method. Leibnitz's rules for differentiation under integral sign.
UNIT-IV (10 Hrs)	First order and higher order partial differential equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation. Solutions of Linear homogeneous and non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type e^{ax+by} , $\sin(ax+by)$, $\cos(ax+by)$, $x^m y^n$.
UNIT-V (10 Hrs)	Applications of partial differential equations: Method of separation of variables, One –dimensional wave equation, the D'Alembert's solution, one- dimensional heat equation
Text Books:	
1.	B.S.Grewal, Higher Engineering Mathematics, 43 rd Edition, Khanna Publishers.
2.	N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.
3.	B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
Reference Books:	
1.	Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2.	V.Ravindranath and P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House.
3.	Erwin Kreyszig, Advanced Engineering Mathematics, 10 th Edition, Wiley-India.
4.	David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3 rd Edition, Universities Press.
5.	Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6.	Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1203	BS	3	--	--	3	30	70	3Hrs

APPLIED CHEMISTRY

(Common to AIDS, CE, CIC, EEE & ME)

Course Objectives:

1.	To understand the physical and mechanical properties of Polymers/Plastics/elastomers helps in selecting suitable materials for different purpose.
2.	To create awareness on fuels as a source of energy for industries like thermal power stations, steel industry, fertilizer industry etc.
3.	To understand the concept of galvanic cells and corrosion with theories like electro chemical theory.
4.	To understand the importance of water.
5.	To understand about the materials which are used in major industries like steel and metallurgical manufacturing industries, construction and electrical equipment manufacturing industries.

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

S.No	Outcome	Knowledge Level
1.	Develop polymer composites, synthetic polymers and formulation of polymers and their use in design	K3
2.	Apply the knowledge about quality of water and its treatment methods for domestic and industrial applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control.	K3
3.	Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.	K3
4.	Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage	K2

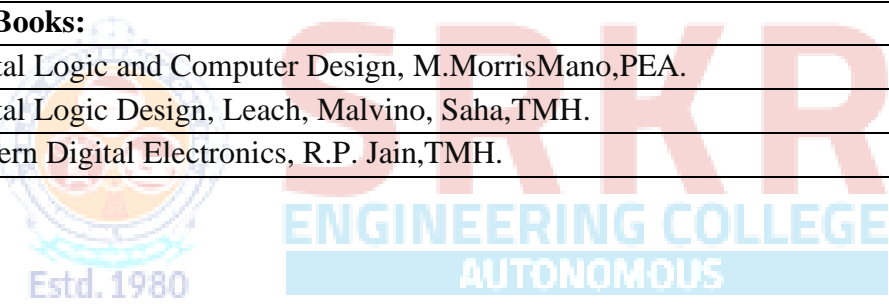
SYLLABUS

UNIT-I (10Hrs)	<p>High Polymers and Plastics; Rubbers & Elastomers</p> <p>Polymerization Definition, Types of Polymerization, free radical Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6. Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;</p>
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UNIT-II (10Hrs)	Energy Sources and Applications: Nuclear Energy: Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications. Thermal fuels – Introduction – Classification – Calorific value – HCV and LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by Otto Hoffman’s by Product Process , Refining crude oil; Knocking; Chemical structure-Knocking, Octane number of gasoline, Cetane number of diesel oil, synthetic Petrol; LPG, CNG
UNIT-III (12Hrs)	Electrochemical cells and Corrosion Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electrolessplating ;Paints
UNIT-IV (8Hrs)	Water technology Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.
UNIT-V (10Hrs)	Chemistry of Engineering Materials& Advanced Engineering materials Cement:- Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete. Refractories:- Definition, Characteristics, classification, Properties and failure of refractories. Solar Energy: - Construction and working of Photovoltaic cell, applications. Solid State Materials: Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors. Liquid Crystals: - Definition – Classification with examples – Applications
Text Books:	
1.	Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing co.
2.	Engineering Chemistry by Willy India Pvt Ltd.
3.	Engineering Chemistry by Dr.K.Anji Reddy and Dr.M.S.R.Reddy ; Silicon Publications.
Reference Books:	
1.	Engineering Chemistry by Shikha Aharwal; Cambridge University Press, 2015 edition.
2.	A text of Engineering Chemistry by S.S.Dara; S.Chand& Co Ltd.
3.	Chemistry in Engineering and Technology by JC Kuriacose and J. Rajaram Mc. Graw Hill edition.

