GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY (A), CHAITANYA NAGAR, RAJAHMUNDRY

Programme Structure of B.Tech. Programme in Computer Science & EngineeringGRBT-19 A.Y: 2019-20

I Year I Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19199101	BSC	Mathematics-I	3	0	0	3	30	70	100
2	19199102	HSMC	Communicative English – I	3	0	0	3	30	70	100
3	19199103	BSC	Engineering Physics	3	0	0	3	30	70	100
4	19199104	ESC	Problem Solving & Programming in C	3	0	0	3	30	70	100
5	19193175	ESC	Engineering Graphics	1	0	3	2.5	30	70	100
6	19199196a	MC	Environmental Studies	2	0	0	0	30*	---	---
7	19199111	HSMC	Communicative English Laboratory-I	0	0	3	1.5	50	50	100
8	19199112	BSC	Engineering Physics Laboratory	0	0	3	1.5	50	50	100
9	19199113	ESC	Problem Solving & Programming Laboratory using C	0	0	3	1.5	50	50	100
			Total	**14**	**1**	**12**	**19**	**300**	**500**	**800**

BSC: 7.5	**ESC: 7**	**HSMC: 4.5**	**MC: 0**

I Year II Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19199201b	BSC	Probability & Statistics	3	0	0	3	30	70	100
2	19199202	HSMC	Communicative English – II	3	0	0	3	30	70	100
3	19199203	BSC	Applied Chemistry	3	0	0	3	30	70	100
4	19199204	ESC	Basic Electrical & Electronics Engineering	3	0	0	3	30	70	100
5	19199205	PCC	Python Programming	3	0	0	3	30	70	100
6	19199296b	MC	Professional Ethics & Human Values	2	0	0	0	30*	---	---
7	19199211	HSMC	Communicative English Laboratory-II	0	0	3	1.5	50	50	100
8	19192212	ESC	Basic Electrical & Electronics Engineering Laboratory	0	0	3	1.5	50	50	100
9	19195213	PCC	Python Programming Laboratory	0	0	3	1.5	50	50	100
10	19199214	BSC	Engineering Chemistry Laboratory	0	0	3	1.5	50	50	100
			Total	**17**	**0**	**12**	**21**	**350**	**550**	**900**

BSC: 7.5	**ESC: 4.5**	**HSMC: 4.5**	**MC: 0**	**PCC: 4.5**

II Year I Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19159301	BSC	Discrete Mathematics	2	1	0	3	30	70	100
2	19150302	PCC	Object Oriented Programming Through C++	3	0	0	3	30	70	100
3	19150303	PCC	Digital Logic & Computer Organization	3	0	0	3	30	70	100
4	19150304	PCC	Data Structures	3	0	0	3	30	70	100
5	19150305	PCC	Data Base Management Systems	3	0	0	3	30	70	100
6	19150306	MC	Design Thinking & Product Innovation	2	0	0	0	30*	---	---
7	19153311	ESC	Basic Engineering Workshop	0	0	3	1.5	50	50	100
8	19150312	PCC	Object Oriented Programming Through C++ Laboratory	0	0	3	1.5	50	50	100
9	19150313	PCC	Data Structures Laboratory	0	0	3	1.5	50	50	100
10	19150314	PCC	Data Base Management Systems Laboratory	0	0	3	1.5	50	50	100
Total				**16**	**1**	**12**	**21**	**350**	**550**	**900**

BSC: 3	**ESC: 1.5**	**PCC: 16.5**	**MC: 0**

II Year II Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19150401	PCC	Java Programming	3	0	0	3	30	70	100
2	19150402	PCC	Operating Systems	3	0	0	3	30	70	100
3	19150403	PCC	Formal Languages and Automata Theory	3	0	0	3	30	70	100
4	19150404	PCC	Number Theory & Applications	2	1	0	3	30	70	100
5	19150405	PCC	Design and Analysis of Algorithms	3	0	0	3	30	70	100
6	1915-466 a-i	OEC	Open Elective-IV	3	0	0	3	30	70	100
7	19150411	PCC	Operating Systems Laboratory	0	0	3	1.5	50	50	100
8	19150412	PCC	Java Programming Laboratory	0	0	3	1.5	50	50	100
Total				**17**	**1**	**6**	**21**	**280**	**520**	**800**

PCC: 18	**OEC: 3**

III Year I Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19150501	PCC	Compiler Design	3	0	0	3	30	70	100
2	19150502	PCC	Web Technologies	3	0	0	3	30	70	100
3	19150503	PCC	Software Engineering	3	0	0	3	30	70	100
4	19150504	PCC	Computer Networks	3	0	0	3	30	70	100
5	19150565 A-C	PEC	Professional Elective-I	3	0	0	3	30	70	100
6	1915-566 a-g	OEC	Open Elective-I	3	0	0	3	30	70	100
7	19150511	PCC	Compiler Design & Computer Networks Laboratory	0	0	3	1.5	50	50	100
8	19150512	PCC	Web Technologies Laboratory	0	0	3	1.5	50	50	100
9	19150581	PR	Community Service Oriented Project	0	0	1	0.5	100	---	100
10	19150522	PR	Mini Project-1/ Study Project/ Internship	---	---	---	2	100	---	100
			Total	**18**	**0**	**7**	**23.5**	**480**	**520**	**1000**

PCC: 15	**PEC: 3**	**PR: 2.5**	**OEC: 3**

III Year II Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19150601	PCC	Data Mining	3	0	0	3	30	70	100
2	19150602	PCC	Artificial Intelligence	3	0	0	3	30	70	100
3	19150603	PCC	Unified Modelling Language	3	0	0	3	30	70	100
4	19150664C	PEC	Professional Elective-II	3	0	0	3	30	70	100
5	19150665b	OEC	Open Elective-II	3	0	0	3	30	70	100
6		MC	Constitution of India	2	0	0	0	30*	---	---
7	19150611	HSMC	Soft Skills	0	0	3	1.5	50	50	100
8	19150612	PCC	AI Tools & Techniques Laboratory	0	0	3	1.5	50	50	100
9	19150613	PCC	Unified Modeling Language Laboratory	0	0	3	1.5	50	50	100
			Total	**17**	**0**	**9**	**19.5**	**300**	**500**	**800**

PCC: 12	**PEC:3**	**OEC: 3**	**HSMC: 1.5**	**MC: 0**

IV Year I Semester

S. No	Course Code	Course Type	Course Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19150701	PCC	Cryptography and Network Security	3	0	0	3	30	70	100
2	19150702	PCC	Machine Learning	3	0	0	3	30	70	100
3	19150763C	PEC	Professional Elective-III	3	0	0	3	30	70	100
4	19150764A	PEC	Professional Elective-IV	3	0	0	3	30	70	100
5	19151765a	OEC	Open Elective-III	3	0	0	3	30	70	100
6	19159796	MC	Intellectual Property Rights and Patents	2	0	0	0	30*	---	---
7	19150711	PCC	Cryptography and Network Security Laboratory	0	0	3	1.5	50	50	100
8	19150712	PCC	Machine Learning Laboratory	0	0	3	1.5	50	50	100
9	19150721	PR	Mini Project-2/ Internship	---	---	---	2	100	---	100
Total				**17**	**0**	**6**	**20**	**350**	**450**	**800**
PCC: 9		**PEC: 6**		**PR: 2**		**OEC: 3**		**MC: 0**		

IV Year II Semester

S. No	Course Code	Course Type	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
				L	T	P		Int.	Ext.	Total
1	19150801	PCC	Software Testing Methodologies	3	0	0	3	30	70	100
2	19150802	PEC	Professional Elective-V	3	0	0	3	30	70	100
3	19150841	PR	Project	0	0	18	9	80	120	200
Total				**6**	**0**	**12**	**15**	**140**	**260**	**400**
PCC: 3		**PEC: 3**		**PR: 9**						

Professional Electives

PE-1: A-C	Advanced JAVA Programming	Principles of Computer Security	Mobile Computing
PE-2: A-C	Software Architecture, Frameworks and Patterns	Virtual Reality	Distributed Systems
PE-3: A-C	NoSQL Databases	Digital Image Processing	Cloud Computing
PE-4: A-C	Big Data Analytics	Deep Learning	Parallel Computing
PE-5: A-C	Distributed Databases	Cyber Security	Soft Computing

Open Electives

S. No	Open Elective-1	Open Elective-2	Open Elective-3	Open Elective-4
a	CE- Environmental Pollution Control	CE- Solid Waste Management	CE- Global Environment: Problems & Policies	Financial Management for Engineers
b	EEE- Utilization of Electrical Energy	EEE- Energy Management	EEE- Renewable Energy Resources	Entrepreneurship qualities for Engineers
c	MECH- Robotics	ME- MEMS	ME- Nano Technology	Managerial Economics & Financial Analysis
d	ECE- Internet of Things	ECE- Digital Image Processing	ECE- Data Communication	Principles of Management
e	CSE- Fundamentals of Operating Systems	CSE- Information Security	CSE- Human Computer Interaction	Organizational Behavior
f	MM- Elements of Mining Technology	MM- Disaster Management in Mining	MM- Remote Sensing & GIS in Mining	Digital Marketing
g	AME- Basic Automobile Engineering	AME- Hybrid and Electric Vehicles	AME- Modern Vehicle Technology	Operations Management
h	---	---	---	Total Quality Management
i	---	---	---	Human Resource Management

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. I Sem (1 semester)			
Course Code	**MATHEMATICS -1** (COMMON TO ALL BRANCHES)				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Types of matrices, Limits, continuity.		3	-	-	3

Course Objective:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students understand advanced level mathematics to develop the confidence and ability to handle real world problems and their applications.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Transform the knowledge of solving system of linear equations using matrices.
CO2:	*Apply mean value Rolls, Lagranges and Cauchy mean value theorem in engineering applications.*
CO3:	*Acquire the knowledge maxima and minima of function of several variables*
CO4:	*Evaluate multiple integrals and their applications*
CO5:	*Understand Beta and Gamma functions, evaluate improper integrals.*

Syllabus:

Unit I: Matrix Operations and Solving Systems of Linear Equations

Rank of a matrix by echelon form, solving system of linear homogeneous and non-homogeneous equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Quadratic forms and nature of the Quadratic forms, reduction of Quadratic form to canonical form by diagonalisation and orthogonal transformation.

Unit II: Mean Value Theorems

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

Unit III: Multivariable calculus

Partial derivatives, total derivatives, chain rule, Homogeneous functions and Euler's theorem, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit IV: Multiple Integrals

Evaluation of double integrals (cartesian and polar coordinates) and triple integrals, change of variables, change of order of integration, areas enclosed by plane curves.

Unit V: Special Functions

Beta and Gamma functions and their properties, relation between Beta and Gamma functions, evaluation of improper integrals.

Text books:

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

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. T.K.V.Iyenger, et.al., Engineering Mathematics, Volume-III, .Chand Publicatiobns, 2018.
4. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2015.

Web Links:

1. https://nptel.ac.in/courses/111105121/
2. https://nptel.ac.in/courses/111105035/
3. https://www.sanfoundry.com/engineering-mathematics-multiple-choice-questions-answers/
4. https://ocw.mit.edu/courses/mathematics/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*
CO1	*3*	*2*	*2*	*2*	-	-	-	-	-	-	-	*1*
CO2	*3*	*2*	*2*	*2*	-	-	-	-	-	-	-	*1*
CO3	*3*	*2*	*2*	*2*	-	-	-	-	-	-	-	*1*
CO4	*3*	*2*	*2*	*2*	-	-	-	-	-	-	-	*1*
CO5	*3*	*2*	*2*	*2*	-	-	-	-	-	-	-	*1*

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. I Sem (1 semester)			
Course Code	**COMMUNICATIVE ENGLISH –I** (common for all the branches)				
Teaching	Total contact hours - 54	L	T	P	C
Prerequisite(s): **Learner should be equipped with basic language and communication skills like Reading, Writing, Listening and Speaking**.		3	-	-	3

Course Objectives: This course aims

- To focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- To impart effective strategies for good writing , summarize information and practice writing essays
- To provide the knowledge of grammatical structures, vocabulary and encourage their appropriate use in speech and writing

Course Outcomes:

On Completion of the course, the students will be able to	
CO1:	students will be able to develop effective reading strategies
CO2:	will be able to demonstrate writing skills that are required for professional development and use graphic elements for communication
CO3:	will be able to apply grammatical skills and vocabulary effectively in speech and writing

Syllabus:

UNIT-I

READING: Detailed Text: Exploration- "A Proposal to Girdle the Earth (Excerpt)" by Nellie Bly, from English All Round: Communication Skills for Under Graduate Learners-1 by ORIENT BLACK SWAN.

Non-Detailed Text: 'An Ideal Family' by Katherine Mansfield from 'Panorama: A Course on Reading."-OXFORD

GRAMMAR: Concept of word Formation, Verbs, adjectives, adverbs, Word order in sentences

VOCABULARY: Content words and function words; Word forms

WRITING SKILLS: Paragraph writing-Beginnings and endings of paragraphs - introducing a topic, providing a transition to the next paragraph.

UNIT-II

READING: Detailed Text: On Campus - An excerpt from "The District School as It Was by One Who Went to It" by Warren Burton from English All Round: Communication Skills for Under Graduate Learners-1 by ORIENT BLACK SWAN

Non-Detailed Text: ''War' by Luigi Pirandello from 'Panorama: A Course on Reading." -OXFORD

GRAMMAR: Use of articles and zero article; prepositions.

VOCABULARY: Linkers, sign posts and transition signals.

WRITING SKILLS: Summarizing an oral or written text.

UNIT-III

READING: Detailed Text: Working Together - The Future of Work? (Adopted from web resources)From English All Round: Communication Skills for Under Graduate Learners-1 by ORIENT BLACK SWAN

Non-Detailed Text: 'The Verger' by Somerset Maugham from Panorama: A Course on Reading'-OXFORD

GRAMMAR: Tense and aspect; direct and indirect speech, reporting verbs for academic purposes.

VOCABULARY: Prefixes and suffixes

WRITING SKILLS: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions

Unit–IV

READING: Detailed Text: Fabric of Change- H. G. Wells and the Uncertainties of Progress by Peter J. Bowler from English All Round: Communication Skills for Under Graduate Learners-1by ORIENT BLACK SWAN

. **GRAMMAR:** Correction of sentences-sequencing jumbled sentences

VOCABULARY: use of antonyms and homophones

WRITING SKILLS: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables -Sensible writing, Defining and classifying

Unit – V

READING: Detailed Text: Tools for Life -Leaves from the Mental Portfolio of a Eurasian by Sui Sin Far From English All Round: Communication Skills for Under Graduate Learners-1 by ORIENT BLACK SWAN.

GRAMMAR: Reading comprehension- framing right answers and editing the given text

VOCABULARY: Idioms and Phrases

WRITING SKILLS: Writing structured essays on specific topics using suitable claims and evidences.

Text Books:

Detailed Textbook: ENGLISH ALL ROUND: Communication Skills for Under Graduate Learners-1 Published by Orient Black swan Pvt Ltd

Non-detailed Textbook: PANORAMA: A COURSE ON READING, Published by Oxford University Press India

REFERENCE BOOKS:

- Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
- InfoTech English by Maruthi Publications

WEB REFERENCES:

All Skills (LSRW)

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-' : No Correlation)

	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*
CO1	-	-	-	-	-	*2*	*3*	*2*	-	-	-	-
CO2	-	-	-	-	-	*3*	*3*	*3*	-	-	-	*1*
CO3	-	-	-	-	-	*2*	*3*	*3*	-	-	-	-

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. I Sem (1 semester)			
CourseCode 19199104	**Engineering Physics** (common for CSE, ECE, EEE)				
Teaching	Totalcontacthours-58	L	T	P	C
		3	-	0	3

Course Objective

Physics Curriculum is re-oriented to the needs of CSE, ECE and EEE branches of graduate engineering courses that serve as a transit to understand the specific advanced topics.

Course Outcomes:

On Completion of the course, the students will be able	
CO1:	To impart knowledge of physical optical phenomenon like Interference, Diffraction and polarization involving design of optical instruments with higher resolution To explain the concept of dielectric constant and polarization in dielectric materials and summarize Gauss's law in the presence of dielectrics
CO2:	To interpret dielectric loss, Lorentz field and Claussius- Mosotti relation and classify the magnetic materials based on susceptibility and their temperature dependence.To apply the Gauss' Theorem for divergence and Stokes' Theorem for curl and evaluate Maxwell'sdisplacement current and correction in Ampere's law.
CO3:	To assess the electromagnetic wave propagation in different media and its power and explain the working principle of optical fibers and its classification based on refractive index profile and mode of propagation with their applications. To classify the energy bands of semiconductors and outline the properties of n-type and p-type semiconductors.
CO4:	To study the basic Quantum mechanics, interpretation of the direct and indirect band gap in semiconductors and identify the type of semiconductor using Hall effect.

Syllabus:

UNIT –I

OPTICS **12h**

Interference of Light -Principle of Superposition- Interference in thin films (reflected light)-Newton's Rings – Theory and Applications

Introduction on Diffraction - Single slit Diffraction (Qualitative) - multiple slits (Grating) – Grating spectrometer to determine the Wavelength

Polarization - Brewster's law - Types of Polarization (plane, circular, elliptical) – Double refraction - Nicol's Prism - Half wave and Quarter wave plate - Engineering applications of Interference, Diffraction and Polarization

UNIT –II **12h**

DIELECTRICS

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of dielectric polarizations (Quantitative) - Claussius-Mosotti equation (qualitative)-Applications of Dielectrics

MAGNETIC PROPERTIES

Introduction to Magnetics-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Ferrites, Magnetic device applications

UNIT –III **10h**

Electromagnetic Fields

Divergence and Curl of Electric and Magnetic Fields-Maxwell's Equations, Electromagnetic wave propagation (conducting and non-conducting media)

Fiber Optics

Introduction to Optical Fibers-Total Internal Reflection-Critical angle of Propagation-Acceptanceangle - Numerical Aperture-Classification of fibers based on Refractive index profileand modes.

UNIT –IV **12h**

QUANTUM MECHANICS:

Introduction to matter waves – Schrodinger -Time Independent and Time Dependent wave equations - Particle in a box

FREE ELECTRON THEORY:

Classical free electron theory –Drawbacks - Quantumfree electron theory – Concept of Fermi Level – Density of states(Qualitatively)

UNIT –V **12h**

Band Theory of Solids:

Bloch's theorem (Qualitatively) – Kronig Penny model – Origin of Energy Bands -Energy bands in crystalline solids – classification of crystalline solids according to band theory.

