

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
ARTIFICIAL INTELLIGENCE & DATA SCIENCE (AID)
(Effective for the batches admitted from 2020-21)**

VISION OF THE INSTITUTE

“To Promote Excellence in Technical and Management Education”

MISSION OF THE INSTITUTE

- Strengthen the Learning-Teaching Process for Holistic Development.
- Upgrade Physical Infrastructure to meet the Curriculum needs.
- Enhance Industry-Institute Interactions to acquire Professional Competency.
- Promote Innovation and Research to address Challenges of Society.

INSTITUTION OBJECTIVES

- To create a conducive and competitive environment for students through curricular and extra-curricular activities.
- Promote the culture of research among the faculty.
- To promote synergetic alliances with premier Institutions, Industry, CSIR laboratories and various Government organizations for Collaborative Research Projects.
- To promote economic and social enrichment of the society through Skill Development Programmes, Entrepreneurship and extension activities.
- To introduce demand driven new UG & PG academic programmes.
- To ensure a high degree of quality in terms of providing infrastructure, research ambience, faculty and staff development.

CORE VALUES

- **Thirst for Quality Education:** The stake holders of the institute particularly management, employees and students of the institution have a consistent thirst for quality improvement of the processes and services in the institution.
- **Life Long Learning:** In the fast changing technological world, acquiring a special skill at one point of time will not be enough for ever long survival. Hence to flourish in the work place and to bring in innovations in the ways of doing, employee, student as well as alumni must be continuous learners and tech savvy.
- **Diversity and Participation:** AITS promotes the involvement of faculty, staff, and students from all social, economic, ethnic, cultural and religious backgrounds to get the synergy of combining the diversified agents. The focus is on involving students to exhibit their talent in various curricular and co-curricular activities and strengthening alumni link to share their experiences to the students.
- **Academic Integrity and Accountability:** Management induces accountability in the employees for the career of the students and the academic leadership establishes a mentoring mechanism for realization of responsibilities of students towards their parents and in turn to the society.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

“To achieve excellence in the field of Artificial Intelligence and Data Science with professional competency”

MISSION

- To educate, train and develop highly qualified engineers capable of meeting the challenges of a rapidly growing artificial intelligence system and capable of handling other diverse issues in data science engineering.
- To educate students towards the design and development of intelligent products and services meeting global demands and standards

- Best utilize Industry Institute linkages to acquire professional competency.
- Create facilities of training and research in new thrust areas of computing thus promoting continuing education facilities.
- To enable the graduates to adapt to the rapidly changing technology with strong fundamentals

Competencies and Performance Indicators

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation for the solution of complex engineering problems.	
Competency	Performance Indicators
1.1 Demonstrate competence in mathematical modelling	1.1.1 Apply the knowledge of discrete structures, linear algebra, statistics and numerical techniques to solve problems 1.1.2 Apply the concepts of probability, statistics and queuing theory in modeling of computer based system, data and network protocols
1.2 Demonstrate competence in basic sciences	1.2.1 Apply laws of natural science to an engineering problem
1.3 Demonstrate competence in engineering fundamentals	1.3.1 Apply engineering fundamentals.
1.4 Demonstrate competence in specialized engineering knowledge to the program	1.4.1 Apply theory and principles of computer science engineering to solve an engineering problem
PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	
2.1 Demonstrate an ability to identify and formulate complex engineering problem	2.1.1 Evaluate problem statements and identifies objectives 2.1.2 Identifies processes/modules/algorithms of a computer based system and parameters to solve a problem 2.1.3 Identifies mathematical algorithmic knowledge that applies to a given problem
2.2 Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1 Reframe the computer based system into interconnected subsystems 2.2.2 Identifies functionalities and computing resources 2.2.3 Identify existing solution/methods to solve the problem, including forming justified approximations and assumptions 2.2.4 Compare and contrast alternative solution/methods to select the best methods 2.6.5 Compare and contrast alternative solution processes to select the best process
2.3 Demonstrate an ability to formulate and interpret a model	2.3.1 Able to apply computer engineering principles to formulate modules of a system with required applicability and performance 2.3.2 Identify design constraints for required performance criteria
2.4 Demonstrate an ability to execute a solution process and analyze results	2.4.1 Applies engineering mathematics to implement the solution 2.4.2 Analyze and interpret the results using contemporary tools 2.4.3 Identify the limitations of the solution and sources/causes 2.4.4 Arrive at conclusions with respect to the objectives
PO 3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.	