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1201	ES	3	--	--	3	30	70	3 Hrs.
DIGITAL LOGIC DESIGN								
(For AIML & CIC)								
Course Objectives: The objective of this course is to								
1.	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.							
2.	To introduce the basic tools for design of combinational and sequential digital logic.							
3.	To learn simple digital circuits in preparation for computer engineering							
Course Outcomes: At the end of the course Students will be able to								
S.No	Outcome							Knowledge Level
1	An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation							K2
2	An ability to understand the different switching algebra theorems and apply them for logic functions.							K3
3	An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.							K2
4	Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.							K3
5	Students will be able to design various sequential circuits starting from flip-flop to registers and counters.							K3
SYLLABUS								
UNIT-I (8 Hrs)	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 (10 Hrs)	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 (10 Hrs)	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 (10 Hrs)	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 (10 Hrs)	Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter.
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.MorrisMano,PEA.
2	Digital Logic Design, Leach, Malvino, Saha,TMH.
3	Modern Digital Electronics, R.P. Jain,TMH.



Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1202	ES	3	--	--	3	30	70	3 Hrs.
PYTHON PROGRAMMING								
(For AIML & CIC)								
Course Objectives: Students are expected to learn								
1.	To learn about Python programming language syntax, semantics, and the runtime environment							
2.	To be familiarized with universal computer programming concepts like data types, containers							
3.	To be familiarized with general computer programming concepts like conditional execution, loops & functions							
4.	To be familiarized with general coding techniques and object-oriented programming							
Course Outcomes: At the end of the course the student will be able to								
S.No	Outcome							Knowledge Level
1.	Understand the basic principles of python programming.							K2
2.	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.							K3
3.	Applying the concept of functions and modular programming for solving the real-world problems							K3
4.	Develop applications for real time problems by applying object oriented programming concepts and handle different file operations							K3
5.	Handle different exceptions raised in python and Design user interface using Tkinter graphics for application development.							K3
SYLLABUS								
UNIT-I (12 Hrs)	<p>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.</p> <p>Data Types and Expression: Strings Assignment, and Comment, Numeric Data Types and Character Sets, Using functions and Modules.</p> <p>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.</p>							
UNIT-II (10 Hrs)	<p>Control Statement: Definite iteration for Loop Formatting Text for output, Selection if and if else Statement, Conditional Iteration TheWhileLoop</p> <p>Strings and Text Files: Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods TextFiles.</p>							
UNIT-III (10 Hrs)	<p>List and Dictionaries: Lists, Defining Simple Functions, Dictionaries</p> <p>Design with Function: Functions as Abstraction Mechanisms, Problem Solving with Top</p>							

	Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System, Managing a Program's Namespace, Higher Order Function. Modules: Modules, Standard Modules, Packages.
UNIT-IV (8 Hrs)	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 Oopssupport Design with Classes: Objects and Classes, Data modelling Examples, Case Study An ATM, Structuring Classes with Inheritance and Polymorphism
UNIT-V (10 Hrs)	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 GUIResources. Programming: Introduction to Programming Concepts withScratch.
Text Books:	
1.	Fundamentals of Python First Programs, Kenneth. A. Lambert, 2 nd Edition, Cenagage learning,2018.
2.	Python Programming: A Modern Approach, Vamsi Kurama, Pearson,2018.
Reference Books:	
1.	Introduction to Python Programming, Gowrishankar.S, Veena A, first edition ,CRC Press,2018.
2.	Introduction to Programming Using Python, Y. Daniel Liang, Pearson,2013.
e-Resources:	
1.	https://www.tutorialspoint.com/python3/python_tutorial.pdf

Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1203	ES	3	--	--	3	30	70	3 Hrs.

DATA STRUCTURES

(For AIML & CIC)

Course Objectives: Students are expected to learn

1.	Be familiar with basic techniques of algorithm analysis
2.	Master the implementation of data structures like stacks, queues, linked lists, binary trees, and graphs.
3.	Be familiar with basic techniques for algorithm development like recursion.
4.	Be familiar with several sub-quadratic sorting algorithms including quick sort, merge sort and heap sort
5.	Master analyzing problems and writing program solutions to problems using the above techniques.