Semiconductor Physics:

Introduction – Density of carriers in Intrinsic and Extrinsic semiconductors-Drift & Diffusion-relevance of Einstein's equation – Hall effect in semiconductors

Text books

1. M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. P.K.Palanisamy, "Engineering Physics", Sci-tech Publications.
3. H.K.Malik&A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018

Reference Books

1. David J.Griffiths, “Introduction to Electrodynamics”- 4/e, Pearson Education,2014
2. GerdKeiser “Optical Fiber Communications”- 4/e, Tata Mc GrawHill ,2008
3. S.M.Sze “Semiconductor devices-Physics and Technology”-Wiley,2008
4. R. K. Gaur, S. L.Gupta, Engineering Physics, Dhanpat Rai Publications.
5. P.K.Palanisamy, “Applied Physics”Sci-tech Publishers.

Web Links:

1. https://www.britannica.com/science/interference-physics
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

CO-PO Mapping:

1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	2	1	2	2	-	-	2	1	1
CO2	2	2	2	1	2	1	2	1	2	-	2	2
CO3	2	3	2	1	2	2	-	2	2	1	2	1
CO4	2	3	2	1	-	2	1	2	2	2	1	-

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. I Sem (1 semester)			
Course Code 19199112	**Engineering Physics Laboratory** (common for CSE, ECE, EEE)				
Teaching	Total contact hours-48	L	T	P	C
		-	-	3	1.5

Course Objectives:

On Completion of the course, the students will be able	
CO1:	To handle optical instruments like microscope and spectrometer, determine thickness of a hair/paper with the concept of interference and to estimate the wavelength and resolving power of different colors using diffraction grating
CO2:	To demonstrate the importance of dielectric material in storage of electric field energy in the capacitors and plot the intensity of the magnetic field of circular coil carrying current with varying distance
CO3:	To evaluate the acceptance angle of an optical fiber and numerical aperture and determine the resistivity of the given semiconductor using four probe method
CO4:	To identify the type of semiconductor i.e., n-type or p-type using Hall effect and determine the band gap of a given semiconductor

List of Physics Experiments

1. Determination of the radius of curvature of the lens by Newton's ring method
2. Magnetic field along the axis of a circular coil carrying current.
3. To determine the resistivity of semiconductor by Four probe method
4. To determine the energy gap of a semiconductor
5. Measurement of resistance with varying temperature
6. To determine the V-I characteristics of P-N Junction diode
7. To determine the V-I characteristics Zener diode
8. To verify the laws of vibration using sonometer
9. To determine the acceleration due to gravity using compound pendulum.

References:

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

Web link:

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

CO-PO Mapping:

1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial [High],

'-' : No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	2	-	3	1	-	1	-	-	2
CO2	2	3	2	3	2	3	1	-	3	-	-	3
CO3	2	3	2	3	2	3	1	-	2	-	-	3
CO4	2	2	3	3	2	2	1	-	2	-	-	3

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. I Sem			
Course Code 19199105	**PROBLEM SOLVING & PROGRAMMING IN 'C'**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Mathematics, Logical Ability		2	1	0	3

Course Objective(s)

This course is intended to teach the problem solving through programming and to train the student to the basic concepts of C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Outcomes:

On completion of the course, the students will be able to-

CO-1. Obtain the knowledge about different languages used in computer programming and basic terminology used in the computer programming.

CO-2. Write algorithm, flow chart, and structure of C program and make use of different C tokens inside C program.

CO-3. Develop program by using Control structure, different looping and Jump statement.

CO-4. Implement applications of Array, Structure and String inside the program. Also acquire the knowledge of different FILE operations.

CO-5. Obtain knowledge about accessing the memory in the program and also to develop the program by using different types of function calls.

UNIT-1

Introduction to Computers: Generations, CPU, Memory, I/o Devices

Introduction to Problem Solving: Algorithm, Pseudo code and Flowchart.

Introduction to Computer Programming: Computer Languages: Machine level, Assembly level and High-level language.

UNIT-2

C' Fundamentals: Structure of a C-program, C-character set, C Tokens: variables, constants, identifiers, data types and sizes, operators, Preprocessor.

I/O Functions: Header files, Standard I/O library functions-formatted I/O functions.

Decision making statements: simple if, if-else, nested if-else, else-if ladder, switch-case statements and sample programs.

Iterative Statements: for, while, do-while. Jump Statements-break, continue, goto

UNIT-3

Introduction to Arrays, Strings

Arrays- Declaration, initialization, storing and accessing elements of 1-D, 2-D and multi-dimensional arrays.

Array Applications: addition, multiplication, transpose, symmetry of a matrix.

Strings: declaration, initialization, reading and writing characters into strings, string operations, character and string manipulation functions.

UNIT-4: Pointers, Functions & Storage Classes

Pointers: Introduction to pointers, defining a pointer variable, Pointer to Pointer, Examples of pointers, using pointers in expressions, pointers and arrays.

Functions: declaration, definition, prototype, function call, return statement, types of functions, parameter passing methods, and function recursion.

Storage Classes: Auto, Static, Extern and Register

UNIT-5

Structures, Unions and Files

Structure and Union: Declaration, initialization, storing and accessing elements by using structure and union.

Files: Definition, Input and output operation into file.

Text Books

1. Problem Solving and Programming Concepts, Maureen Sprankle and Jim Hubbard, Pearson, 9th Edition.
2. "Programming in ANSI C" by E.Balagurusamy, McGraw Hill Publications.
3. "Programming in C" by Ashok N. Kamthane, 2/e Pearson, 2013.
4. "The C – Programming language" B.W.Kernighan, Dennis M. Ritchie.PHI.
5. "Let Us C", 12th Edition by Yashavant P. Kanetkar online in India.

Reference Books

1. Programming in C by Ajay Mittal, Pearson.
2. Programming with C, Bichkar, Universities press.
3. Programming in C, Reema Thareja, OXFORD.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (II semester)			
Course Code 19199293	**ENVIRONMENTAL STUDIES** (EEE)				
Teaching	Total contact hours - 65	L	T	P	C
Prerequisite(s): Knowledge of environment science		3	0	0	0

Course Objective: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Gain a higher level of personal involvement and interest in understanding and solving environmental problems.
CO2:	Comprehend environmental problems from multiple perspectives with emphasis on human modern lifestyles and developmental activities
CO3:	Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
CO4:	Recognize the interconnectedness of human dependence on the earth's ecosystems
CO5:	Influence their society in proper utilization of goods and services.

Syllabus:

UNIT – I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable Energy resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

UNIT – II: Ecosystems, Biodiversity, and its Conservation

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Definition: genetic, species and ecosystem diversity – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III: Environmental Pollution and Solid Waste Management

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV: Social Issues and the Environment

SOCIAL ISSUES AND THE ENVIRONMENT: Urban problems – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment 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.

UNIT – V: Human Population and the Environment

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health –Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health.

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

TEXT BOOKS :

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company

REFERENCES :

1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice hall of India Private limited.

Web Links:

1. https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf
2. https://www.tutorialspoint.com/environmental_studies/environmental_studies_tutorial.pdf
3. https://play.google.com/store/apps/details?id=com.techzone.higher.enviroment&hl=en_US

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	1	2	2	3	2	3	3	1
CO2	3	2	3	2	3	2	3	2	3	3	3	2
CO3	3	2	3	2	3	2	3	2	3	3	3	1
CO4	2	3	3	2	1	3	2	3	2	3	3	2
CO5	3	2	3	3	2	3	2	3	2	3	2	3

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. I Sem (1 semester)			
Course Code	COMMUNICATIVE ENGLISH LAB- I				
Teaching	Total contact hours – 48	L	T	P	C
Prerequisite(s) Learner should be equipped with basic language and communication skills like, Listening and Speaking which ensure good pronunciation and ease in communication		-	-	3	1.5

Course Objective: The course aims to

➢ Adopt activity based teaching-learning methods to ensure effective learning both in the classroom and laboratory sessions.

➢ Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

➢To improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Learning to communicate in English
CO2:	Comprehend native speakers accent.
CO3:	Speak appropriately in real life situations

Syllabus:

UNIT 1: BASIC AURAL AND ORAL SKILLS

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and other

Speaking: Phonetics-Accent and pronunciation

UNIT 2 CONVERSATIONAL SKILLS

Listening: Listening to audio texts, framing question in order to find out the gist of the text.

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

UNIT 3: LANGUAGE IN USE

Listening: Listening for global comprehension and summarizing.

Speaking: 1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating

2. Apologizing, Advising, Suggesting, Agreeing and Disagreeing

UNIT 4: LANGUAGE APPPLICATOIN

Listening: Making predictions while listening to conversations/ transactional dialogues; listening to video and narrating the theme.

Speaking: word stress-di-syllabic words, Poly-Syllabic words -Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

UNIT 5: FORMAL INTERPRETATION

Listening: TED Talks – understanding the summary

Speaking: Formal oral presentations on topics from academic contexts and technical back ground

Suggested Lab Manual: INTERACT from Orient Black Swan

Reference Books:

1. English Pronunciation in use- Mark Hancock, Cambridge University Press
2. English Phonetics and Phonology-Peter Roach, Cambridge University Press.

Web links:

https://www.usingenglish.com/comprehension/
https://www.englishclub.com/reading/short-stories.htm
https://www.english-online.at

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*
CO1	-	-	-	-	-	*3*	*3*	*3*	-	-	-	*3*
CO2	-	-	-	-	-	*2*	*3*	*2*	-	-	-	*1*
CO3	-	-	-	-	-	*3*	*2*	*3*	-	-	-	*1*

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech.			
Course Code 19199113	**Problem Solving & Programming Laboratory Using C**				
Teaching	Total contact hours- 36	L	T	P	C
Prerequisite(s): Basic knowledge of Mathematics, Logical Ability		0	0	3	1.5

Course Objective(s):

This course is intended to impact adequate programming skills to solve mathematical problems and to develop programming skills using the fundamentals and basics of C language. This enables effective usage of arrays, strings, functions, pointers and files.

Course Outcomes:

On completion of the course, the students will be able to-

CO-1. Know concepts in problem solving.
CO-2. Analyze a problems and Implement programs in C language.
CO-3. Work with arrays, pointers and structures.
CO-4. Apply functions concepts for problem solving.
CO-5. Implement FILE operations for storage purpose.

Programs:

1. Write a C Program to
   a) Calculate the area of triangle using the formula
      Area = (s (s-a) (s-b) (s-c)) 1/2, where s= (a+b+c)/2
   b) To find the largest of three numbers using ternary operator.
   c) To swap two numbers without using a temporary variable.
2. Write a C program that perform the following operations:
   a) Reading and writing a complex number
   b) Addition of two complex numbers
3. Write a C program to
   a) 2"s complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2"s complement of 11100 is 00100. Write a C program to find the 2"s complement of a binary number.
   b) Find the roots of a quadratic equation.
   c) Take two integer operands and one operator form the user, Performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
4. Write a C Program to print the following patterns
   a) Floyd's triangle
   b) Pyramid
   c) Pascal Triangle
5. Write a C program to
   a) Check whether the given number is Armstrong number or not.
   b) Check whether the given number is palindrome or not.
   c) Find the sum of individual digits of a positive integer and find the reverse of the given number.
   d) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

e) Generate all the prime numbers between 1 and n, where n is a value supplied by the user.

6. Write a C Program to
   a) Print the multiplication table of a given number n up to a given value, where n is entered by the user.
   b) Enter a decimal number, and calculate and display the binary equivalent of that number.
   c) Enter a binary number, and calculate the decimal equivalent of that number.
7. Write a C program to
   a) Interchange the largest and smallest numbers in the array.
   b) Implement a linear search.
   c) Implement binary search.
8. Write a C program to
   a) Examples which explore the use of structures, union and other user defined variables.
   b) Declare a structure for calculating the percentage achieved by 3 students, by considering the structure elements as name, pin no, mark1, mark2, mark3.
9. Write C Programs
   a) For the following string operations without using the built in functions to
      i. length of a string
      ii. reverse a string
      iii. append a string to another string
      iv. compare two strings
   b) Write a C Programs to check whether the given string "MADAM" is palindrome or not without using the built in functions.
10. Write a C program
    a) Use functions to perform the following operations:
       i. To insert a sub-string in to given main string from a given position.
       ii. To delete n Characters from a given position in a given string.
    b) To replace a character of string either from beginning or ending or at a specified location
11. Write a C Programs for the following string operations with and without using the built in functions
    a) To reverse a string using pointers.
    b) To concatenate two strings by using pointer.
12. Write a C programs that use both recursive and non-recursive functions for the following
    a. To find the factorial of a given integer.
    b. To find the GCD of two given integers.
    c. To find Fibonacci sequence.
13. Write C programs to
    a) Find the area of triangle by using call by value and call by reference concepts.
    b) Pointer based function to exchange value of two integers using passing by address.
14. Write C programs to
    a) Read and display the data from a file.
    b) Copy the data from one file to another file.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-		-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. I Sem (1 semester)			
Course Code 19199112	**Engineering Physics Laboratory** (common for CSE, ECE, EEE)				
Teaching	Total contact hours-48	L	T	P	C
		-	-	3	1.5

Course Objectives:

On Completion of the course, the students will be able	
CO1:	To handle optical instruments like microscope and spectrometer, determine thickness of a hair/paper with the concept of interference and to estimate the wavelength and resolving power of different colors using diffraction grating
CO2:	To demonstrate the importance of dielectric material in storage of electric field energy in the capacitors and plot the intensity of the magnetic field of circular coil carrying current with varying distance
CO3:	To evaluate the acceptance angle of an optical fiber and numerical aperture and determine the resistivity of the given semiconductor using four probe method
CO4:	To identify the type of semiconductor i.e., n-type or p-type using Hall effect and determine the band gap of a given semiconductor

List of Physics Experiments

1. Determine the thickness of the fiber using wedge shape method
2. Determination of the radius of curvature of the lens by Newton's ring method
3. Determination of wavelength by plane diffraction grating method
4. Dispersive power of a diffraction grating
5. Resolving power of a grating
6. Magnetic field along the axis of a circular coil carrying current.
7. To determine the resistivity of semiconductor by Four probe method
8. To determine the energy gap of a semiconductor
9. Measurement of resistance with varying temperature
10. To determine the V-I characteristics of P-N Junction diode
11. To determine the V-I characteristics Zener diode
12. To determine the carrier concentration and Hall coefficient
13. To verify the laws of vibration using sonometer
14. To determine the acceleration due to gravity using compound pendulum.

References:

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

Web link:

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

CO-PO Mapping:

1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial [High], '-' : No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	2	-	3	1	-	1	-	-	2
CO2	2	3	2	3	2	3	1	-	3	-	-	3
CO3	2	3	2	3	2	3	1	-	2	-	-	3
CO4	2	2	3	3	2	2	1	-	2	-	-	3

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. II Sem (2^{nd} semester)			
Course Code 19199201a	**(PROBABILITY & STATISTICS)** (FOR CSE BRANCH)				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Knowledge of Mathematics at 10+2 , Basic Statistics with Reasoning ability		3	-	-	3

Course Objective:

- Paraphrase a comprehensive set of descriptive statistical methods, in order to display data in a meaningful way.
- Integrate correlation analysis in order to estimate the nature and the strength of the linear relationship.
- Implement regression analysis to predict the value of one variable based on the value of the other variable.
- Exemplify probability theory in order to evaluate the probability of real world events;
- Apply discrete and continuous probability distributions to provide solutions for practical problems.
- Monitoring confidence interval estimates and hypotheses tests for population parameters Execute comprehensive set of statistical tools in making practical decisions and creating reports in workplace situations; and in completing papers and research projects in other university and college courses.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Apply the knowledge of descriptive statistics and method of data science in practical engineering problems.
CO2:	Apply the Knowledge of Probability in practical Engineering problems.
CO3:	Demonstrate the knowledge of Probability distributions.
CO4:	Enhance knowledge in Sampling & Estimation techniques.
CO5:	Enhance Knowledge in Design of Experiments.

Syllabus:

Unit I: Descriptive Statistics and Methods for Data Science

Data science, Statistics Introduction, Population vs Sample, event, mutually exclusive, independent and exhaustive events. Measures of Central tendency, Measures of Variability (spread or variance) Skewness, Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, principle of least squares, method of least squares, regression lines.

UNIT II: Probability

Probability, axioms of probability, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT III: Probability Distributions
Probability distribution - Binomial, Poisson approximation to the Binomial distribution and Normal distribution-their properties.

UNIT 1V: Estimation and Testing of Hypothesis, Large Sample Tests
Estimation- parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems.

UNIT V: Small Sample Tests
Student t-distribution (test for single mean and two means), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes. One-way ANOVA Classified data.

Text Books:

1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
3. Probability and statistics for Engineering and Scientists : Ronald E.Walpole, Sharon L.Mayers and Keying Ye:Pearson.

Reference Books:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

Web Links:

1. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-151-probability-and-statistics-in-engineering-spring-2005/lecture-notes/
2. https://lecturenotes.in/subject/69/probability-and-statistics-ps
3. https://nptel.ac.in/courses/111105041/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	-	-	-	-	-	-	-	2
CO2	2	2	2	2	-	-	-	-	-	-	-	2
CO3	2	2	2	2	-	-	-	-	-	-	-	2
CO4	2	2	2	2	-	-	-	-	-	-	-	2
CO5	2	2	2	2	-	-	-	-	-	-	-	2

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. IISem (II semester)			
Course Code	**COMMUNICATIVE ENGLISH –II**				
Teaching	**Total contact hours – 54**	L	T	P	C
Prerequisite(s): **Learner should possess the primary communicative abilities suitable for global exposure and professional communication**		**3**	-	-	3

Course Objective: This course aims to

- Provide training and opportunities to develop fluency in English through participation in formal group discussions and presentations using audio-visual aids.
- Demonstrate good writing skills for effective paraphrasing, argumentative essays and formal Correspondence.
- Encourage use of a wide range of grammatical structures and vocabulary in speech and writing.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Paraphrase short academic texts using suitable strategies and conventions
CO2:	Make formal structured presentations on academic topics using PPT slides with relevant graphical elements
CO3:	Build the ability to convey in different communicative forms.

Syllabus:

UNIT: I

READING: Detailed Text: Mohammad Yunus' Speech at the Nobel Prize ceremony. AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

Non-Detailed Text: The Scare Crow by Satyajit Ray from 'Panorama: A Course on Reading."-OXFORD

GRAMMAR: Conjunctions and sentence connectors

V**OCABULARY:** Adjective-noun collocations

WRITING SKILLS: E-mail writing: structure, etiquette.