3.1 Demonstrate an ability to define a complex / openended problem in engineering terms	<p>3.1.1 Able to define a precise problem statement with objectives and scope</p> <p>3.1.2 Able to identify and document system requirements from stake holders</p> <p>3.1.3 Ability to review state of the art literature to synthesize system requirements</p> <p>3.1.4 Ability to choose appropriate quality attributes as defined by ISO/IEC/IEEE standard.</p> <p>3.1.5 Explore and synthesize system requirements from larger social and professional concerns</p> <p>3.1.6 Ability to develop software requirement specifications (SRS)</p>
3.2 Demonstrate an ability to generate a diverse set of alternative design solutions	<p>3.2.1 Ability to explore design alternatives</p> <p>3.2.2 Ability to produce a variety of potential design solutions suited to meet functional requirements</p> <p>3.2.3 Identify suitable non functional requirements for evaluation of alternate design solutions</p>
3.3 Demonstrate an ability to select optimal design scheme for further development	<p>3.3.1 Ability to perform systematic evaluation of the degree to which several design concepts meet the criteria</p> <p>3.3.2 Consult with domain experts and stakeholders to select candidate engineering design solution for further development</p>
3.4 Demonstrate an ability to advance an engineering design to defined end state	<p>3.4.1 Ability to refine architecture design into a detailed design within the existing constraints</p> <p>3.4.2 Ability to implement and integrate the modules</p> <p>3.4.3 Ability to verify the functionalities and validate the design</p>
PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	
4.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	<p>4.1.1 Define a problem for purposes of investigation, its scope and importance</p> <p>4.1.2 Ability to choose appropriate procedure/algorithm, data set and test cases</p> <p>4.1.3 Ability to choose appropriate hardware/software tools to conduct the experiment</p>
4.2 Demonstrate an ability to design experiments to solve open ended problems	4.2.1 Design and develop appropriate procedures/methodologies based on the study objectives .
4.3 Demonstrate an ability to analyze data and reach a valid conclusion	<p>4.3.1 Use appropriate procedures, tools and techniques to collect and analyze data</p> <p>4.3.2 Critically analyze data for trends and correlations, stating possible errors and limitations</p> <p>4.3.3 Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions</p> <p>4.3.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions</p>
PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	
5.1 Demonstrate an ability to identify / create modern engineering tools, techniques and resources	<p>5.1.1 Identify modern engineering tools, techniques and resources for engineering activities</p> <p>5.1.2 Create/adapt/modify/extend tools and techniques to solve engineering problems</p>
5.2 Demonstrate an ability to select and apply discipline specific tools, techniques and resources	<p>5.2.1 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs</p> <p>5.2.2 Demonstrate proficiency in using discipline specific tools</p>

5.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1 Discuss limitations and validate tools, techniques and resources 5.3.2 Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use
PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	
6.1 Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.1.1 Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level
6.2 Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1 Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	
7.1 Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	7.1.1 Identify risks/impacts in the life-cycle of an engineering product or activity 7.1.2 Understand the relationship between the technical, socio economic and environmental dimensions of sustainability
7.2 Demonstrate an ability to apply principles of sustainable design and Development	7.2.1 Describe management techniques for sustainable development 7.2.2 Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline
PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	
8.1 Demonstrate an ability to recognize ethical dilemmas	8.1.1 Identify situations of unethical professional conduct and propose ethical alternatives
8.2 Demonstrate an ability to apply the Code of Ethics	8.2.1 Identify tenets of the ASME professional code of ethics 8.2.2 Examine and apply moral & ethical principles to known case studies
PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	
9.1 Demonstrate an ability to form a team and define a role for each member	9.1.1 Recognize a variety of working and learning preferences; appreciate the value of diversity on a team 9.1.2 Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.
9.2 Demonstrate effective individual and team operations-communication, problem solving, conflict resolution and leadership skills	9.2.1 Demonstrate effective communication, problem solving, conflict resolution and leadership skills 9.2.2 Treat other team members respectfully 9.2.3 Listen to other members and Maintain composure in difficult situations