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

S.No	Outcome	Knowledge Level
1.	Demonstrate the concept of recursion, the way arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory.	K2
2.	Illustrate the different data structures like stacks, queues, linked lists, trees and graphs and different ways of implementing them.	K2
3.	Apply stacks, linked lists, queues and trees to solve different Computer Science problems and Engineering problems.	K3
4.	Apply the principal algorithms for sorting and searching to the given data and analyze the computational efficiency.	K3
5.	Make use of Graphs to solve real life applications.	K3

SYLLABUS

UNIT-I (10 Hrs)	<p>Basic Concepts: Arrays, Structures: Data Structures -Definition, Classification of Data Structures, Operations on Data Structures, Algorithm Specification, Data Abstraction, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notation, Comparing Time Complexities. Array as an Abstract Data Type, Polynomial Abstract Data Type, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures</p> <p>Simple Searching and Sorting Techniques: Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Fibonacci search, Selection Sort, Bubble Sort, Insertion Sort, Shell Sort, Introduction to Merge Sort, Introduction to Recursion: Towers of Hanoi, Quick Sort, Merge Sort, Complexity Analysis of Basic Sorting and Searching techniques.</p>
UNIT-II (10 Hrs)	<p>Stacks, Queues Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix,</p>

	And Prefix conversion, Circular Queues using arrays, Dequeues, Priority Queues, Pointers, Dynamically Allocated Storage using pointers, Dynamically Linked Stacks and Queues.
UNIT-III (10 Hrs)	<p>Linked Lists: Singly Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list, Radix Sort. Circular Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from Circular Linked Lists. Doubly Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from Doubly Linked Lists. Polynomials: Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials.</p>
UNIT-IV (10 Hrs)	<p>Trees: Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element From a Binary Search Tree, Height of a Binary Search Tree</p>
UNIT-V (10 Hrs)	<p>Graphs: Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim's and Kruskal's Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination-Dijkstra's Algorithm</p>
 SRM AUTONOMOUS	
Text Books:	
1.	Fundamentals of Data Structures in C, 2nd edition, Horowitz, Sahni and Anderson-Freed, Universities Press, 2008.
Reference Books:	
1.	Data Structures Using C, 2 nd Edition. Reema Thareja, Oxford.
2.	Data Structures with C by Seymour Lipschutz, Schaum Outline Series, 2010.
3.	Data Structures using C by R. Krishna Moorthy G. Indirani Kumaravel, TMH, New Delhi, 2008.
4.	Data Structures and algorithm analysis in C, 2 nd ed, Mark Allen Weiss.
e-Resources	
1.	https://nptel.ac.in/courses/106/102/106102064/
2.	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
3.	https://www.geeksforgeeks.org/data-structures/
4.	http://algs4.cs.princeton.edu/home/
5.	https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf

Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS1208	BS	--	--	3	1.5	15	35	3Hrs

APPLIED CHEMISTRY LAB

(Common to AIDS, CE, CIC, EEE & ME)

Course Objectives:

1.	To investigate and understand Physical behaviour in the laboratory using scientific reasoning and logic and interpret the result of simple experiments and demonstration of chemical Principle and also evaluate the impact of chemical discoveries on how we view the world.
2.	Effectively communicate experimental results and solutions to application problems through oral and written reports.
3.	Recognize the classical ideas and chemical phenomena and also define and analyse the concepts.

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

S.No	Outcome	Knowledge Level
1.	Gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's. Carrying out different types of chemical reactions for analysing different materials in micro level quantities.	K3
2.	Analyze and generate experimental skills to enhance the analytical thinking capabilities in the modern trends in engineering and technology.	K3

LIST OF EXPERIMENTS

1	Determination of Alkalinity of water sample.
2	Determination of total hardness of water by EDTA method.
3	Estimation of Ferrous Iron by KMnO_4 .
4	Estimation of oxalic acid by KMnO_4 .
5	Estimation of Mohr's salt by $\text{K}_2\text{Cr}_2\text{O}_7$.
6	Estimation of Dissolved oxygen by Winkler's method.
7	Determination of pH of water and soil sample.
8	Determination of Chlorides present in water sample.
9	Conductometric titration of strong acid Vs strong base.
10	Potentiometric titration of strong acid Vs strong base.
11	Potentiometric titration of strong acid Vs weak base.
12	Preparation of Phenol formaldehyde resin.
13	Determination of saponification value of oils.
14	Determination of pour and cloud points of lubricating oil.
15	Determination of Acid value of oil.

Reference Books:

1.	Engineering Chemistry Lab Manual Prepared by Chemistry Faculty of S.R.K.R. Engineering College.
2.	Laboratory manual on Engineering Chemistry by Dr.Sudha Rani; Dhanpat Rai Publishing Company.
3.	Engineering Chemistry Laboratory manual – I & II by Dr.K.Anji Reddy; Tulip Publications.

Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1204	ES	--	--	3	1.5	15	35	3 Hrs.
PYTHON PROGRAMMING LAB								
(For AIML & CIC)								
Course Objectives: The aim of this lab is								
1.	To acquire programming skills in core Python.							
2.	To acquire Object Oriented Skills in Python							
3.	To develop the skill of designing Graphical user Interfaces in Python							
4.	To develop the ability to write database applications in Python							
Course Outcomes: After completion of the course, students will be able to								
S.No	Outcome							Knowledge Level
1.	Apply the basics of programming in the Python language							K3
2.	Formulate and apply programming knowledge of control statements for solving complex problems							K3
3.	Implement the operations of different data structures							K3
4.	Implement object oriented and modular programming concepts							K3
5.	Design/ implement GUI applications & handle files and exceptions							K3
LIST OF EXPERIMENTS								
1	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.							
2	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.							
3	Write a program that uses a <i>for</i> loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89.							
4	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.							
5	Use a <i>for</i> 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 <i>Close</i> if the numbers are within .001 of each other and <i>Not close</i> otherwise.							
8	Write a program that asks the user to enter a word and prints out whether that word contains any vowels.							
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 <i>abcde</i> and <i>ABCDE</i> the program should print out <i>AaBbCcDdEe</i> .
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.
	(a) Print the list. (b) Print the average of the elements in the list. (c) Print the largest and smallest values in the list. (d) Print the second largest and second smallest entries in the list (e) 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 <i>sum digits</i> that is given an integer num and returns the sum of the digits of num.
18	Write a function called <i>first diff</i> 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 <i>number of factors</i> that takes an integer and returns how many factors the number has.
20	Write a function called <i>is sorted</i> that is given a list and returns True if the list is sorted and False otherwise.
21	Write a function called <i>root</i> 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 <i>primes</i> 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 <i>merge</i> that takes two already sorted lists of possibly different lengths and merges them into a single sorted list.
	(a) 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 <i>temps.txt</i> , converts those temperatures to Fahrenheit, and writes the results to a file called <i>ftemps.txt</i> .
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 <i>get price</i> 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 <i>make purchase</i> 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 <i>convert to minutes</i> 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 <i>convert to hours</i> 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, <code>c = Converter(9,'inches')</code> . 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 <code>c.feet ()</code> and should get 0.75 as the result.
30	Write a Python class to implement <code>pow (x, n)</code> .
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.
Reference Books:	
1	Core Python Programming
2	Python Data Science
3	Programming in Python 3--A Complete Introduction to the Python Language
4	Getting Started with Python Data Analysis
5	Python Data Analysis
6	Mastering Python Data Analysis

Code	Category	L	T	P	C	I.M	E.M	Exam
B20AM1205	ES	--	--	3	1.5	15	35	3 Hrs.
DATA STRUCTURES LAB								
(For AIML & CIC)								
Course Objectives:								
1.	Demonstrate the different data structures implementation.							
Course Outcomes: At the end of the course students will be able to								
S.No	Outcome							Knowledge Level
1.	Develop programs for basic data structures such as arrays, stacks, queues, linked lists, trees and graphs							K3
2.	Develop programs to solve fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.							K3
3.	Use various searching and sorting algorithms.							K3
LIST OF EXPERIMENTS								
Exercise -1 (Searching)								
<ul style="list-style-type: none"> a) Write C program that use both recursive and non-recursive functions to perform Linear search for a Key value in a given list. b) Write C program that use both recursive and non-recursive functions to perform Binary search for a Key value in a given list. 								
Exercise -2 (Sorting-I)								
<ul style="list-style-type: none"> a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order b) Write C program that implement Quick sort, to sort a given list of integers in ascending order c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order 								
Exercise -3(Sorting-II)								
<ul style="list-style-type: none"> a) Write C program that implement radix sort, to sort a given list of integers in ascending order b) Write C program that implement merge sort, to sort a given list of integers in ascending order 								
Exercise -4 (Singly Linked List)								
<ul style="list-style-type: none"> a) Write a C program that uses functions to create a singly linked list b) Write a C program that uses functions to perform insertion operation on a singly linked list c) Write a C program that uses functions to perform deletion operation on a singly linked list d) Write a C program to reverse elements of a single linked list. 								
Exercise -5(Queue)								
<ul style="list-style-type: none"> a) Write C program that implement Queue (its operations) using arrays. b) Write C program that implement Queue (its operations) using linked lists 								
Exercise -6 (Stack)								
<ul style="list-style-type: none"> a) Write C program that implement stack (its operations) using arrays 								