UNIT: II

READING: DETAILED TEXT: Biography of A. R. Rahman from AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

NON-DETAILED TEXT: A village Lost to the Nation by Krishna Chandra Pujari from 'Panorama: A Course on Reading."-OXFORD

GRAMMAR: Active and passive voice, foreign expressions in English.

VOCABULARY: ACRONYMS and their usage

WRITING SKILLS: Formal letter writing- structure, conventions and etiquette (enquiry, complaints, seeking permission, seeking internship);

UNIT: III

READING: DETAILED TEXT: "You Start Dying Slowly" by Pablo Neruda. AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

Non-Detailed Text: Martin Luther King by Chinua Achebe from 'Panorama: A Course on Reading."-OXFORD

GRAMMAR: subject agreement, verb-noun collocations

VOCABULARY: word roots

WRITING: Resume- drafting **a** cover letter for job application.

UNIT IV:

READING: DETAILED TEXT: 'Most Beautiful' by Ruskin Bond. AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

GRAMMAR: Misplaced modifiers-conditional clauses

VOCABULARY: Idiomatic expressions

WRITING: Note taking**-** avoiding redundancies and clichés in written communication

UNIT V:

READING: DETAILED TEXT: "Film Making" by Satyajit Ray. From AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

GRAMMAR: Editing short texts, correcting common errors in grammar and usage,

VOCABULARY: words often confused

Writing: Structure and contents of a Project Report; identifying sections in project reports; understanding the purpose of each section; significance of references. Writing Introduction and Conclusion

Prescribed Text books:

DETAILED TEXTBOOK: AVENUES-Course Book-II by ORIENT BLACK SWAN Pvt Ltd

NON-DETAIL TEXT BOOK: 'Panorama: A Course on Reading."-OXFORD

Reference Books:

● Bailey, Stephen. Academic writing: A handbook for international students. Rutledge, 2014.

● Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Henley ELT; 2nd Edition, 2018.

WEB REFERENCES:

English Language Learning Online

BBC Vocabulary Games

Free Rice Vocabulary Game

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], ' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	3	2	-	-	-	1
CO2	-	-	-	--	-	2	3	2	-	-	--	2
CO3	-	-	-	-	-	3	3	2	-	-	-	1

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (1 semester)			
Course Code 19199203	APPLIED CHEMISTRY ECE,CSE				
Teaching	**Total contacthours-65**	L	T	P	C
Prerequisite (s): Knowledge of theoretical and experimental from Intermediate level, Application of Chemistry theory and calculations required course.		3	-	-	3

Course Objective:

To instruct electrochemical energy systems and their applications , basic concepts of battery technology and Photovoltaic's and to expose the students to latest instrumental techniques such as scanning electronic microscope (SEM) & transmission electron microscope (TEM).

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Compare different types of cells
CO2	Explain the merits of fuel cells
CO3	List various sources of renewable energy
CO4	Distinguish between polymers and plastics
CO5	Distinguish between nano clusters & nanowires, polymers

Syllabus

Unit- I

ELECTROCHEMICAL ENERGY SYSTEMS - I

Introduction- concept of conductivity, Electrode Potential, Measurement of single Electrode Potentials, Nernst equation, Electrochemical Series, Reference electrodes (Calomel electrode, Standard Hydrogen electrode) - electrochemical cell - Galvanic Cell vs Electrolytic Cell - Ion Selective Electrodes- glass membrane electrode- gas sensing electrodes - Concentration Cells.

Unit-II

ENERGY SOURCES AND APPLICATIONS

Basic concepts, battery characteristics, classification of batteries, Important applications of batteries, Classical batteries-dry/ Leclanche cell, Modern batteries-zinc air, lithium cells-Li MnO_2 cell- challenges of battery technology. Fuel cells- Introduction - classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell- Merits of fuel cell. p and n type semi conductors - PV cell / solar cell- Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy.

Unit- III

CORROSION AND ITS PREVENTION

Definition–theories of corrosion (chemical and electrochemical) galvanic corrosion, differential aeration corrosion, Pitting corrosion, Passivity of metals, factors influencing

corrosion, corrosion control methods, proper designing and cathodic protection, protective coatings-cathodic and anodic coating, electroplating ,paints.

Unit-IV

POLYMER CHEMISTRY

Introduction to polymers, functionality of monomers, types of polymerization, mechanism of addition polymerization,

Plastics –compounding and fabrication of plastics. Preparation, properties and applications of –PVC,polyethylene, Bakelite, urea-formaldehyde, Nylon-66. Elastomers–Buna-S, Buna-N– preparation, properties and applications.

Conducting polymers – polyacetylene – mechanism of conduction and applications.

Unit – V

MATERIAL CHEMISTRY

Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM). Insulators and magnetic materials-electrical insulators Ferro and ferric magnetism and its applications

Text Books:

1. P.C. Jain and M. Jain, Engineering Chemistry,15/e, Dhanapat Rai & Sons, Delhi (2014).
2. B.K. Sharma, Engineering Chemistry, Krishna Prakashan, Meerut.
3. O G Palanna, Engineering Chemistry, Tata McGraw Hill Education Private Limited, (2009).

References:

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003)
2. B.S Murthy and P. Shankar, A Text Book of NanoScience and NanoTechnology, University Press (2013).
3. N. Krishna Murthy and Anuradha, A text book of Engineering Chemistry, Murthy Publications (2014).

Weblink:

1. www.chem.tufts.edu
2. www.chem1.com

CO-PO Mapping:

1: Slight [Low]; 2: Moderate[Medium]; Substantial[High], '-' : No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	1	1	-	-	2	-	-	1
CO2	2	-	1	-	-	2	-	-	1	-	-	1
CO3	3	-	1	-	1	2	-	-	2	-	-	2
CO4	3	-	2	-	-	2	-	-	3	2	-	3
CO5	3	-	2	-	-	2	-	-	2	-	-	3

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (2 semester)			
Course Code 19199206	**PYTHON PROGRAMMING**				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Knowledge of any programming language		3	0	0	3

Course Objective(s):
This course is intended to teach adequate knowledge on different data structures technique and to develop solutions for problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

Course Outcomes:
On completion of the course, the students will be able to-
CO-1: Handle different data structures.
CO-2: understand the use of control statements, function overloading, operator overloading in real time application
CO-3: Implement files using various file operations.

UNIT-1
Introduction to Python: History Features, Installing Python, Running Python, Comments, Operators, Identifiers, and Variables.

UNIT-2
Conditional Statements, Loops, Statements and Syntax, Numbers

UNIT-3
Sequences: Strings, Lists, Tuples, Dictionaries, Files and Input/output

UNIT-4
Errors and Exceptions, Functions and functional programming, Modules.

UNIT-5
Object oriented programming in Python, Execution environment, Regular expressions.

Text Books
1. Wesley J. Chun "Core Python Programming" Prentice Hall
2. Head First Python, 2nd Edition

Reference Books
1. Mark Lutz “Programming Python, 4th Edit O'ReillyMedia
2. David Beazley and Brian K. Jones"Python Cokboo'Reilly

CO-PO Mapping:
(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-' : No Correlation)

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PO12
CO1	2	-	-	-	1	-	-	-	-	-	-	-
CO2	3	1	-	-	2	-	-	-	-	-	-	-
CO3	-	2	-	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	**Godavari Institute of Engineering & Technology (Autonomous)**	I B.Tech. II Sem (1I semester)			
Course Code	COMMUNICATIVE ENGLISH LAB- II				
Teaching	**Total contact hours – 45**	L	T	P	C
Prerequisite(s) Learner should be equipped with basic language skills and communication skills like Listening and Speaking			-	3	1.5

Course Objectives the course aims

- To enable students to develop listening skills for better comprehension of academic presentations, lectures and speeches.
- To hone the speaking skills of students by engaging them in various activities such as just a minute (JAM), group discussions, oral presentations, and role plays.
- To expose learners to key Reading techniques such as Skimming and Scanning for comprehension of different texts. .

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	communicate confidently in English in social and professional contexts with improved skills of fluency and accuracy
CO2:	speak grammatically correct sentences employing appropriate vocabulary suitable to different contexts
CO3:	read for various scholarly materials for information and comprehension

Syllabus:

UNIT1: ARGUMENTATIVE SKILLS

Listening: Listening for presentation strategies and answering questions on the speaker, audience and key points.

Speaking: Debating-dos and don'ts – structure of a debate

UNIT 2: PRESENTATION SKILLS

Formal and informal Presentations-Following an argument/ logical flow of thought; answering questions on key concepts after listening to key concepts and academic discourse

U**NIT 3: CO-ORDINATING SKILLS-**

Listening: Group Discussion -Identifying views and opinions expressed by different speakers while listening to discussions.

Speaking: Group discussion on general topics; agreeing and disagreeing, using claims and examples/ evidences for presenting views, opinions and position- types and styles of G.Ds

UNIT 4: INTERVIEW SKILLS-industry readiness

Listening: Watching and listening to job interviews-understanding interview questions

Speaking: Mock Interviews-Interview etiquette

UNIT 5: PROFESSIONAL COMPETENCE

Listening: Watching and listening to news and panel discussions; workplace communication - formal dialogues/ conversations.

Speaking: speech presentation.

Suggested Lab Manual : INTERACT by Orient Black Swan

SOFTWARE: Train to Success series and Speak Well

References book: Infotech English, Maruthi Publications.

Web Resources:

- 1-language.com
- http://www.5minuteenglish.com
- https://www.englishpractice.com

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*
CO1	-	-	-	-	-	*3*	*2*	*3*	-	-	-	*1*
CO2	-	-	-	-	-	*2*	*2*	*3*	-	-	--	*1*
CO3	-	-	-	-	-	*3*	*2*	*2*	-	-	-	*2*

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (2 semester)			
Course Code 19199214	**PYTHON PROGRAMMING LAB**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge in programming Language		0	0	3	1.5

Course Objective(s):

This course is intended to teach the adequate knowledge on the python programming language and to develop the skills of programming for implementing object oriented concepts and data structures by using python programming language.

1. Implement a Python program that obtains the name from the user and prints the message "Hello Username, Welcome to the Python World!".
2. Implement a Python program to print all the prime numbers below n. n value should be taken from the user at the time of execution.
3. Implement Sorting Program in Python:
4. Enter a list of numbers and sort the values in largest-to -smallest order.
5. Implement a Python program for finding the factorial of a given number.
6. Implement a STACK program by using PYTHON.
7. Implement a QUEUE program by using PYTHON.
8. Implement a Python Program for creating a dictionary and display its keys alphabetically.
9. A string with parentheses is well bracketed if all parentheses are matched: every opening bracket has a matching closing bracket and vice versa.Write a Python function well bracketed(s) that takes a string s containing parentheses and returns True if s is well bracketed and False otherwise.
10. Implement a Python Program that reads and displays the contents of a file.
11. Program to show how a class method calls a function defined in the global namespace.
12. Program to illustrate the difference between public and private variables using class.
13. Program to call a class method from another method of the same class.

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (1 semester)			
Course Code 19199212	**ENGINEERING CHEMISTRY LABORATORY (CSE, ECE)**				
Teaching	**Total contact hours 48**	L	T	P	C
Prerequisite(s):Basic knowledge of Engineering Chemistry Applications		**0**	**0**	**3**	**1.5**

COURSE OBJECTIVES

To familiarize the students with the basic concepts of Engineering Chemistry lab, training the students on how to handle the instruments and to demonstrate the digital and instrumental methods of analysis.

COURSE OUTCOMES

On Completion of the course, the students will be able to-	
CO1:	Explain the functioning of the instruments such as pH, Conductivity and Potentiometric meters
CO2:	Determine the total hardness of water
CO3:	Perform various Redox titrations
CO4:	Preparation of polymers
CO5:	Compare viscosities of different oils

LIST OF EXPERIMENTS

1. Determination of strength of an acid by pH metric method
2. Determination of Fe (II) in Mohr's salt by potentiometric method
3. Determination of conductance by conductometric method
4. Determination of Hardness of a ground water sample.
5. Determination of chromium (VI) in potassium dichromate
6. Determination of strength of $KMnO_4$ using standard Oxalic acid solution.
7. Determination of Zinc by EDTA method.
8. Preparation of Phenol-Formaldehyde resin
9. Determination of viscosity of a liquid
10. Determination of surface tension of a liquid
11. Estimation of active chlorine content in Bleaching powder

TEXT BOOKS

1. Mendham J, Denney RC, Barnes JD, Thosmas M and Sivasankar B Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers (2000).
2. N.K Bhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, Dhanpat Rai Publishing Company (2007).

CO-PO Mapping:

1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	2	2	-	-	1	-	-	1
CO2	3	2	2	1	1	2	-	-	2	-	-	1
CO3	2	2	2	1	1	2	-	-	-	-	-	1
CO4	3	2	2	1	1	2	-	-	2	1	-	1
CO5	2	2	2	1	1	2	-	-	-	-	-	1

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19159301	**DISCRETE MATHEMATICS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Mathematics		2	1	0	3

Course Objective(s):
This course is intended to teach the simple mathematical proofs and possess the ability to verify them and to understand logical arguments and logical constructs. This course includes better understanding of sets, functions, and relations. This course will also give exposure to describe computer programs in a formal mathematical manner. This course includes working with graphs and its applications

Course Outcomes:
On completion of the course, the students will be able to-
CO-1. Perform operations on discrete structures such as sets, functions, relations, and sequences.
CO-2. Apply algorithms and use definitions to solve problems to prove statements in elementary Number theory.
CO-3. Construct mathematical arguments using logical connectives and quantifiers.
CO-4. Verify the correctness of an argument using propositional and predicate logic and truth Tables.
CO-5. Explain basic definitions and properties associated with simple planar graphs, including Isomorphism, connectivity, and Euler's formula, and describe the difference between Eulerian and Hamiltonian graphs.
CO-6. Use graphs and trees as tools to visualize and simplify situations.

UNIT-1
Propositional Calculus: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautologies, equivalence of Formulas, Tautological Implications, Normal forms, Argument.
Predicate Calculus: Predicative Logic, statement functions, variables and quantifiers, free & bound variables, inference theory of predicate calculus

UNIT-2
Set Theory: Introduction, binary sets, operations on binary sets, Principle of Inclusion and Exclusion.
Relations: Introduction, Properties of Binary Relations, Operations on Relations, Equivalence, Transitive closure, Compatibility Relations, Partial ordering Relations, Hasse diagram.
Functions: Introduction, Types of functions, Composition of functions, Inverse functions, Recursive functions, Pigeonhole principle.

UNIT-3
Graph Theory: Basic Concepts, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Types of Graphs, Isomorphism, Homomorphism.
Spanning Trees: Properties, Algorithms for Spanning trees and Minimum Spanning Tree.

UNIT-4

Number Theory & Induction: Properties of integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

Algebraic Structures: Lattice-Properties, Lattices as Algebraic Systems, Algebraic Systems with one Binary Operation, Properties of Binary operations Groups: Abelian Group, Cosets, Subgroups (Definitions and Examples of all Structures)

UNIT-5

Binomial Theorem: Binomial and Multinomial Coefficients, Generating functions, Properties of Generating functions, The Principles of Inclusion – Exclusion.

Recurrence Relation: Recurrence Relations, Formulation as Recurrence Relations, Solving linear homogeneous recurrence Relations by substitution, generating functions and the Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations.

Text Books

1. Discrete Mathematics, Swapan Kumar chakrborthy, Bikashkantisarkar, OXFORD.
2. Discrete Mathematical Structures with Applications to Computer Science, Tremblay, Manohar, TMH.

Reference Books

1. Discrete Mathematics, Proofs, Structures and applications, Rowan Garnier, John Taylor 3rd Ed, CRC Press
2. Discrete Mathematics, S.Santha, Cengage
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	1	2		-	-	-	-	-	-	-
CO3	3	3	-	-	3	-	-	-	-	-	-	-
CO4	2	-	3	2	-	-	-	-	-	-	-	-
CO5	3	2	2	-	3	-	-	-	-	-	-	-
CO6	1	2	3	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150302	**OBJECT ORIENTED PROGRAMMING USING C++**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Logical Thinking and basics of procedural oriented programming.		3	0	0	3

Course Objectives:
This course is intended to teach the principles of data abstraction, inheritance and polymorphism. The principles of virtual functions and polymorphism, concept of exception handling.Develop applications for a range of problems using object-oriented programming techniques.

Course Outcomes:
After successful completion of this course, a successful student will be able to
CO-1. Describe the procedural and object oriented paradigm with concepts of data abstraction, inheritance.
CO-2. Understand principles of virtual functions and polymorphism
CO-3. Describe the concept of exception handling
CO-4. Use object-oriented programming techniques in a wide range of real time applications.

UNIT - I
Object-Oriented Concept: Definition of object oriented programming, definition of class and object, properties of OOP concepts: (Abstraction, Encapsulation, Inheritance and Polymorphism), differences between OOP and Procedure oriented programming, advantages of object oriented programming.
C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators and it's Precedence, Type conversions, and overview of Pointers, Arrays, Strings, Structures.

UNIT - II
Introduction to Control Structure & Function Concept: Flow control statement- if, if-else, if-else ladder, switch, while, for, do, break, continue. Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions. Dynamic memory allocation and de-allocation operators (new and delete).

UNIT - III
C++ Classes and Data Abstraction: Class member(data member and member functon), Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors (zero-argument, parameterised, Copy)and Destructors, Data abstraction, ADT and information hiding.

UNIT - IV
Inheritance: Defining a class hierarchy, Defining the Base and Derived classes, Different forms of inheritance, Base and Derived class construction, Virtual base class.
Virtual Functions and Polymorphism: Static and Dynamic binding, Operator Overloading, virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes.

UNIT - V
Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions.

TEXT BOOKS:

1. The Complete Reference C++, 4th Edition, Herbert Schildt, Tata McGraw Hill.
2. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.

CO-PO Mapping:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	-	-	-	1	-	-	-	-	-	-	-
CO 2	3	1	-	-	2	-	-	-	-	-	-	-
CO 3	-	2	-	-	3	-	-	-	-	-	-	-
CO 4	-	3	3	-	3	-	-	-	-	-	-	2

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150303	**Digital Logic & Computer Organization**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Basic knowledge of Number Systems		3	0	0	3

Course Objective:
This course is intended to teach the basics involved digital logic circuits used in the computer system. This includes the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design. This course will also expose students to the basic architecture of processing, memory and I/O organization in a computer system.