9.3 Demonstrate success in a teambased project	9.3.1 Present results as a team, with smooth integration of contributions from all individual efforts
PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	
10.1 Demonstrate an ability to comprehend technical literature and document project work	10.1.1 Read, understand and interpret technical and nontechnical information 10.1.2 Produce clear, well-constructed, and well-supported written engineering documents 10.1.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
10.2 Demonstrate competence in listening, speaking, and presentation	10.2.1 Listen to and comprehend information, instructions, and viewpoints of others 10.2.2 Deliver effective oral presentations to technical and nontechnical audiences
10.3 Demonstrate the ability to integrate different modes of communication	10.3.1 Create engineering-standard figures, reports and drawings to complement writing and presentations 10.3.2 Use a variety of media effectively to convey a message in a document or a presentation
PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	
11.1 Demonstrate an ability to evaluate the economic and financial performance of an engineering activity	11.1.1 Describe various economic and financial costs/benefits of an engineering activity 11.1.2 Analyze different forms of financial statements to evaluate the financial status of an engineering project
11.2 Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	11.2.1 Analyze and select the most appropriate proposal based on economic and financial considerations
11.3 Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	11.3.1 Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks 11.3.2 Use project management tools to schedule an engineering project so it is completed on time and on budget
PO 12: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	
12.1 Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps	12.1.1 Describe the rationale of requirement for continuing professional development 12.1.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
12.2 Demonstrate an ability to identify changing trends in engineering knowledge and practice	12.2.1 Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current 12.2.2 Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field.
12.3 Demonstrate an ability to identify and access sources for new information	12.3.1 Source and comprehend technical literature and other credible sources of information. 12.3.2 Analyze sourced technical and popular information for feasibility, viability, sustainability, etc.

Program Specific Outcomes - COMPETENCY & PERFORMANCE INDICATORS

Competency	Performance Indicators
PSO13: Demonstrate the working principles of the hardware and Optimized coding aspects of computer systems.	
13.1 Demonstrate an ability to identify the gap in hardware knowledge and to close these gaps	13.1.1 Describe the rationale of requirement for continuing professional development 13.1.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
13.2 Demonstrate an ability to write optimized code	13.2.1 Develop solution space for a problem 13.2.2 Determine the time and space complexity for every solution 13.2.3 Analyze and Reason a Solution as an optimized one
PSO14: Design products based on the professional engineering practices with effective strategies.	
14.1 Demonstrate an ability to identify a real time problem and provide a software solution	14.1.1 Identify and analyze a real time problem 14.1.2 Describe product feasibility 14.1.3 Design the product

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SCIENCES, TIRUPATI (AUTONOMOUS)**

**B. Tech - Artificial Intelligence & Data Science (AI & DS)
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**INDUCTION PROGRAM (3 weeks
duration)**

- ❖ Physical activity
- ❖ Creative Arts
- ❖ Universal Human Values
- ❖ Literary
- ❖ Proficiency Modules
- ❖ Lectures by Eminent People
- ❖ Visits to local Areas
- ❖ Familiarization to Dept./Branch & Innovations

Semester I (First year)

Sl.	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	BS	20ABS9901	Algebra & Calculus	3	0	0	3	30	70	100
2	BS	20ABS9902	Applied Physics	3	0	0	3	30	70	100
3	HS	20AHS9901	Communicative English	3	0	0	3	30	70	100
4	ES	20AES0301	Engineering Graphics Lab	1	0	4	3	30	70	100
5	ES	20AES0501	Problem Solving and Programming	3	0	0	3	30	70	100
6	HS LAB	20AHS9902	Communicative English Lab	0	0	3	1.5	30	70	100
7	BS LAB	20ABS9907	Applied Physics Lab	0	0	3	1.5	30	70	100
8	ES LAB	20AES0503	Problem Solving and Programming Lab	0	0	3	1.5	30	70	100
Total credits							19.5	240	560	800