- b) Write C program that implement stack (its operations) using Linked list
- c) Write a C program that uses Stack operations to evaluate postfix expression

Exercise -7 (Binary Search Tree)

- a) Write a C program to Create a BST
- b) Write a C program to insert a node into a BST.
- c) Write a C program to delete a node from a BST.
- d) Write a recursive C program for traversing a binary tree in preorder, inorder and postorder.

Exercise -8 (Graphs)

- a) Write a C program to perform depth first search and breadth first search on a given graph
- b) Write a C program for finding the transitive closure of a digraph
- c) Write a C program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm

Reference Books:

1. Fundamentals of Data Structures in C, 2nd edition, Horowitz, Sahani and Anderson-Freed, Universities Press, 2008.

e-Resources

1. <https://nptel.ac.in/courses/106/102/106102064/>
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
3. <https://www.geeksforgeeks.org/data-structures/>



Course Code	Category	L	T	P	C	I.M	E.M	Exam
B20MC1201	MC	2	--	--	0	--	--	--
ENVIRONMENTAL SCIENCE								
(Common to AIDS, CE, CIC, CSBS, EEE & ME)								
Course Objectives: The objectives of the course are to impart:								
1.	Overall understanding of the natural resources.							
2.	Basic understanding of the ecosystem and its diversity.							
3.	Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.							
4.	An understanding of the environmental impact of developmental activities.							
5.	Awareness on the social issues, environmental legislation and global treaties.							
Course Outcomes: After completion of the course, students will be able to								
S.No	Outcome							Knowledge Level
1	Bring awareness among the students about the nature and natural ecosystems							K2
2	Sustainable utilization of natural resources like water, land, energy and air							K4
3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation							K5
4	Constitutional provisions for the protection of natural resources							K2
5	Green technologies and its applications							K3
SYLLABUS								
UNIT-I (8 Hrs)	<p>Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects;. Role of information technology in environment and human health.</p> <p>Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.</p>							
UNIT-II (8 Hrs)	<p>Natural Resources: Natural resources and associated problems.</p> <p>Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.</p> <p>Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.</p> <p>Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.</p>							

	<p>Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.</p> <p>Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.</p> <p>Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.</p>
UNIT-III (8 Hrs)	<p>Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.</p>
UNIT-IV (8 Hrs)	<p>Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his wellbeing.</p> <p>Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.</p>
UNIT-V (8 Hrs)	<p>Social Issues and the Environment: Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Sustainability: theory and practice, Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation.-Public awareness.</p>
UNIT-VI (8 Hrs)	<p>Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics. Environmental dairy.</p> <p>The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.</p>
Text Books:	
1.	Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada Rani; Pearson Education, Chennai
2.	Environmental Studies, R. Rajagopalan, 2 nd Edition, 2011, Oxford University Press.
3.	Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula

Reference Books:	
1.	Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2.	A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3.	Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4.	Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014



Code	Category	L	T	P	C	I.M	E.M	Exam
B20MC1203	MC	--	--	2	--	--	--	--

NATIONAL SERVICE SCHEME (NSS)

(Common to All Branches)

Course Objectives:

1.	To understand the community and understand themselves in relation to their community.
2.	Identify the needs and problems of the community and involve them in problem solving process.
3.	Utilize their knowledge for finding practical solution to individual and community problems.

Course Outcomes: Student will be able to

S.No	Outcome	Knowledge Level
1.	Understand general orientation about community service, voluntarism role and responsibility of NSS volunteer.	K2
2.	Analyze about the community he live in.	K4
3.	Asses the life in adopted villages.	K5
4.	Identify the importance of national days and attain participation in it.	K3

SYLLABUS

1.	Volunteerism- community and beyond (Theory).
2.	Role and responsibility of NSS volunteer (Theory).
3.	General orientation about community service (Theory).
4.	Arranging lectures on social issues in schools or villages (Theory).
5.	Arranging rally's on social issues.
6.	Socio economic survey in adopted villages
7.	Plantation of saplings.
8.	Blood donation camp
9.	Rainwater harvesting awareness camp.
10.	Celebration of national days as per NSS list.