Course Outcomes:
On completion of the course, the students will be able to-

CO-1: Minimize a Boolean function using Boolean algebra and K-Maps.
CO-2: Model a system as combinational switching circuit and analyze the applications of decoder, encoder, multiplexer and de-multiplexer.
CO-3: Model a sequential circuit and design various binary counters.
CO-4: Describe various addressing modes, instruction formats and program control statements.
CO-5: Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components.

UNIT -I
Boolean Algebra and Logic Gates: Postulates of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and standard forms, Basic operators and Logic gates, Simplification of Boolean Expressions by K-Maps.

UNIT -II
Combinational Logic: Combinational Circuit Design Procedure, Binary Adder-Subtractor, Floating Point Representation of numbers, Decoder, Encoder, Multiplexer, Demultiplexer.

UNIT -III
Sequential Logic: Sequential Circuits, Flip-Flops - SR, JK, D and T flip flops, Shift Registers, Asynchronous Counters, Synchronous Binary Counters, Ripple Counter, Johnson's Counter.

UNIT -IV
Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.
Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

UNIT -V
Central Processing Unit: Operation Code Encoding and Decoding, Instruction set and instruction Formats, Addressing Modes, CPU Buses.
Memory Organization: Introduction, Memory Parameters, Semiconductor memory cell, Dynamic RAM, ROM, Cache in memory organization, Design and performance of cache memory system, Virtual memory-Address translation, Page Replacement, page Fetching, Page size.
Memory mapped IO, Direct memory access, DMA controller.

Text books:

1. Rajaraman V., Radhakrishnan T, Digital Logic and Computer Organization, PHILearning
2. Morris M. Mano, Digital Design, 5th edition, Pearson, 2014.
3. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, MGH
4. William Stallings, Computer Organization and Architecture: Designing for Performance, 8/e, Pearson Education India. 2010.

Reference Books:

1. Z. Kohavi, Switching and Finite Automata Theory, Tata McGraw Hill.
2. C. H. Roth, L. L. Kinney, Fundamentals of Logic Design, 7th edition, Cengage Learning.
3. Computer System Architecture, M. Morris Mano, 3rd Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

Web Links:

1. **https://nptel.ac.in/courses/117106086/**
2. **https://nptel.ac.in/courses/117105078/**

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	2		3	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150304	**DATA STRUCTURES**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Mathematics & Logical Ability		3	0	0	3

Course Objective(s):
This course is intended to teach the basic techniques of algorithm analysis with writing recursive methods. This course includes several sub-quadratic sorting algorithms and implementation of data structures. This course is designed to deal with the comprehensive knowledge of data structures and ability to implement the same in software applications

Course Outcomes:
On completion of the course, the students will be able to-
CO-1: Choose appropriate data structure as applied to specified problem definition.
CO-2: Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
CO-3: Apply concepts learned in various domains like DBMS, compiler construction.
CO-4: Use linear and non-linear data structures like stacks, queues, linked list etc.,

UNIT-1
Data structure- Definition, types of data structures
Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence. Preliminaries of algorithm, Algorithm analysis and complexity.
Searching Techniques: Linear Search, Binary Search and Fibonacci Search.
Sorting Techniques: Insertion sort, selection sort, exchange-bubble sort, quick sort and merge sort Algorithms.

UNIT-2
Stacks: Basic Stack Operations, Representation of a Stack using Arrays
Applications of Stack: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions.

UNIT-3
Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack.
Applications of Queues-Circular Queues, De-queue, Priority Queues.

UNIT-4
Linked Lists: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, reversing a single linked list, Circular linked list and Double linked list.
UNIT-5
Trees-Binary Trees, terminology, representation and traversals-pre, post & in order traversals.
Graphs- terminology, representation and traversals (BFS&DFS).

Text Books

1. Data Structures with C, Seymour Lipscutz, Schaum's Outlines, TMH-special 2nd Edition
2. Data structures using C, 2nd Edition, ReemaThareja, Oxford higher education.

Reference Books

Data structures: A Pseudo code Approach with C, 2nd edition, R.F.Gilberg andB.A.Forouzan, Cengage Learning

1. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum, Y. Langsam, M.J.Augenstein, Pearson.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-		3	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150305	**Database Management Systems**				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Basic knowledge of Data structures, Proportional logic		3	0	0	3

Course Objective(s):

This course is intended to teach the students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications. This course includes the logical design, physical design and implementation of relational databases.

Course Outcomes:

On completion of the course, the students will be able to

CO:1 Define a Database Management System

CO:2 Give a description of the Database Management structure Understand the applications of Databases

CO:3 Know the advantages and disadvantages of the different models

CO:4 Compare relational model with the Structured Query Language (SQL)

CO:5 Know the constraints and controversies associated with relational Database model. know the rules guiding transaction ACID

CO:6 Understand the concept of data planning and Database design Identify the various functions of Database Administrator

UNIT-I

Introduction: Database System VS file System, Advantages of a DBMS View of Data, Data Abstraction, three-level schema structure instances and Schemas, , data types, table definitions, data Models, ER Model, Relational Model, Other Models, Database Languages: DDL, DML, DCL. Different types of data base Users and their responsibility.

UNIT-II

The Entity Relationship Model: Data base design and ER diagrams, Beyond ER Design Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Concept Design with the ER Model, and Conceptual Design for Large enterprises.

UNIT- III

Database Query Operation: DML operations- **Procedural** (selection, projection, set difference, cartesian product, join) and **non-procedural:** domain and tuple calculus, DDL operations. Basic SQL querying (select and project) using where clause, sub queries, grouping, aggregation, ordering, implementation of different types of joins.

UNIT-IV

Schema Refinement (Normalization): Purpose of Normalization, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF), Boyce-Codd normal form (BCNF), Lossless join and dependency preserving decomposition, Fourth normal form (4NF).

UNIT–V

Transaction Management: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Storage and Indexing: Database file organization, file organization on disk, heap files and sorted files, hashing, single and multi-level indexes.

Text Books

1. Database System Concepts 6e By Abraham Silberschatz, Henry Korth and S Sudarshan
2. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH

Reference Books

1. Introduction to Database Systems, 8/e C J Date, PEA
2. The Database book principles & practice using Oracle/My Sql Narain Gehani, University Press.
3. Oracle Database 11g. The complete reference (oracle press)

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	1	2		-	-	-	-	-	-	-
CO3	3	3	-	-	3	-	-	-	-	-	-	-
CO4	2	-	3	2	-	-	-	-	-	-	-	-
CO5	3	2	2	-	3	-	-	-	-	-	-	-
CO6	1	2	3	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150306	**Design Thinking and Product Innovation**				
Teaching	Total contact hours - 32	L	T	P	C
Prerequisite(s):Fundamental knowledge Digital logic and sensors		2	0	0	0

Course Objectives:
This course is intended to build mindsets & foundations essential for designers, to learn about the Human-Centered Design methodology and understand their real-world applications. This course includes the usage of Design Thinking for problem solving methodology for investigating ill-defined problems. This course undergoes several design challenges and work towards the final design challenge.

Course Outcomes:
On completion of the course, the students will be able to

CO-1: Create software designs that are scalable and easily maintainable
CO-2: Use structural design patterns for better class and object composition
CO-3: Ability to understand and apply common design patterns to incremental / iterative development.
CO-4: Ability to identify appropriate patterns for design of given problem.

Apply Design Thinking on the following Streams to
Project Stream 1: Electronics, Robotics, IOT and Sensors
Project Stream 2: Computer Science and IT Applications
Project Stream 3: Mechanical and Electrical tools
Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

TASKS TO BE DONE:
Task 1: Everyone is a Designer Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast Gain a quick introduction to the design thinking methodology Go through all stages of the methodology through a simple design challenge Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems Start Design Challenge and learn about teams & problems through this Foster team collaboration, find inspiration from the environment and learn how to identify

Problems.

Task 4: Empathizing Continue Design Challenge and learn empathy Learn techniques on how to empathize with users Go to the field and interview people in their environments Submit Activity Card.

Task 5: Ideating Continue Design Challenge and learn how to brainstorm effectively Encourage exploration and foster spaces for brainstorming Submit Activity Card

Task 6: Prototyping Continue Design Challenge and learn how to create effective prototypes Build tangible models and use them as communication tools Start giving constructive feedback to classmates and teammates Submit Activity Card.

Task 7: Testing Finish Design Challenge and iterate prototypes and ideas through user feedback
Evolve ideas and prototypes through user feedback and constructive criticism Get peer feedback on individual and group performance Submit Activity Card.

Task 8: Final Report Submission and Presentation.

Note: The colleges may arrange for Guest Speakers from Various Design Fields: Graphic Design, Industrial Design, Architecture, Product Design, Organizational Design, etc to enrich the students with Design Thinking Concept.

HOW TO PURSUE THE PROJECT WORK?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human- centered design.
- The class will then divide into teams and they will be working with one another for about 2-3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with Design Challenge and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges.
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

REFERENCES

1. Tom Kelly, Design Firm (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires
1. Innovation (Harper Business, 2009)
2. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

WEB LINKS

Human-Centered Design Toolkit (IDEO);
https://www.ideo.com/post/design-kit
Design Thinking Boot Camp Bootleg (Stanford D-School);
https://dschool.stanford.edu/resources/the-bootcamp-bootleg
Collective Action Toolkit (frog design);
https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-' : No Correlation)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	-	-	-	1	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	1
CO3	1	1	-	-	2	-	-	-	-	-	-	-
CO4	-	3	2	-	1	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem			
Course Code 19150312	**OOPS through C++ Laboratory**				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Basic understanding of any Programming language and OOPS concepts		0	0	3	1.5

Course Objective(s):

This course is intended to teach the OOPS through C++. To develop the skills of programming for Object oriented concepts.

List of Experiments:

1. Write a C++ program illustrating Variable Scope.
2. Write a C++ program illustrating Swap integer values by reference.
3. Write a C++ program illustrating Checking whether the number is even or odd using Ternary operator.
4. Write a C++ program illustrating a program to find the roots of a quadratic equation. Use switch statements to handle different values of the discriminant (b^2-4*a*c).
5. Write a C++ program illustrating interactive program to multiply 2 variables after checking the compatibility.
6. Write a C++ program illustrating an interactive program to process complex numbers. It has to perform addition, subtraction, multiplication, and division of complex numbers. Print results in x+iy form. Create a class for the complex number representation.
7. Write a C++ program illustrating to sort integer numbers.
8. Write a C++ program illustrating factorial using recursion.
9. Write a C++ program illustrating pass by value, pass by reference, and pass by address.
10. Write a C++ program illustrating Function overloading.
11. Write a C++ program illustrating an interactive program for swapping integer, real, and character type variables without using function overloading Write the same program by using function overloading features and compare the same with its C counterpart.
12. Write a C++ program illustrating inline functions.
13. Write a C++ program illustrating Friend function.
14. Write a C++ program illustrating user defined string processing functions using pointers (string length, string copy, string concatenation)
15. Write a C++ program illustrating interactive program for computing the roots of a quadratic equation by handling all possible cases. Implement parameterized constructor to initialize the input data member.
16. Write a C++ program illustrating Constructor overloading (Both parameterized and default).
17. Write a C++ program illustrating Copy constructor.
18. Write a C++ program illustrating access data members & member functions using ‘this’ pointer.
19. Write a C++ program illustrating for overloading ++ operator to increment data.
20. Write a C++ program illustrating Overloading increment, decrement, binary (+, &, <<) operator.
21. Write a C++ program illustrating overloading of new and delete operator.
22. Write a C++ program illustrating Inheritance (Multiple, Multilevel and Hybrid).
23. Write a C++ program illustrating Virtual function.
24. Write a C++ program illustrating Virtual classes & virtual functions.
25. Write a C++ program illustrating Abstract classes.
26. Write a C++ program illustrating Exception handling.
27. Write a C++ program illustrating the concept throw and throws.

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150313	**DATA STRUCTURES LAB**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of mathematics and C-language		0	0	3	1.5

Course Objective(s):
This course is intended to teach the adequate knowledge on Data Structures and to develop the skills of programming for implementing them.

List of Experiments

1. Write recursive program for the following
   a) Write recursive and non-recursive C program for calculation of GCD (n, m)
   b) Write a C program that use recursive function to perform Binary Search for a key value in a given list.
   c) Write a C program that use recursive function to perform Linear Search for a key value in a given list.
2. Write C program that implement
   a) Insertion sort, to sort a given list of integers in ascending order
   b) Selection sort to sort a given list of integers in ascending order
   c) Bubble sort, to sort a given list of integers in ascending order
   d) Quick sort, to sort a given list of integers in ascending order
   e) Merge sort, to sort a given list of integers in ascending order
3. Write C program that implement
   a) Stack (its operations) using arrays
   b) Stack operations to convert infix expression into equivalent postfix expression
4. Write C program that implement
   a) Queue (its operations) using arrays.
   b) Circular queue (its operations) using arrays.
   c) De-queue (its operations) using arrays.
5. Write a C program that uses functions to
   a) Create a singly linked list
   b) Perform insertion operations on a singly linked list
   c) Perform deletion operations on a singly linked list

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. I Sem (3 semester)			
Course Code 19150314	**DATABASE MANAGEMENT SYSTEMS LAB**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Databases and MySQL /Oracle latest version		0	0	3	1.5

Course Objectives:

This course is intended to teach the student database design. To impart the knowledge of Querying the database. To brief the PL/SQL and its applications to the learners.

Lab Experiments

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
   Example: - Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING, Join and Creation and dropping of Views.
4. Queries using Conversion functions (TO_CHAR, TO_NUMBER AND TO_DATE), STRING FUNCTIONS (CONCATENATION, LPAD, RPAD, LTRIM, RTRIM, LOWER, UPPER, INITCAP, LENGTH, SUBSTR AND INSTR), DATE FUNCTIONS (SYSDATE, NEXT_DAY, ADD_MONTHS, LAST_DAY, MONTHS_BETWEEN, LEAST, GREATEST, TRUNC, ROUND, TO_CHAR, TO_DATE)
5. i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
6. ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
7. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
8. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
9. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
10. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
11. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
12. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
13. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
14. Implement the normalization concept by using a particular relation/Table
15. Convert any database table into 3NF

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150402	**JAVA PROGRAMMING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Logical Thinking, Programming and Object oriented concepts.		3	0	0	3

COURSE OBJECTIVE(S):
This course is intended to teach the object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs. This course included applying object oriented techniques to solve bigger computing problems.

Course Outcomes:
On completion of the course, the students will be able to-
CO-1: Learn the structure of Java Program and its applications
CO-2: Develop a software/application using Java Programming language
CO-3: Synthesize the give problem and implement it in Java
CO-4: Choose an engineering approach to solve problems using Java

UNIT-1
Java Basics: History of JAVA, Java Virtual Machine, Java Features, Program structures. Variables, Primitive Data types, Identifiers- Naming Conventions, Keywords, Literals, Primitive Type Conversion and Casting, Flow of control-Branching, Conditional, loops.
Classes and Objects: classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, Garbage collector, Static keyword, this keyword, Arrays, Command line arguments.

UNIT-2
Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class.
Interfaces & Packages: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages, using Packages, Access protection, java. Lang package.

UNIT -3
Exceptions & Assertions - Introduction, Exception handling techniques-try...catch, throw, throws, finally block, user defined exception.
Multithreading: java.lang. Thread, the main Thread, Creation of new threads, Thread priority, Multithreading- Using is Alive () and join (), Synchronization.

UNIT-4
Introduction to Java Collections: Set, Map, List

UNIT-5
Applets: Applet class, Applet structure, An Example Applet Program, Applet Life Cycle

Text Books

1. The Complete Reference Java, 8ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.

Reference Books

1. Programming in Java E.BalaguruSamy.
2. JAVA Programming, K.Rajkumar.Pearson
3. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech
4. Core JAVA for Beginners, RashmiKanta Das, Vikas.
5. Object Oriented Programming Through Java, P. Radha Krishna, Universities Press

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-
CO4	-	3	2	-	3	-	-	-	-	-	-	-
CO5	1	1	1	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester) & **Open Elective**			
Course Code 19150403	**OPERATING SYSTEMS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of peripheral devices		3	0	0	3

Course Objectives:

This course is intended to teach about the Operating Systems concepts such as process, main memory management. To gain knowledge about secondary memory management, CPU and disk scheduling etc.

Course Outcomes:

On completion of the course, the students will be able to-

CO-1. Describe the general architecture of computers and types of Operating Systems
CO-2. Understand the various concepts of process and File System
CO-3. Implement concurrency mechanisms and Paging Technique
CO-4. Implement Bankers Algorithms to handle deadlocks and scheduling
CO-5. Design and analyze mechanisms used in memory management

UNIT-1

Computer System and Operating System Overview: Overview of computer operating system and its types, operating system structure, operating system operations, protection and security, services, systems calls, operating system generation.

UNIT-2

Process Management: Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT-3

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors.

UNIT-4

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

Virtual Memory Management: Virtual memory, demand paging, page-Replacement algorithms, Allocation of Frames, Thrashing

UNIT-5

Principles of Deadlock– System model, deadlock characterization, deadlock prevention, avoidance and detection, recovery form deadlock

File System Interface- The concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

Mass-Storage Structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling (FCFS, SCAN, CSCAN, SSTF)

Text Books

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems – Internal and Design Principles Stallings, Sixth Edition–2005, Pearson education.

Reference Books

1. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	2		3	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150404	**FORMAL LANGUAGES AND AUTOMATA THEORY**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s):Fundamental knowledge of Discrete Mathematics		3	0	0	3

Course Objective(s):

This course is intended to teach the concepts of NFA And DFA. Regular Languages and Regular Expression. Understand various Grammars like Regular grammars-right linear and left linear. Grammars, Context free Grammars and push down automata. Aware of the concept of Turing Machines

Course Outcomes:

On completion of the course, the students will be able to-

CO-1. Appreciate the role and structure of Language theory.

CO-2. Design of regular expressions for language constructs and conversions of NFA and DFA.

CO-3. Demonstrate the derivations and properties of various CFG and Regular Grammars.

CO-4. Understand the Minimization of CFG's.

CO-5. Appreciate the role of the Turing machine as computational and universal machine

UNIT-1

Introduction

Symbols, Alphabets, Strings, Languages, operations on Strings and Languages, Finite State Machine, Definitions, Model representation of a Finite Automata, Acceptance of Strings and Languages, Deterministic finite automaton(DFA) and Non-deterministic Finite Automaton(NFA),Transition diagrams and Language recognizers.(Proofs Not Required)

UNIT-2

Finite Automata

Acceptance of languages, Equivalence of NFA and DFA, NFA to DFA conversion, NFA with Ɛ-transitions, Significance, Conversion of NFA with Ɛ-transitions to NFA without Ɛ-transitions, Minimization of finite automata, Equivalence between two DFA's.

UNIT-3

Regular Languages: Regular sets, Regular expressions, Operations and applications of regular expressions, Identity rules, Inter-Conversion of a given Regular Expression and Finite Automaton **,** Pumping Lemma for Regular Languages (Proofs Not Required)

Grammar Formalism: Regular grammars, Right linear and left linear grammars, Conversion from left linear to right linear grammars, Equivalence of regular grammar and finite automata, Inter-conversion. (Proofs Not Required)

UNIT-4:

Context Free Grammars: Context free grammars and languages, Derivation trees, Left most and Right most derivation of strings and sentential forms Ambiguity, left recursion and left factoring in context free grammars, Minimization of context free grammars, Normal forms for context free grammars, Chomsky normal form, Grei-bach normal form, Pumping Lemma for Context Free Languages (Proofs Not Required).

Pushdown Automata: Definition, Graphical notation, Acceptance of context free language, Acceptance by final state and empty state and its equivalence, Equivalence of context free grammars

and pushdown automata. Definition of Context Sensitive Grammar (CFG) (Proofs Not Required)

UNIT-5

Turing Machine

Chomsky hierarchy on Languages, Turing Machine, definition, model, Representation of Turing machines, Design of Turing machines, Types of Turing machines, Post Correspondence Problem-PCP, Decidable and Un-Decidable problems.

Text Books

1. "Introduction to Automata Theory Languages & Computation", 3/e, Hopcroft, Ullman, PEA
2. "Introduction to Theory of Computation, 2/e", Sipser, Thomson

Reference Books

1. "Theory of Computation", Rajesh Shukla, Cengage, 2010
2. TheoryofComputerScience,Automatalanguagesandcomputation,2/e,Mishra, Chandra shekaran, PHI
3. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	3	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	2	-	-	-	-	-	-	-
CO4	-	3	2	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150405	**NUMBER THEORY & APPLICATIONS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Advanced Mathematics and Linear Algebra		2	1	0	3

Course Objective(s):

This course is intended to teach the basic number theory .To make the learner use of primes in computer science legibly .To teach the congruency modulus relations and quadratic residues .To teach the arithmetic functions.

Course Outcomes:

On completion of the course, the students will be able to

CO-1 Understand the importance of number theory in computer science

CO-2 Apply the congruency modulo relations to the cryptography

CO-3 Solve all arithmetic functions and their applications

UNIT-1

Divisibility & Primes

Introduction, Well-ordering Principle, Division algorithm, Decimal Expansion of a Positive Integer, GCD, Euclid's algorithm, Fibonacci Sequence, Coprime Integers, Least Common Multiple, Linear Diophantine equations, Prime numbers, fundamental theorem of arithmetic, distribution of primes, Fermat and Mersenne primes, Primality test by Trial Division

UNIT-2

Congruences

Modular arithmetic, linear congruences, Chinese Remainder Theorem, arithmetic modulo p, pseudo primes and Carmichael numbers, Euler function, RSA cryptography, group of units modulo an integer, primitive roots.

UNIT-3

Quadratic Residues and Quadratic Forms

Quadratic residues, Legendre symbol, Gauss lemma, quadratic reciprocity.

Binary quadratic forms, equivalent forms, discriminant, positive definite forms, representation of a number by a form, reduction of positive definite forms, reduced forms, class number, sum of two and four squares.

UNIT-4

Fermats & Eulers Theorm, Number Theoretic Functions: Fermat's Little Theorem and Pseudo primes, Wilson's Theorem, The Fermat-Kraitchik Factorization Method, The Greatest Integer Function, An Application to the Calendar.

UNIT-5

Introduction to Cryptography

Primitive Roots for Primes, Composite Numbers Having Primitive Roots, From Caesar Cipher to Public Key Cryptography, The Knapsack Cryptosystem, An Application of Primitive Roots to Cryptography

Text Books

1. G.A. Jones & J.M. Jones, Elementary Number Theory, Springer UTM, 2007.
2. David M. Burton; Elementary Number Theory, McGraw-Hill, 2005.

Reference Books

1. H. Davenport, The Higher Arithmetic, Cambridge University Press, 2008.
2. Niven, H.S. Zuckerman & H.L. Montgomery, Introduction to the Theory of Numbers, Wiley, 2000

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High], '-' : No Correlation)

	PO1	PO 2	PO3	PO4	PO 5	PO6	PO7	PO 8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	3	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-
CO3	1	2	-	-	3	-	-	-	-	-	-	-

Course Objectives

This course is intended to teach the students to analyze worst-case running times of algorithms using asymptotic analysis, describe various algorithm design situation and also explain the major graph algorithms and their analyses.

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150406	**DESIGN AND ANALYSIS OF ALGORITHMS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Should have basic knowledge on algorithm design and Programming language concepts.		3	0	0	3

Course Outcomes:

On completion of the course, the students will be able to-

CO-1. Analyze best and worst-case running times of algorithms

CO-2. Describe various algorithm design situation

CO-3. Design engineering problems

Unit-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort

Unit-II

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, spanning trees, Minimum cost spanning trees, Single source shortest path problem.

Unit-III

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Unit-IV

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Unit-V

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem.

NP-Completeness: Complexity Classes P, NP, NP-hard and NP-complete, Clique decision problem, Node cover decision problem.

Text Books

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam**,** Universities Press.

Reference Books

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
3. Algorithm Design, Foundation, Analysis and internet Examples, Michel T Goodrich, Roberto Tamassia, Wiley

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150411	**OPERATING SYSTEMS Laboratory**				
Teaching	Total contact hours - 48	L	T	P	C
Prerequisite(s): Knowledge on Algorithms and any Programming Language		0	0	3	1.5

Course Objective(s):

This course is intended to teach adequate knowledge on the Operating Systems and also includes the skills of programming for implementing various scheduling algorithms using a programming language.

PART-1

1. Unix Commands
   a) Study of Unix/Linux general purpose utility command list man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.
   b) Study of vi editor.
   c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
   d) Study of Unix/Linux file system (tree structure).
   e) Study of .bashrc, /etc/bashrc and Environment variables.
2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program that illustrates two processes communicating using shared memory
4. Write a C program to simulate producer and consumer problem using semaphores

PART-2

1. Simulate the following CPU scheduling algorithms
   a. Round Robin b. SJF c. FCFS d. Priority
2. Multiprogramming-Memory management- Implementation of fork(), wait(), exec() and exit(), System calls
3. Simulate the following
   a. Multiprogramming with a fixed number of tasks (MFT)
   b. Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms.
   a. FIFO b. LRU c. LFU
7. Simulate the following File allocation strategies
   a. Sequenced b. Indexed c. Linked
8. Simulate the following disk scheduling algorithms
   a. FCFS b. SCAN c. CSCAN d. SSTF

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	II B.Tech. II Sem (4 semester)			
Course Code 19150412	**JAVA PROGRAMMING LABORATORY**				
Teaching	Total contact hours - 36	L	T	P	C
Prerequisite(s): Basic understanding of any Programming language and OOPS concepts		0	0	3	1.5

Course Objective(s):
This course is intended to teach the Java programming language. To develop the skills of programming for Object oriented concepts.

List of Experiments:

1. Write a JAVA program to display default value of all primitive data types of JAVA
2. Write a JAVA program that displays the roots of a quadratic equation ax2+bx+c=0. Calculate the discriminate D and basing on the value of D, describe the nature of roots.
3. Write a JAVA program to display the Fibonacci sequence
4. Write a JAVA program give example for command line arguments.
5. Write a JAVA program to give the example for 'this' operator. And also use 'this' keyword as return statement.
6. Write a JAVA program to demonstrate static variables, methods, and blocks.
7. Write a JAVA program to search for an element in a given list of elements (linear search).
8. Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
9. Write a JAVA program to sort given list of numbers.
10. Write a JAVA program to sort an array of strings
11. Write a JAVA program to check whether given string is palindrome or not.
12. Write a JAVA program to determine the addition of two matrices.
13. Write a JAVA program to determine multiplication of two matrices.
14. Write a JAVA program for the following

a. Example for call by value.
b. Example for call by reference.

15. Write a JAVA program that illustrates simple inheritance.
16. Write a JAVA program that illustrates multi-level inheritance
17. Write a JAVA program demonstrating the difference between method overloading and method overriding.
18. Write a JAVA program demonstrating the difference between method overloading and constructor overloading.
19. Write a JAVA program to give the example for 'super' keyword.
20. Write a JAVA program illustrating multiple inheritance using interfaces.
21. Write a JAVA program to illustrate the concept of final keyword in the program.
22. Write a JAVA program to create a package named pl, and implement this package in ex1 class.
23. Write a JAVA program to create a package named mypack and import it in circle class.

24. Write a JAVA program to give a simple example for abstract class.
25. Write a JAVA program that describes exception handling mechanism.
26. Write a JAVA program for example of try and catch block. In this check whether the given array size is negative or not.
27. Write a JAVA program to illustrate sub class exception precedence over base class.
28. Write a JAVA program for handling of user defined exception by using throw.
29. Write a JAVA program to illustrate the concept of throws keyword.
30. Write a JAVA program to illustrate creation of threads using runnable class.(start method start each of the newly created thread. Inside the run method there is sleep() for suspend the thread for 500 milliseconds).
31. Write a JAVA program to create a class MyThread in this class a constructor, call the base class constructor, using super and starts the thread. The run method of the class starts after this. It can be observed that both main thread and created child thread are executed concurrently
32. Write a JAVA program to illustrate the concept of thread synchronization.
33. Write Java program by implementing the concepts of different collections as list, map and set
34. Write a JAVA program that describes the life cycle of an applet.
35. Write a JAVA program to design a laughing baby face.
36. Write a JAVA program to create a simple calculator.

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150501	**COMPILER DESIGN**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Knowledge of automata theory, context free languages, data structures and simple graph algorithms, logic or algebra.		3	0	0	3

Course Objective(s):

- To explore the principles, algorithms, and data structures involved in the design and construction of compilers.
- To know about context-free grammars, lexical analysis, parsing techniques, symbol tables, error recovery, code generation, and code optimization.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Realize basics of compiler design and apply for real time applications

CO-2: Explore different translation languages

CO-3: Know about compiler generation tools and techniques

CO-4: Design a compiler for a simple programming language

UNIT-1

Overview of language processing – pre-processors – compiler, assembler, interpreters, linkers&loaders, structure of a compiler – phases of a compiler.

Lexical Analysis – Role of Lexical Analysis– Lexical Analysis vs. Parsing, Token, patterns and Lexemes, Lexical Errors, Regular Expressions – Regular definitions for the language constructs – Strings, Sequences.

UNIT-2

Syntax Analysis – discussion on CFG, parse trees, Role of a parser – classification of parsing techniques – Brute force approach, left recursion, left factoring

Top down parsing – First and Follow- LL(1) Grammars, Non- Recursive predictive parsing.

UNIT-3

Bottom up parsing approach and its types, Introduction to simple LR – Why LR Parsers – Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables. Construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity.

UNIT-4

Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples.

Symbol tables: use and need of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data.

UNIT-5

Code Generation and Code Optimization:

Code Generation: Issues in Code Generation – Design of a simple Code Generator.

Code Optimization: Principal Sources of Optimization – Peep-hole optimization – DAG- Optimization of Basic Blocks, Global Data Flow Analysis – Efficient Data Flow Algorithm.

Text Books

1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D. Ullman,2nd ed, Pearson,2007.
2. Compiler Design O.G.Kakde, Laxmi Publications 4th Edition, 2015

Reference Books

1. Engineering a compiler, 2nd edition, Keith D.Cooper& Linda Torczon, Morgan Kaufman.
2. http://www.nptel.iitm.ac.in/downloads/106108052/
3. Principles of compiler design, V. Raghavan, 2nd ed, TMH, 2011.
4. Compiler construction, Principles and Practice, Kenneth C Louden, CENGAGE
5. Implementations of Compiler, A new approach to Compilers including the algebraic methods, Yunlinsu,SPRINGER

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150502	**WEB TECHNOLOGIES**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Fundamentals of Programming		3	0	0	3

Course Objective(s):

- To know the techniques associated with the World Wide Web
- To build web-based media-rich programming tools for creating interactive web pages
- To understand best technologies for solving web client/server problems
- Analyze and design real time web applications

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Analyze a web page and identify its elements and attributes.

CO-2: Create web pages using XHTML and Cascading Styles sheets.

CO-3: Build dynamic web pages

CO-4: Build web applications using PHP

CO-5: Write simple client-side scripts using AJAX Programming through PERL .

UNIT-1

History of the Internet and WWW: HTML 4 protocols- HTTP, SMTP, POP3, MIME, IMAP HTML Common Tags: Lists, Tables, Images, Forms, Frames, Links & Navigation, Image Maps.

UNIT-2

Cascading Style Sheets: Introduction, CSS properties, Types of CSS, Introduction to Java Script, Objects in Java Script. Dynamic HTML with Java Script.

UNIT-3

Working with XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

UNIT-4

AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX. Consuming WEB services in AJAX: (SOAP, WSDL, UDDI)

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script.

UNIT-5

Working with Variables and Constants: Using variables, Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as mySql, Oracle, SQL Sever.

Introduction to PERL, Perl language elements, Interface with CGI- A form to mail program, Simple page search

Text books:

1. Web Technologies, Uttam K Roy, Oxford
2. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, Maclntyre, Morrissey, Cengage

Reference Books:

1. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
2. Web Technologies, HTML JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
3. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage

Web Links:

1. **https://nptel.ac.in/courses/106/105/106105084/**

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	3	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	1	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	2	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	3
CO5	-	-	-	3	-	-	-	1	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150503	**SOFWAREENGINEERING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge about software and any programming Language, Process Models.		3	0	0	3

Course Objective(s):

- Apply basic software engineering methods and practices, and their appropriate application.
- Learn the basic principles of software development life cycle.
- Understand the importance of the software development process Design and develop correct and robust software products.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Identify, formulate, and solve complex engineering problems by applying principles of software engineering

CO-2: Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare.

CO-3: Acquire and apply new knowledge as needed, using appropriate learning strategies.

CO-4: Function effectively on a team whose members together provide leadership, objectives.

CO-5: Create a collaborative and inclusive environment, establish goals, plan tasks, and meet targets.

UNIT-1

Introduction to Software Engineering: Software, Software Crisis, Software Engineering definition, Evolution of Software Engineering Methodologies, Software Engineering Challenges.

Software Processes: Software Process, Software development life cycle, Software Development Process Models.

UNIT-2

Requirements Engineering: Software Requirements, Requirements engineering Process-Requirements elicitation, Requirements Analysis, Structured Analysis, Data Oriented Analysis and Object oriented Analysis, Prototyping Analysis, Requirements Specification, Requirements Validation, requirement Management.

UNIT-3

Software Design: Software Design Process, Characteristics of Good Software Design, Design Principles, Modular Design, Design Methodologies, Structured Design, Transform Vs Transaction Analysis.

Object-Oriented Design: Object oriented Analysis and Design Principles, Performing user interface design.

UNIT-4

Implementation: Coding Principles, Coding Process, Code verification, Code documentation

Software Testing: Testing Fundamentals, Test Planning, Black Box Testing, White Box Testing, Levels of Testing, Usability Testing, Regression testing, debugging approaches.

UNIT-5

Software Quality: Software Quality Factors, Verification & Validation, the Capability Maturity Model Integration.

Software Maintenance: Software maintenance, Maintenance Process Models, Reengineering activities.

Text Books

1. Software Engineering, concepts and practices, UgrasenSuman, Cengage learning
2. Software Engineering, 8/e, Sommerville, Pearson.
3. Software Engineering, 7/e , Roger S.Pressman , TMH

Reference Books

1. Software Engineering, A Precise approach, PankajJalote, Wiley
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	1	-	-	-	-	-
CO2	-	-	-	-	1	-	-	-	-	-	-	2
CO3	-	-	2	-	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	3	-	-	3	-	-	-
CO5	-	2	-	-	2	-	-	-	-	3	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150504	**Computer Networks**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge about Communication Systems		3	0	0	3

Course Objective(s):

- To understand the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Independently understand basic computer network technology.

CO-2: Identify the different types of network topologies and protocols.

CO-3: Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

UNIT-1

Introduction: OSI model overview, TCP/IP and other networks models, Network Topologies, Network technologies (WAN, LAN, MAN), Physical layer: Transmission media (Guided, Wireless)

UNIT-2

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait protocol. **Sliding window protocol**: One bit, Go back N, Selective repeat-Stop and wait protocol, Data link layer in HDLC: configuration and transfer modes, frames, control field, point to point protocol (PPP): framing transition phase, multiplexing, multi link PPP.

UNIT-3

Random Access: ALOHA, Carrier Sense Multiple Access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA).

UNIT-4

Network Layer: Design Issues, Internetworking, Routing Algorithms. Shortest path routing, Flooding, Broadcast routing, Congestion control algorithms: general principles of congestion control, congestion prevention policies.

UNIT-5

Network Layer Protocols: ARP, ICMP, IPV6 frame format

Transport Layer: The transport service, Elements of transport protocols, the internet transport protocols: UDP, TCP congestion control.

Application layer (WWW and HTTP): Architecture: Client server model, Domain name system (DNS): E-mail (SMTP) and File transfer (FTP), HTTP and WWW.

Text Books:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.

Reference Books:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150505-A	**ADVANCED JAVA PROGRAMMING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Should have basic knowledge on Core Java Programming, HTML and web application.		3	0	0	3

Course Objective(s):

- Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
- Design and develop Web applications using Servlets and JSP.
- Implement reusable software component, using Java Bean.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using AWT & Swings.

CO-2: Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)

CO-3: Create dynamic web pages, using Servlets and JSP.

CO-4: Implement a reusable software component, using Java Bean.

UNIT-1

GUI Programming: Designing graphical user interfaces in java, components and Containers, layout managers, AWT components, adding Menu to window, extending GUI features using swing components.

UNIT-2

Basics of JDBC: Introduction to JDBC, JDBC drivers. Architecture and components of JDBC.MS-Access/ORACLE/MySQL for (Type-3 and Type-4) connection, creating and executing SQL query. Introduction to result set, result set with prepared statement, result set scroll ability type, updating data to the database using result set, executing stored procedures using callable statement.

UNIT-3

Java Beans: Introduction to Java beans and API, advantages of Java beans, BDK introspection, using bound properties, bean information interface, constrained properties persistence, customizers.

UNIT-4

Introduction to Servlets: Basics of web application, Introduction to servlet, Lifecycle of a servlet, installing the Java servlet Development Kit, Tomcat Server & Testing Tomcat. JSDK the servlet API. The javax.servlet package, reading servlet parameters, Reading Initialization

parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using cookies-session tracking.

UNIT-5

Introduction to JSP: The problem with servlet, the anatomy of a JSP page, JSP processing. Handling JSP errors: JSP translation error, JSP request time error. Creating a JSP error page.

Text Books

1. The Complete Reference Java, 8ed, Herbert Schildt, TMH
2. Patrick Naughton, Herbert Schildt, "COMPLETE REFERENCE: JAVA2", Tata McGraw-Hill, 2003.
3. Advanced Java Programming, Uttam K. Roy, Oxford University Press.
4. Internet and World Wide Web: How to program,6/e, Dietel, Dietel, Pearson.

Reference Books

1. Java Server Faces, HansBergstan, O'reilly.
2. Web Tehnologies, 2/e, Godbole, kahate, TMH

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150505-B	**PRINCIPLES OF COMPUTER SECURITY**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic Concepts of Computer Science		3	0	0	3

Course Objective(s):

- To understand the principal concepts, major issues, technologies, and basic approaches in information security, includes mastering the key concepts of information security and how they "work".
- To develop a "security mindset:" learn how to critically analyze situations of computer and network usage from a security perspective, identifying the salient issues, viewpoints, and trade-offs.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Evaluate vulnerability of an information system and establish a plan for risk management.

CO-2: Demonstrate basic principles of Web application security

CO-3: Evaluate the authentication and encryption needs of an information system.

CO-4: Demonstrate how to secure a network

UNIT-1

Introduction to Software Security: Security mindset, Computer Security Concepts (the CIA triad), Threats, Attacks, and Assets. Software Security: Vulnerabilities and protections, malware, program analysis

UNIT-2

Practical Cryptography: Encryption, authentication, hashing, symmetric and asymmetric cryptography, Digital Signatures and Certificates

UNIT-3

Network Security: Network security issues, Sniffing, IP spoofing, Common threats, E-Mail security, IPSec, SSL, PGP, Intruders, Virus, Worms, Firewalls-need and features of firewall, Types of firewall, Intruder Detection Systems.

UNIT-4

Cyber Security: Cyber Crime and security, Security tools, Introduction to Digital Forensic, OS fingerprinting, TCP/IP stack masking, Social Engineering.

UNIT-5

Applications and special topics: Web application Security, Privacy and Anonymity, public policy.

TEXTBOOK:

1. Computer Security: Principles and Practice, William Stallings; Lawrie Brown

REFERENCES:

1. Introduction to Computer Security, 2004 Matt Bishop, Addison-Wesley, ISBN 0-321-24744
2. Buchmann J. A., Introduction to Cryptography, Springer Verlag (2001).
3. Stallings William, Cryptography and Network Security, Pearson Education (2006).
4. Schneier Bruce, Applied Cryptography, John Wiley and Sons (1996).
5. Britz M., Computer Forensic and cyber crime, Upper Saddle River, Prentice Hall (2003).

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	2	-	-	-	-	-	-	-	-
CO2	1	-	-	-	3	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150505-C	**MOBILE COMPUTING**				
Teaching	Totalcontacthours-48	L	T	P	C
Prerequisite(s): Basic fundamental of computer, internet and network, Transfer protocols.		3	0	0	3

Course Objective:

- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the platforms and protocols used in mobile environment.

Course Outcomes:

On completion of the course, the students will be able to-

CO-1: Think and develop new mobile application.

CO-2: Take any new technical issue related to this new paradigm and come up with a solution(s).

CO-3: Develop new ad hoc network applications and/or algorithms/protocols.

CO-4: Understand & develop any existing or new protocol related to mobile environment

UNIT-1

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT-2

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT-3

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and over Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT-4

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Data Dissemination: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods

UNIT-5

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

Text books

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, MGH

Reference Books

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.Learning.

Web Links:

https://nptel.ac.in/courses/106/106/106106147/#

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	-	2	-	1	-	1	-
CO2	1	2	-	-	2	-	-	2	-	2	-	-
CO3	-	-	3	-	-	1	-	-	-	3	-	-
CO4	-	1	-	2	-	-	1	2	-	-	-	2

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150511	**COMPILER DESIGN & COMPUTER NETWORKS LABORATORY**				
Teaching	Total contact hours- 36	L	T	P	C
Prerequisite(s): Basic knowledge about Compliers and Peripheral devices and any Programming Language		0	0	3	1.5

Course Objective:

- To explore the principles, algorithms, and data structures involved in the design and construction of compilers.
- To build and understand the fundamental concepts of computer networking.

Course Outcomes:

On completion of the course, the students will be able to-

CO-1: Gain knowledge base in compiler design and its applications.

CO-2: Identify the different types of network topologies and protocols.

CO-3: Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

PART –A

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
2. Simulate First and Follow of a Grammar
3. Develop an operator precedence parser for a given language.
4. Construct a recursive descent parser for an expression.
5. Construct a LL(1) parser for an expression
6. Design predictive parser for the given language
7. Implementation of shift reduce parsing algorithm.
8. Design a LALR bottom up parser for the given language.
9. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools
10. Write a program to perform loop unrolling.
11. Convert the BNF rules into YACC form and write code to generate abstract syntax tree.
12. Write a program for constant propagation.

PART –B

1. Implement the data link layer framing methods such as character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra‘s algorithm to compute the Shortest path in a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. I Sem (5 semester)			
Course Code 19150512	**WEB TECHNOLOGIES LABORATORY**				
Teaching	Total contact hours- 36	L	T	P	C
Prerequisite(s): Various JS Frameworks and SQL		0	0	3	1.5

Course Objective(s):

- To know the techniques associated with the World Wide Web
- To build web-based media-rich programming tools for creating interactive web pages
- To understand best technologies for solving web client/server problems
- Analyze and design real time web applications

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Analyze a web page and identify its elements and attributes.

CO-2: Create web pages using XHTML and Cascading Style Sheets.

CO-3: Build dynamic web pages using JavaScript (Client side programming).

CO-4: Create XML documents and Schemas.

Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links.

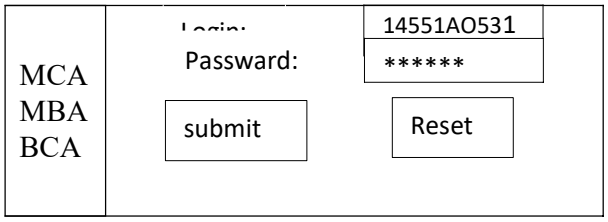
For **e.g.:** When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	Description of the Web Site			

2) **login page**

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

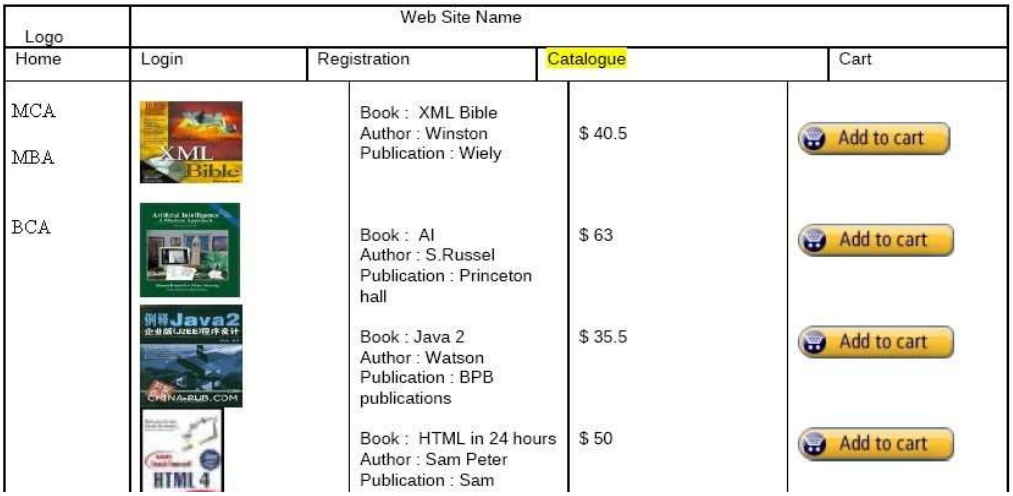


3) Catalogue Page:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

a) Snap shot of Cover Page.
b) Author Name.
c) Publisher.
d) Price.
e) Add to cart button.



4) Registration Page:

Create a "*registration form* "with the following fields

a) Name (Text field)
b) Password (password field)
c) E-mail id (text field)
d) Phone number (text field)
e) Sex (radio button)
f) Date of birth (3 select boxes)
g) Languages known (check boxes – English, Telugu, Hindi, Tamil)
h) Address (text area)

5) Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

6) Write an XML file which will display the Book information which includes the following:

a) Title of the book

b) Author Name
c) ISBN number
d) Publisher name
e) Edition
f) Price

Write a Document Type Definition (DTD) to validate the above XML file.

7) Write Ruby program reads a number and calculates the factorial value of it and prints the same.

8) Write a Ruby program which counts number of lines in a text file using its regular expressions facility.

9) Write a Ruby program that uses iterator to find out the length of a string.

10) Write simple Ruby programs that uses arrays in Ruby.

11) Write programs which uses associative arrays concept of Ruby.

12) Write Ruby program which uses Math module to find area of a triangle.

13) Write Ruby program which uses tk module to display a window

14) Define complex class in Ruby and do write methods to carry operations on complex objects.

15) Write a program which illustrates the use of associative arrays in perl.

16) Write perl program takes a set names along the command line and prints whether they are regular files or special files

17) Write a perl program to implement UNIX `passwd' program

18) An example perl program to connect to a MySQl database table and executing simple commands.

19) Example PHP program for cotactus page.

20) **User Authentication:**

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

   If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ''.

Use init-parameters to do this.

21) Example PHP program for registering users of a website and login.

22) Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them.

Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

23) Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

24) Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

25) **HTTP** is a stateless protocol. Session is required to maintain the state.
The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).
Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 Semester)			
Course Code 19150601	**DATA MINING**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Linear Algebra, Probability and Statistics and programming fundamentals		3	0	0	3

Course Objective(s):

- To understand the methodology of engineering legacy databases for data warehouse and data mining to derive business rules for decision support systems.
- To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.

Course Outcome(s):

On successful completion of the course, the students will be able to-

CO-1: Understand the need of data mining and the way it is different from traditional statistical techniques.

CO-2: Understand the need and importance of pre-processing techniques

CO-3: Understand and implement classical algorithms in data mining; students will be able to assess the strengths and weaknesses of the algorithms, identify the application area of algorithms, and apply them.

CO-4: Analyze and evaluate performance of algorithms for Association Rules.

CO-5: Analyze Classification and Clustering algorithms

UNIT-1

Introduction: What Motivated Data Mining? Why is it Important, Data Mining—On What Kind of Data, Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Classification of Data Mining Systems, Data Mining Task Primitives, Major Issues in Data Mining.

UNIT-2

Data Pre-processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation. **Data Warehouse and OLAP Technology:** What is a Data Warehouse? Differences between Operational Database Systems and Data Warehouses, Data Warehousing: A Multitier Architecture, Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models, Typical OLAP Operations

UNIT-3

Mining Frequent Patterns, Associations: Market Basket Analysis, Frequent Itemsets, Closed Itemsets, and Association Rules, **Frequent Itemset Mining Methods:** Apriori Algorithm,

Finding Frequent Itemsets by Confined Candidate Generation. Generating Association Rules from Frequent Itemsets, A Pattern-Growth Approach for Mining Frequent Itemsets.

UNIT-4

Classification: Basic Concepts: What Is Classification? General Approach to Classification, Decision Tree Induction, Attribute Selection Measures, Bayes' Theorem, Naive Bayesian Classification, Rule-Based Classification: Using IF-THEN Rules for Classification, Rule Extraction from a Decision Tree.

UNIT-5

Cluster Analysis: What Is Cluster Analysis? Requirements for Cluster Analysis, Overview of Basic Clustering Methods, **Partitioning Methods:** *k*-Means: A Centroid-Based Technique, *k*-Medoids: A Representative Object-Based Technique.

Text Books

1. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.
2. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.

Reference Books

1. Margaret H Dunham, "Data Mining Introductory and advanced topics", 6thEdition, Pearson Education, 2009.
2. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
3. Data Mining: Introductory and Advanced topics: Dunham, Pearson.
4. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
5. Data Mining Techniques, Arun K Pujari, Universities Press

CO-PO MAPPING:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	3	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	2	-	-	1
CO3	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	1	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	2

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 Semester)			
Course Code 19150602	**ARTIFICIAL INTELLIGENCE**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Mathematics, Algorithms, Discrete mathematics and programming languages		3	0	0	3

Course Objective(s):

- To expertise in one of the most fascinating and fastest growing areas of Computer Science through classroom program that covers topics related to human intelligence and its applications in industry, defense, healthcare, agriculture and many other areas.
- To acquire knowledge in a rigorous, advanced and professional graduate-level foundation in Artificial Intelligence.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Build intelligent agents for search and games

CO-2: Solve AI problems through programming with Python

CO-3: Learning optimization and inference algorithms for model learning

CO-4: Design and develop programs for an agent to learn and act in a structured environment.

UNIT-1

Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.

UNIT-2

Search Algorithms: Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search.

UNIT-3

Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, construction and inference, temporal model, hidden Markov model.

UNIT-4

Markov Decision process: MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

UNIT-5

Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

Text Books

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Prentice Hall
2. Saroj Kaushik, “Artificial Intelligence”, Cengage Learning India, 2011

Reference Books

1. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill
2. Trivedi, M.C., “A Classical Approach to Artifical Intelligence”, Khanna Publishing House, Delhi.
3. David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010.

Websites For Reference

https://nptel.ac.in/courses/106105077
https://nptel.ac.in/courses/106106126
https://aima.cs.berkeley.edu

CO-PO MAPPING:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	3	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	2	-	-	-
CO3	2	2	3	-	2	-	-	-	-	-	-	-
CO4	3	-	-	2	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150603	**UNIFIED MODELING LANGUAGE**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Basic knowledge on Class, Object and relationship between class and object.		3	0	0	3

Course Objective(s):

- To designed with a basic objective of design rather than implementation.
- To Understand the Unified Process and show how UML can be used within the process.
- To analyze and comparison of the major UML tools for industrial-strength development and design pattern.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Identify the purpose and methods of use of common object-oriented design patterns

CO-2: Select and apply these patterns in their own designs for simple programs

CO-3: Represent the data dependencies of a simple program using UML.

UNIT-1

Introduction : Introduction to OOAD; typical activities / workflows / disciplines in OOAD, Introduction to iterative development and the Unified Process, Introduction to UML; mapping disciplines to UML artifacts, Introduction to Design Patterns - goals of a good design, Introducing a case study & MVC architecture

UNIT-2

Basic Structural Modelling: Classes, Relationships, Common Mechanisms, and diagrams, class diagrams

Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

UNIT-3

Inception: Artifacts in inception, Understanding requirements- the FURPS model, Understanding Use case model- introduction, use case types and formats, Writing use cases- goals and scope of a use case, elements / sections of a use case, Use case diagrams, Use cases in the UP context and UP artifacts, Identifying additional requirements, Writing requirements for the case study in the use case model

UNIT-4

Elaboration: System sequence diagrams for use case model, Domain model: identifying concepts, adding associations, adding attributes, Interaction Diagrams

Design Model: Design Class diagrams in each MVC layer, Mapping Design to Code, Design class diagrams for case study and skeleton code

UNIT-5

More UML Diagrams: State-Chart diagrams, Activity diagrams, Component Diagrams, Deployment diagrams, Object diagrams.

Advanced concepts in OOAD: Use case relationships, Generalizations Domain Model refinements, Architecture, Packaging model elements.

Text Books

1. Applying UML and patterns' by Craig Larman, Pearson.
2. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning.
3. 'UML distilled' by Martin Fowler, Addison Wesley, 2003.

Reference Books

1. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreilll
2. UML 2 Toolkit, by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: WILE\'-Dreamtechlndia Pvt. Lid.

Web References:

www.wisdomjobs.com
www.programsformca.com

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	-	2	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150604-A	**SOFTWARE ARCHITECTURE, FRAMEWORKS AND PATTERNS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge on Software application program knowledge and its usage and implementation.		3	0	0	3

Course Objective(s):

- To understand the software architecture.
- To implement and analyze frameworks, patterns, its various types and its implementations and approaches.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understand the Patterns, Design Patterns, Frameworks, Software and To Application Architecture, Types of Architecture.

CO-2: Monolithic, Need of Micro services Architecture, MS implementation, MS tools and technologies.

CO-3: Understand the Core Java Design patterns, GOF, JEE Blue Print patterns and principles.

CO-4: Understand what is an API, APIs classification and types, Technology specific APIs, API Tools.

UNIT-1:

Design Patterns: Patterns, Design Patterns and Principles, Frameworks, Architecture, Enterprise Architecture, Various Architecture Design pattern, Patterns History, MVC Design Patterns, Standards, Benefits. GOF and JEE Blue Print Patterns, Creational, Structural and Behavioral patterns, Modern Java EE Patterns, Core J2EE Patterns.

UNIT-2:

Architecture Types & Microservices Architecture: Roles &Responsibility of an Architect, Architecture Styles – Client Server, Layered, Pipe & Filter, Q Based, 12 Index, SOA.

What are Microservices, Monolithic Vs Micro-services, Micro-services Challenges, Application Architecture Patterns, Service Decomposition, Building Micro-services application

UNIT-3:

Microservices Architecture Tools and Technologies: Deployment Patterns, Communication Style, Service Discovery, Externa API, Data Management, Security, Testing, Develop Spring Boot Microservices application.

UNIT-4:

Microservices Design Patterns: Managing transactions with SAGA, Distributed transactions, DDD aggregate pattern, Microservices Logging, Monitoring and Security, Microservices Cloud, Deploy Microservices with Docker.

UNIT-5:

Introduction to API: What is API - API Design Principles, Types of APIs, Web APIs, REST APIs, SOAP APIs, Message APIs, RPCs, API Standards

Text Books

1. 'Head First Design Patterns: A Brain-Friendly Guide - 10th Anniversary Edition (Covers Java 8) Paperback – 2016' by Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra.
2. 'Patterns of Enterprise Application Architecture: Pattern Enterpr. Applica Arch' by Martin Fowler
3. Core J2EE Patterns: Best Practices and Design Strategies (2nd Edition) 2nd Edition by Deepak Alur, Dan Malks, John Crupi.

References Books

1. 'Designing Web APIs: Building APIs That Developers Love 1st Edition' by Brenda Jin, SaurabhSahni and Amir Shevat.
2. 'REST API Design Rulebook: Designing Consistent RESTful Web Service Interfaces 1st Edition' by Mark Masse.
3. J'ava Message Service API Tutorial and Reference: Messaging for the J2EE Platform 1st Edition' by Mark Hapner, Rich Burridge, Rahul Sharma, Joseph Fialli, Kim Haase.
4. 'Microservices Patterns', by Chris Richardson
5. 'Microservice Architecture: Aligning Principles, Practices, and Culture' 1st Edition byIrakliNadareishvili, Ronnie Mitra, Matt McLarty, Mike Amundsen.
6. 'Microservices Architecture' by Ajay Kumar
7. 'Mastering Spring Cloud: Build self-healing, microservices-based, distributed systems using Spring Cloud' by PiotrMinkowski.

Web References

https://spring.io/projects/
https://microservices.io/
https://any-api.com/
http://www.corej2eepatterns.com/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-
CO4	-	3	2	-	3	-	-	-	-	-	-	-
CO5	1	1	1	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150604-A	**VIRTUAL REALITY (ELECTIVE-3)**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): NIL		3	0	0	3

Course Objective(s):

- Virtual reality in different object & applications.
- Virtualization of image having big data.
- High performance of computing with virtual reality.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understanding of techniques, processes, technologies and equipment used in immersive virtual reality

CO-2: Identify critical awareness of historical and theoretical contexts relevant to immersive virtual reality

CO-3: Identify and Analyze visualization of image having big data.

UNIT-1

Introduction: The three I's of virtual reality, commercial VR technology and the five classic components of a VR system.

UNIT-2

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Output Devices: Graphics displays, sound displays & haptic feedback.

UNIT-3

Modeling: Geometric modeling, kinematics modeling, physical modeling, behavior modeling, model management.

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues.

UNIT-4

Applications: Medical applications, military applications, robotics applications.

UNIT-5

VR Programming-I: Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes.

VR Programming-II: 3D Sprites, animated 3D sprites, particle systems.

Text Books

1. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.
2. Killer Game Programming in Java, Andrew Davison, Oreilly-SPD, 2005.

Reference Books

1. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier(Morgan Kaufmann).
2. 3D Modeling and surfacing, Bill Fleming, Elsevier (Morgan Kauffman).
3. 3D Game Engine Design, David H.Eberly, Elsevier.
4. Virtual Reality Systems, John Vince, Pearson Education.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150604-C	**DISTRIBUTED SYSTEMS**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Fundamental knowledge about Operating System and Computer network.		3	0	0	3

Course Objective(s):

- To understand the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission, IPC mechanisms in distributed systems, Remote procedure calls.
- To expose current technology used to build architectures to enhance distributed computing infrastructures with various computing principles.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Discuss trends in Distributed Systems.

CO-2: Apply network virtualization.

CO-3: Apply remote method invocation and objects.

CO-4: Design process and resource management systems.

UNIT-1

Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges. Case study: World Wide Web.

System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT-2

Inter-process Communication: Introduction, The API for the Internet Protocols- the Characteristics of Inter-process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

UNIT-3

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT-4

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads–Address Space, Creation of a New Process, Threads.

UNIT-5

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.

Text Books

1. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Fourth Edition, Pearson Publication

CO-PO MAPPING:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-		3	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150612	**AI TOOLS & TECHNIQUES LABORATORY**				
Teaching	Total contact hours-36	L	T	P	C
Prerequisite(s): Basic Concepts of Computer Science and Security Systems		0	0	3	1.5

Course Objective(s):

- To expertise in one of the most fascinating and fastest growing areas of Computer Science through classroom program that covers topics related to human intelligence and its applications in industry, defense, healthcare, agriculture and many other areas.
- To acquire knowledge in a rigorous, advanced and professional graduate-level foundation in Artificial Intelligence.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Build intelligent agents for search and games

CO-2: Solve AI problems through programming with Python

CO-3: Learning optimization and inference algorithms for model learning

CO-4: Design and develop programs for an agent to learn and act in a structured environment.

List of Experiments

1. Write a computer program to conduct uninformed and informed search.
2. Write a computer program to conduct game search.
3. Write a computer program to construct a Bayesian network from given data.
4. Write a computer program to infer from the Bayesian network.
5. Write a computer program to run value and policy iteration in a grid world.
6. Write a computer program to do reinforcement learning in a grid world.
7. Mini Project work.

List of Suggested Books

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Prentice Hall
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill
3. Trivedi, M.C., “A Classical Approach to Artifical Intelligence”, Khanna Publishing House, Delhi.
4. Saroj Kaushik, “Artificial Intelligence”, Cengage Learning India, 2011
5. David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010.

Web References

https://nptel.ac.in/courses/106105077

https://nptel.ac.in/courses/106106126

https://aima.cs.berkeley.edu

https://ai.berkeley,edu/project_overview.html (for Practicals)

CO-PO Mapping

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	3
CO4	-	-	3	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	III B.Tech. II Sem (6 semester)			
Course Code 19150613	**UNIFIED MODELING LANGUAGE LABORATORY**				
Teaching	Total contact hours–36	L	T	P	C
Prerequisite(s): Concepts of OOPs		0	0	3	1.5

Course Objective(s):

- To create a requirements model using UML class notations and use-cases based on statements of user requirements.
- To analyze the requirement models given to them for correctness and quality.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Show the importance of systems analysis and design in solving complex problems

CO-2: Show how the object-oriented approach differs from the traditional approach to systems analysis and design

CO-3: Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.

CO-4: Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships

List Of Experiments

(**Textbook no.2 i.e.** Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning will be the primary source for finding templates for developing different artifacts/diagrams)

Take Three Case Studies

- Customer Support System (in the Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson &Burd Cengage Learning).
- Point-Of-Sale Terminal (in Larman textbook)
- Library Management System (**in the Reference Book no.2 i.e. UML toolkit**)

1. **Familiarization with Rational Rose or Umbrello**
2. **For each case study**
   a) Identify and analyze events
   b) Identify Use cases
   c) Develop event table
   d) Identify & analyze domain classes
   e) Represent use cases and a domain class diagram using Rational Rose

3. **For each case study**
   a) Develop Use case diagrams
   b) Develop elaborate Use case descriptions & scenarios
   c) Develop prototypes (without functionality)
   d) Develop system sequence diagrams

4. **For each case study**
   a) Develop high-level sequence diagrams for each use case
   b) Identify MVC classes / objects for each use case
   c) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects

5. **For each case study**
   a) Develop Use case Packages
   b) Develop component diagrams
   c) Identify relationships between use cases and represent them
   d) Refine domain class model by showing all the associations among classes

6. **For each case study**
   a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

Text Books

1. Applying UML and patterns' by Craig Larman, Pearson.
2. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd CengageLearning.
3. 'UML distilled' by Martin Fowler, Addison Wesley, 2003.

Reference Books

1. O'Reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreilll
2. UML 2 Toolkit, by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: WILE\'-Dreamtechlndia Pvt. Lid.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY (Autonomous)	II B.Tech I Semester			
Course Code 19150606	**CONSTITUTION OF INDIA** **Conputer Science & Engineering**				
Teaching	Total contact hours: 32	L	T	P	C
Prerequisite(s): Basic knowledge of fundamental Rights, Indian Constitution		2	0	0	---

Course Objective(s):

- 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

Course Outcome(s):

After successful completion of this course, a student will be able to-

CO-1: Understand historical background of the constitution making and its importance for building a democratic India.

CO-2: Understand the functioning of three wings of the government ie., executive, legislative and judiciary.

CO-3: Understand the value of the fundamental rights and duties for becoming good citizen of India.

CO-4: Analyze the decentralization of power between central, state and local self- government.

CO-5: 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 Panchayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

UNIT-1

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.

UNIT-2

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, Lok Sabha, Rajya Sabha, The Supreme Court and High Court:

Powers and Functions.

UNIT-3

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

UNIT-4

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

UNIT-5

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

References:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice Hall of India Pvt. Ltd.
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics

e-Resources:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High], '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	-	2	-	-	-	-
CO2	-	-	-	-	-	3	-	3	-	-	-	-
CO3	-	-	-	-	-	3	-	2	-	-	-	-
CO4	-	-	-	-	-	3	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	2	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150701	**CRYPTOGRAPHY AND NETWORK SECURITY**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Number Theory and Computer Networks		3	0	0	3

Course Objective(s):

- To understand and address various software security problems in a secure and controlled environment.
- To understand the general concepts and various kinds of message security problems, and techniques that could be used to protect the software from security threats.
- To understand the "modus operandi" of adversaries; which could be used for increasing software dependability.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Analyze the security principles and corresponding attacks.

CO-2: Apply different encryption algorithms to message security

CO-3: Evaluate and Analyze Hashing Algorithms

CO-4: Study the IP and Transport layer security.

UNIT-1

Introduction: The OSI Security Architecture, Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense (Phishing Defensive measures, Web based attacks, SQL injection & Defense techniques), Buffer overflow & format string vulnerabilities.

UNIT-2

Block Ciphers & Symmetric Key Cryptography: Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Block Cipher Modes of Operations

UNIT-3

Public Key Cryptography: Principles of public key cryptography algorithms, RSA Algorithms, Diffie Hellman KeyExchange, Elgamal cryptosystem, Elliptic Curve Cryptography.

Cryptographic Hash Functions: Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC& CMAC.

UNIT-4

Digital Signatures: Digital Signatures, NIST Digital Signature Algorithm. X.509 Certificate, Key management & distribution.

User Authentication- Remote user authentication principles, Kerberos

Network Security: Security issues in web, Secure Sockets Layer, Transport Layer Security, HTTPs, Secure Shell

UNIT-5

IP Security: Overview and its policies, Encapsulating security payload, Internet key exchange and cryptographic suites.

Firewalls:

Text Books

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Eighth edition.
2. Introduction to Computer Networks & Cyber Security, ChwanHwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

Reference Books

1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage, 2010

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	3
CO4	-	-	3	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech I Sem.			
Course Code	**MACHINE LEARNING**				
Teaching	Total contact hours - 48	**L**	**T**	**P**	**C**
Prerequisite (s): Data structures and probability and statistics		**3**	**0**	**0**	**3**

Course Objective(s):

- To introduce students to the basic concepts and techniques of Machine Learning.
- To become familiar with regression methods, classification methods, clustering methods.
- To become familiar with Artificial Neural Networks, Dimensionality Reduction Techniques.

Course Outcome(s):

After successful completion of this course, a student will be able to-

CO-1: Gain knowledge about basic concepts of Machine Learning

CO-2: Identify machine learning techniques suitable for a given problem

CO-3: Solve the problems using various machine learning techniques

CO-4: Apply Artificial Neural Networks and Dimensionality reduction techniques.

CO-5: Design application using machine learning techniques.

UNIT-1

Introduction: Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning.

Predicting Numeric Values: Regression - Finding the best fit lines with linear regression, locally weighted linear regression, Shrinking Coefficients, The bias / Variance tradeoff.

Logistic Regression: Classification with logistic regression and the sigmoid function, using optimization to find the best regression coefficients.

UNIT-2

Support Vector Machines Separating data with the maximum margin, finding the maximum margin, efficient optimization with SMO algorithm, Using Kernels for more Complex data.

Instance-Based Learning: Introduction, k-Nearest Neighbor Learning, Radial Basis Functions, Case-Based Reasoning.

UNIT-3

Evaluation Hypotheses: Motivation, Estimation hypothesis accuracy, Basics of sampling theory, a general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT-4

Artificial Neural Networks: Introduction, Neural network representation, Appropriate problemsfor neural network learning, Perceptrons, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition,Advanced topics in artificial neural networks

UNIT-5

Dimensionality Reduction Techniques: Principal Component analysis.

Genetic Algorithms: Representing Hypotheses, Genetic Operators, Fitness Function and Selection, Illustrative Example.

Text Books

1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

Reference Books

1. Introduction to Machine Learning, EthemAlpaydin, PHI, 2004

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	-	-	1	2	3	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	2	1	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150703-A	**NoSQL DATABASES**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Good in Database and Concepts.		3	0	0	3

Course Objective(s):

- To understand the concept of Storing & Retrieval of unstructured data, the areas of applicability (CAP), Map Reduce, and various option available in MongoDB.
- To understand how stack like Java to connect to MongoDB for data insert and fetch.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Design and effectively put MongoDB in use for application that demands large volume of data set.

CO-2: Able to write complex map-reduce functions to aggregate data from multiple notes and derive meaning details out of it.

CO-3: Able to visualize the deployment model, associated security, application architecture.

UNIT-1

Introduction to NoSQL: NoSQL Data Model Design, Feature Set, areas of applicability, Types of NoSQL – Key-Value, Document Type, Graph based

UNIT-2

NoSQL – Types: Key-Values Database, Document Database, Graph & Triple Store, Hybrid NoSQL Database

UNIT-3

MongoDB Introduction: MongoDB- Introduction, Feature Set, Deployment Model, Document & Collections, Replication, Sharding, Linking, Embedding, Shell Command, Query Language, Scalability

UNIT-4

MongoDB MR Function: Capped Collection, Projections, Aggregate Pipeline, Map-Reduce, Storage, Connection via Java(Spring Data), Indexing& text seaching, Transaction Support, MongoDB Query

UNIT-5

Enterprise Feature & Deployment Model: Storage Model- in memory/Encrypted/LDAP based, Security, Change Streams, Replication, Sharding, Clustering, Administration

Text Book

1. ‘Professional NoSQL’ by ShashankTiwari
2. ‘NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence’ by Pramod J. Sadalage, Martin Fowler

References Books

1. ’The Definitive Guide to MongoDB’ by David Hows (Author), EelcoPlugge (Author), Peter Membrey (Author)

Web References

https://www.mongodb.com/
https://martinfowler.com/nosql.html

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO	PO6	PO7	PO8	PO9	PO1	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 Semester)			
Course Code	**DIGITAL IMAGE PROCESSING**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Signals and systems, digital signal processing.		3	0	0	3

Course Objective(s):

- To acquire techniques in the digital image processing for image enhancement as well as restoration of noisy images.
- To understand image restoration, morphing, segmentation and compression methods and develop various algorithms.
- To apply techniques in any field which needs to handle the image data.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Acquire knowledge in the digital image processing for image enhancement as well as restoration of noisy images

CO-2: Understand the methods like Image restoration, morphing, segmentation and compression.

CO-3: Understand and apply various techniques to handle the image data in any field.

UNIT-1

Introduction: Fundamental steps in digital image processing, components of image processing system. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels

UNIT-2

Image Enhancement in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods

UNIT-3

Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function

UNIT-4

Mathematical Morphology: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms

UNIT-5

Image Segmentation: Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation

Image Compression: Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards.

Text Books:

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

Reference Books

1. Computer & Machine Vision, Theory, Algorithms, Practicles, E R Davies, Elsevier, 4ed
2. Digital Image Processing with MATLAB and LABVIEW, Vipul Singh, Elsevier

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150703-C	**CLOUD COMPUTING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge about Computer Architecture & Organization, Operating Systems and Networking		3	0	0	3

Course Objective (s):

- To acquire the knowledge on cloud environment.
- To building software systems and components that scale to millions of users in modern internet cloud.
- To understand the concepts and capabilities across the various cloud service models including IAAS, PAAS, SAAS, and developing cloud based software applications on top of cloud platforms.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understanding the key dimensions of the challenge of Cloud Computing

CO-2: Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization

CO-3: Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.

CO-4: Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas

UNIT-1

Systems modeling, Clustering and virtualization: Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency.

UNIT-2

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT-3

Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management,

Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT-4

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT-5

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system, Apache Hadoop, Big Table, Megastore, and Amazon Simple Storage Service (S3).

Text Books

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press

Reference Books

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

Web References

https://nptel.ac.in/courses/106105167/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	1	-	2	3		-	-	-	-	-	-	-
CO4	2	-	-	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 Semester)			
Course Code 19150704-A	**BIG DATA ANALYTICS**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): Java Programming Language, Practice of SQL (queries and sub queries), exposure to Linux Environment.		3	0	0	3

Course Objective(s):

- To provide an overview of an exciting growing field of big data analytics and to introduce the tools required to manage and analyze big data like Hadoop, MapReduce, and SPARK.
- To understand the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To analyze and solve complex real-world problems for decision support.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.

CO-2: Acquire fundamental enabling techniques and scalable algorithms like Hadoop in Bigdata Analytics.

CO-3: Understand the need and application of Map Reduce

CO-4: Understand Hive to explore and analyze huge datasets.

CO-5: Understand Spark Framework and execution Model.

UNIT-1

Introduction to Big Data-Big Data-definition, Why Big data, What comes under Big Data, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, and Validity), Importance of Big Data, Types of Big Data (Structured data, Semi-structured data, Unstructured data), The sources of Big Data, Benefits of Big Data.

UNIT-2

Introduction to Hadoop- what is Hadoop, Why Hadoop, why is Hadoop important? Difference Comparing SQL databases (RDBMS) and Hadoop, Hadoop Architecture, Hadoop ecosystem components, Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, Tasktracker),Google File System VS Hadoop Distributed File System (HDFS), HDFS commands.

UNIT-3

Introduction to MapReduce- Introduction and Definitions to MapReduce, Benefits of MapReduce, MapReduce Algorithm, Map Reduce Workflow (Mapper-Portioner-Combiner-Shuffle-Sort-Reducer-Output),Understanding Hadoop API for MapReduce Framework (Old

and New), Basic programs of HadoopMapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner, YARN(Resource Manager, Node Manager, Application Master, Application Manager)

UNIT-4

Applying Structure to Hadoop Data with Hive- Introduction to HIVE, Configuring Hive, HIVE Architecture, Comparison with Traditional Databases, HIVE data Types (Primitive types, Conversions, Complex types), Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

UNIT-5

Spark- Introduction to Apache Spark, Spark Architecture, MapReduce VS Spark, Resilient Distributed Datasets, Features of RDD, Data Frames, Basic Program of Spark Application, Spark Execution Model.

Text Books

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
2. Hadoop in Action by Chuck Lam, MANNING Publ.
3. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss
4. Spark : The Definitive Guide by MateiZaharia,Bill Chambers.
5. Spark In Action by Marco Bonaci,PeterZecevic

Reference Books

1. Big Data Black Book, DreamTech
2. Chris Eaton, Dirk deroos et al., "Understanding Big data", McGraw Hill, 2012.
3. Hadoop in Practice by Alex Holmes, MANNING Publ.
4. HadoopMapReduce Cookbook,SrinathPerera, ThilinaGunarathne

Web Resources

1. http://www.bigdatauniversity.com
2. http://hadoop.apache.org/
3. https://pig.apache.org/docs/latest/start.html

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High]; '-': No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	2	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150704-B	**DEEP LEARNING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Programming, Statistics, Linear Algebra and Probability		3	0	0	3

Course Objective(s):

- To understand complexity of Deep Learning algorithms and their limitations
- To understand modern notions in data analysis oriented computing
- To be capable of confidently applying common Deep Learning algorithms in practice and implementing their own
- To be capable of performing distributed computations
- To be capable of performing experiments in Deep Learning using real-world data.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline

CO-2: Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.

CO-3: Learn topics such as convolution neural networks, recurrent neural networks, training deep networks and high-level interfaces

CO-4: Build deep learning models in TensorFlow and interpret the results

CO-5: Understand the language and fundamental concepts of artificial neural networks.

UNIT-1

Introduction to TensorFlow: Computational Graph, Key highlights, Creating a Graph, Regression example, Gradient Descent, TensorBoard, Modularity, Sharing Variables, Keras
Perceptrons: What is a Perceptron, XOR Gate

UNIT-2

Activation Functions: Sigmoid,ReLU, Hyperbolic Fns,Softmax
Artificial Neural Networks: Introduction, Perceptron Training Rule, Gradient Descent Rule

UNIT-3

Gradient Descent and Back propagation: Gradient Descent, Stochastic Gradient Descent, Back propagation, Some problems in ANN
Optimization and Regularization: Over-fitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyper parameters

UNIT-4

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications

Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs, Seq2Seq RNNs, LSTM, RNN applications

UNIT-5

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics

Text Book

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

References Books

1. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	-	-	1	2	3	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	2	1	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150704-C	**PARALLEL COMPUTING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Operating Systems		3	0	0	3

Course Objective(s):

- To understand the parallel architectures and algorithms.
- To understand the development techniques for shared memory and message passing models.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understand different parallel architectures and models of computation.

CO-2: Learn parallel algorithms development techniques for shared memory and message passing models.

CO-3: To introduce the various classes of parallel algorithms.

CO-4: Study parallel algorithms for basic problems.

CO-5: Study the complexity and correctness models for parallel algorithms.

UNIT-1

Introduction: Computational demand in various application areas, advent of parallel processing, terminology pipelining, Data parallelism and control parallelism-Amdahl's law**.**

UNIT-2

Scheduling: Organizational features of Processor Arrays, Multi processors and multi-computers. Mapping and scheduling aspects of algorithms. Mapping into meshes and hyper cubes-Load balancing-List scheduling algorithm Coffman-graham scheduling algorithm for parallel processors.

UNIT-3

Algorithms: Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models. Fast Fourier Transform algorithms. Implementation on Hyper cube architectures. Solving linear file - system of equations, parallelizing aspects of sequential methods back substitution and Tri diagonal.

UNIT-4

Sorting: Parallel sorting methods, Odd-even transposition Sorting on processor arrays, Biotonic, merge sort on shuffle - exchange ID, Array processor,2D-Mesh processor and Hypercube Processor Array. Parallel Quick-sort on Multi processors. Hyper Quick sort on hypercube multi computers. Parallel search operations. Ellis algorithm and Manber and ladner's Algorithms for dictionary operations.

UNIT-5

Searching: Parallel algorithms for Graph searching, All Pairs shortest paths and minimum cost spanning tree. Parallelization aspects of combinatorial search algorithms with Focus on Branch and Bound Methods and Alpha-beta Search methods.

Text Books

1. Parallel computing theory and practice, Michel J.Quinn
2. Programming Parallel Algorithms, Guy E. Blelloch, Communications of the ACM

Reference Books

1. Parallel Processing and Parallel Algorithms: Theory and ComputationBy Seyed H Roosta
2. Parallel Algorithms by H Casanova, A Legrand, Y Robert – 2008

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1
CO	2	-	-	-	-	-	-	-	-	-	-	-
CO	-	-	1	-	-	-	-	-	-	-	-	-
CO	-	-	-	-	2	-	-	-	-	-	-	-
CO	-	-	-	-	2	-	-	-	-	-	-	-
CO	2		3	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150711	**CRYPTOGRAPHY AND NETWORK SECURITY LABORATORY**				
Teaching	Total contact hours–36	L	T	P	C
Prerequisite(s): Basic knowledge of Number Theory, Logical Operators		0	0	3	1.5

Course Objective(s):

- To understand and address various software security problems in a secure and controlled environment.
- To understand the general concepts and various kinds of message security problems, and techniques that could be used to protect the software from security threats.
- To understand the "modus operandi" of adversaries; which could be used for increasing software dependability.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Analyze the security principles and corresponding attacks.

CO-2: Apply different encryption algorithms to message security

CO-3: Evaluate and Analyze Hashing Algorithms

CO-4: Study the IP and Transport layer security.

List of Experiments

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should perform AND, OR and XOR each character in this string with 127 and display the result.
3. To encode the data using substitution and transposition algorithms
4. Implement the message encryption and decryption of 8-bit data using S-DES.
5. Implement the encryption and decryption of 64-bit data using DES Algorithm
6. Implement block cipher principles of
   a) ECB b) CBC
7. Implement block cipher principles of
   a) OFB b) CFB
8. Implement RSA algorithm for encryption and decryption in 'C'.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the MD5 algorithm in JAVA.
11. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
12. To study Intrusion Detection System(Snort IDS)

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO	PO6	PO7	PO8	PO9	PO1	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	3
CO4	-	-	3	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150712	**MACHINE LEARNING LABORATORY**				
Teaching	Total contact hours–36	L	T	P	C
Prerequisite(s): Basic knowledge of Machine Learning Concepts, Python programming.		0	0	3	1.5

Course Objective:

- The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate those using python.

Course Outcome(s):

On the successful completion of the course, the student can able to:

CO-1: understand complexity of Machine Learning algorithms and their limitations;

CO-2: understand modern notions in data analysis-oriented computing;

CO-3: be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;

CO-4: Be capable of performing experiments in Machine Learning using real-world data.

List of Experiments

1. Exercises to solve the real-world problems using the following machine learning methods:
   a. Linear Regression
   b. Logistic Regression.
2. Write a program to Implement Support Vector Machines.
3. Exploratory Data Analysis for Classification using Pandas and Matplotlib.
4. Implement a program for Bias, Variance, and Cross Validation.
5. Write a program to simulate a perceptron network for pattern classification and function approximation.
6. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
7. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
8. Write a program to implement the naïve Bayesian classifier for Iris data set. Compute the accuracy of the classifier, considering few test data sets.

9. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO	PO6	PO7	PO8	PO9	PO1	PO11	PO12
CO1	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	3
CO4	-	-	3	-	-	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. I Sem (7 semester)			
Course Code 19150704-B	**DEEP LEARNING**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Programming, Statistics, Linear Algebra and Probability		3	0	0	3

Course Objective(s):

- To understand complexity of Deep Learning algorithms and their limitations
- To understand modern notions in data analysis oriented computing
- To be capable of confidently applying common Deep Learning algorithms in practice and implementing their own
- To be capable of performing distributed computations
- To be capable of performing experiments in Deep Learning using real-world data.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline

CO-2: Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.

CO-3: Learn topics such as convolution neural networks, recurrent neural networks, training deep networks and high-level interfaces

CO-4: Build deep learning models in TensorFlow and interpret the results

CO-5: Understand the language and fundamental concepts of artificial neural networks.

UNIT-1

Foundations of Neural Networks and Deep Learning: Neural Networks: Biological Neuron, Perceptron, MultiLayer Perceptron. Training Neural Networks: Back-propagation.

UNIT-2

Activation Functions: Sigmoid,ReLU, Hyperbolic Fns,Softmax

Artificial Neural Networks: Introduction, Perceptron Training Rule, Gradient Descent Rule

UNIT-3

Gradient Descent and Back propagation: Gradient Descent, Stochastic Gradient Descent, Back propagation, Some problems in ANN

Optimization and Regularization: Over-fitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyper parameters

UNIT-4

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications

Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs, Seq2Seq RNNs, LSTM, RNN applications

UNIT-5

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics

Text Book

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

References Books

1. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	-	-	-	-	-	-	-	-	-
CO3	-	-	1	2	3	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	2	1	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. II Sem (8 semester)			
Course Code 19150801	**SOFTWARE TESTING METHODOLOGIES**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge about Software Engineering and SDLC		3	0	0	3

Course Objective(s):

- To study fundamental concepts in software testing
- To discuss various software testing issues and solutions in software unit test, integration and system testing.
- To expose the advanced software testing topics, such as object-oriented software testing methods.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Apply software testing knowledge and engineering methods.

CO-2: Design and conduct a software test process for a software testing project.

CO-3: Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.

CO-4: Identify the needs of software test automation, and define and develop a test tool to support test automation.

UNIT-1

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, Software Testing Methodology.

UNIT-2

Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, Verification of High level and low level designs, How to verify code, Validation.

Validation Activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing.

UNIT-3

Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.

UNIT-4

Dynamic Testing II: White-Box Testing: Need of White-Box Testing, Logic Coverage Criteria, Basis Path Testing, Graph Matrices, Loop Testing, Data Flow Testing, Mutation Testing.

Static Testing: Inspections, Structured Walkthroughs, Technical Reviews.

UNIT-5

Regression testing: Progressive vs Regressive testing, Regression Testability, Objectives of Regression Testing, When is Regression Testing done?, Regression Testing Types, Regression Testing Techniques.

Automation and Testing Tools: Need for Automation, Categorization of Testing Tools, Selection of Testing tools, Cost Incurred in Testing Tools, Guidelines for Automated Testing, Overview of Some Commercial Testing Tools.

Text Books

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford
2. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
3. Software Testing- Yogesh Singh, CAMBRIDGE

Reference Books

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

Web Reference:

https://nptel.ac.in/courses/106/105/106105150/

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2		-	-	-	-	-	-	-	-
CO2	-	2	3		-	-	-	-	-	-	-	-
CO3	1	-	2	3	-	-	-	-	-	-	-	-
CO4	2	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-	-	3	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. II Sem (8 semester)			
Course Code 19150862A	**DISTRIBUTED DATABASES**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Database Management Systems		3	0	0	3

Course Objective(s):

- To learn the advanced concepts of the Database and understand about the Distributed database types.
- To enhance the knowledge of database systems.
- To understand the aspects of the database technologies, and showing the need for distributed database technology to tackle deficiencies of the centralized database systems

Course Outcome(s):

On completion of the course, the students will be able to-
CO-1: Advanced concepts of Database SQL, PLSQL
CO-2: Distributed Database and Types.
CO-3: Database Security
CO-4: Database Warehouse and ETL

UNIT-1

Advanced SQL: Advanced SQL: Indexing- Aggregates- Special Functions- Sub Queries- Recursive Queries- Control Language Commands- Views and Assertions.

UNIT-2

Advanced PLSQL: Advanced PLSQL: Triggers- Cursors- Functions and Procedures- Embedded and Dynamic SQL- Advanced Transaction Processing- Serializability & Recoverability-Muti version Schemes- Multiple Granularity.

UNIT-3

Database Security: Database Security: What is Data security- Access Controls- Access Control Types- Privileges- SQL Injections and Types- Data Storage and Indexing .

UNIT-4

Distributed Database: CAP Theorem, Distributed Database: Centralized and Distributed Database- Distributed DB Architecture- Distributed Data Storage- Distributed Transactions- Distributed Database Protocols- Distributed Concurrency Control- Deadlock Management- Replication Servers.

UNIT-5

Data Warehousing & ETL: Data Warehousing: What is Data warehousing- Data Warehousing Architecture- Types- Data warehousing Design- Understanding ETL and Process.

Text Books

1. Advanced Database Management System by Shilbhadra Dasgupta, Subhash K. Shinde Rini Chakrabarti.

References Books

1. Database System Concepts (Sixth Edition) by Avi Silberschatz, Henry F. Korth, S. Sudarshan

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	1	-	-	-	1	-	-	-	-	-	-	-
CO2	2	2	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-
CO4	-	3	2	-	3	-	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. II Sem (8 semester)			
Course Code 19150802-B	**CYBER SECURITY**				
Teaching	Total contact hours- 48	L	T	P	C
Prerequisite(s): Basic knowledge of Cryptography and Security Systems.		3	0	0	3

Course Objective(s):

- To appraise the current structure of cyber security roles across the DoD enterprise, including the roles and responsibilities of the relevant organizations.
- To evaluate the trends and patterns that will determine the future state of cyber security

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Analyze threats and risks within context of the cyber security architecture

CO-2: Appraise cyber security incidents to apply appropriate response

CO-3: Evaluate decision making outcomes of cyber security scenarios

UNIT-1

Cyber Crime: Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for Organizational measurement for Handling mobile-Security policies and measures in mobile computing era. Cases.

UNIT-2

Tools and methods used in cybercrime: Proxy servers and Anonymizers Phishing Password cracking-Key loggers and Spy wares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQL Injection-Buffer overflow-Attacks on wireless network. Cases.

UNIT-3

Understanding computer forensic: Historical background of cyber forensic, Forensic analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-Relevance of the OSI 7 Layer model to computer Forensic Computer forensic from compliance perspectives. Cases.

UNIT-4

Forensic of Hand-Held Devices: Understanding cell phone working characteristics Hand-Held devices and digital forensic- Toolkits for Hand-Held device-Forensic of i-pod and digital music devices-Techno legal Challenges with evidence from hand-held Devices. Cases.

UNIT-5

Cyber Security: Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing Security and privacy

Implications-Protecting people privacy in the organizations Forensic best practices for organizations. Cases.

Text Books:

1. Nina Godbole&SunitBelapure “Cyber Security”, Wiley India, 2012.

Reference Books:

1. Harish Chander, “cyber laws & IT protection”, PHI learning pvt.ltd, 2012.
2. Dhiren R Patel, “Information security theory &practice”,PHI learning pvt ltd,2010.
3. MS.M.K.Geetha&Ms.SwapneRaman”Cyber Crimes and Fraud Management, ”MACMILLAN,2012. PankajAgarwal : Information Security& Cyber Laws (Acme Learning), Excel, 2013.
4. VivekSood, Cyber Law Simplified, TMH, 2012.

CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1	3	-	2	1	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	1	-	3	-	-	-	-	-
CO 3	-	3	-	2	-	1	-	-	-	-	-	-

Regulation GRBT-19	Godavari Institute of Engineering & Technology (Autonomous)	IV B.Tech. II Sem (8 semester)			
Course Code 19150802-C	**SOFT COMPUTING**				
Teaching	Total contact hours-48	L	T	P	C
Prerequisite(s): A strong mathematical background, Proficiency with algorithms and Critical thinking and problem solving.		3	0	0	3

Course Objective(s):

- To understand the fundamentals of Soft Computing, Fuzzy Logic & Systems, Neural Networks & Feed Forward Networks to students.
- To acquire knowledge of Genetic Algorithms and Hybrid Systems, Associative Memories & ART Neural Networks.

Course Outcome(s):

On completion of the course, the students will be able to-

CO-1: Describe human intelligence of soft computing and Explain how intelligent system works

CO-2: Apply basics of Fuzzy logic and neural networks.

CO-3: Discuss the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience

CO-4: Relate with neural networks that can learn from available examples and generalize to form appropriate rules for inference systems

UNIT-1

Fundamentals of Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Classification, Clustering, Bayesian Networks, Probabilistic reasoning, applications of soft computing

UNIT-2

Fuzzy Logic & Systems: Fuzzy sets, Crisp Relations, Fuzzy Relations, Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule based system, Defuzzification Methods, Applications: Greg Viot's Fuzzy Cruise Controller, Air Conditioner Controller.

UNIT-3

Fundamentals of Neural Networks & Feed Forward Networks: Neural Networks Architectures, Single Layer Feed Forward Neural Network: The Perception Model, Multilayer Feed Forward Neural Network: Arch123itecture of a Back Propagation Network (BPN), The Solution, Back propagation Learning, Selection of various Parameters in BPN.

UNIT-4

Genetic Algorithms: Basic Concepts of Genetic Algorithms (GA), Biological background, Creation of Offsprings, Working Principle, Encoding, Fitness Function, Reproduction, Inheritance Operators, Cross Over, Inversion and Deletion, Mutation Operator, Bit-wise Operators used in GA, Generational Cycle, Convergence of Genetic Algorithm.

Hybrid Systems: Types of Hybrid Systems, Neural Networks, Fuzzy Logic, and Genetic Algorithms Hybrid, Genetic Algorithm based BPN: GA Based weight Determination.

UNIT-5

Associative Memories & ART Neural Networks: Basic concepts of Linear Associator, Basic concepts of Dynamical systems, Mathematical Foundation of Discrete-Time Hop field Networks (HPF), Mathematical Foundation of Gradient-Type Hopfield Networks, Transient response of Continuous Time Networks. Summing networks with digital outputs, Solving Simultaneous Linear Equations, Bidirectional Associative Memory Networks; Cluster Structure, Vector Quantization.

Text Books

1. N.K Sinda and M.M. Gupta, Soft Computing & Intelligent Systems: Theory & Applications- Academic Press, Elsevier, 2009
2. Introduction to Artificial Neural Systems – J.M.Zurada, Jaico Publishers
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CO-PO Mapping:

(1: Slight [Low]; 2: Moderate[Medium]; 3: Substantial[High]; '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	3	-	2	1	-	-	-	-	-	-	-	-
CO2	3	2	-	-	1	-	-	-	-	-	-	-
CO3	-	3	-	2	-	1	-	-	-	-	-	-
CO4	1	-	3	-	-	-	2	-	-	-	-	-
CO5	-	-	-	3	2	-	-	-	-	-	-	1
CO6	-	1	-	-	3	-	-	-	-	-	-	2