Semester II (First year)

Sl.	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	BS	20ABS9911	Probability and Statistics	3	0	0	3	30	70	100
2	BS	20ABS9921	Numerical Methods	3	0	0	3	30	70	100
3	ES	20AES0509	Basics of Python Programming	3	0	0	3	30	70	100
4	ES	20AES0502	Data Structures	3	0	0	3	30	70	100
5	ES	20AES0507	Web Design	1	0	4	3	30	70	100
6	ES LAB	20AES0510	Basics Of Python Programming Lab	0	0	3	1.5	30	70	100
7	BS LAB	20ABS9918	Computational Lab	0	0	3	1.5	30	70	100
8	ES LAB	20AES0504	Data Structures Lab	0	0	3	1.5	30	70	100
9	MC	20AMC9903	Environmental Studies	2	0	0	0	30	0	30
			Total credits				19.5	270	560	830

Semester III (Second year)

Sl	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	BS	20ABS9914	Discrete Mathematical Structures	3	0	0	3	30	70	100
2	PC	20APC3001	Digital Electronics and Microprocessor	3	0	0	3	30	70	100
3	PC	20APC3002	Database Management Systems	3	0	0	3	30	70	100
4	PC	20APC3004	Object Oriented Programming through Java	3	0	0	3	30	70	100
5	PC	20APC3006	Computer Organization	3	0	0	3	30	70	100
6	PC	20APC3003	Database Management Systems Lab	0	0	3	1.5	30	70	100
7	PC	20APC3005	Object Oriented Programming through Java Lab	0	0	3	1.5	30	70	100
8	PC	20APC3007	Computer Organization Lab	0	0	3	1.5	30	70	100
9	SOC	20ASC3001	Client Side Scripting	1	0	2	2	100	0	100
10	MC	20AMC9902	Constitution of India	2	0	0	0	30	0	30
			Total credits				21.5	370	560	930

Semester IV (Second year)

Sl.	Cate gory	Course Code	Course Title	Hour per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	PC	20APC3008	Formal Languages and Automata Theory	3	0	0	3	30	70	100
2	PC	20APC3009	Computer Networks	3	0	0	3	30	70	100
3	PC	20APC3011	Data warehousing and Mining	3	0	0	3	30	70	100
4	PC	20APC3013	Operating Systems	3	0	0	3	30	70	100
5	HS	20AHSMB01	Managerial Economics and Financial Analysis	3	0	0	3	30	70	100
6	HS	20AHS9905	Universal Human Values	3	1	0	3	30	70	100
7	PC	20APC3010	Computer Networks Lab	0	0	3	1.5	30	70	100
8	PC	20APC3012	Data warehousing and Mining Lab	0	0	3	1.5	30	70	100
9	PC	20APC3014	Operating Systems Lab	0	0	3	1.5	30	70	100
10	SOC	20ASC3002	Server Side Scripting	1	0	2	2	100	0	100
Total credits							24.5	370	630	1000

Semester V (Third year)

Sl.	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	PC	20APC3015	Compiler Design	3	0	0	3	30	70	100
2	PC	20APC3017	Introduction to Big Data	3	0	0	3	30	70	100
3	PC	20APC3019	Deterministic, Stochastic & Statistical Methods for Data Science	3	0	0	3	30	70	100
4	OE	20AOE3001	Cloud Computing	2	0	2	3	30	70	100
		20AOE3002	Information Retrieval	2	0	2				
		20AOE3003	Parallel and Distributed Computing	2	0	2				
5	PE	20APE3001	Human Computer Interaction	3	0	0	3	30	70	100
		20APE3002	Data Privacy and Security	3	0	0				
		20APE3003	Game Programming	3	0	0				
6	PC LAB	20APC3018	Introduction to Big Data Lab	0	0	3	1.5	30	70	100
7	PC LAB	20APC3016	Compiler Design lab	0	0	3	1.5	30	70	100
8	SC	20ASC3003	Soft Skill Lab	1	0	2	2	100	0	100
9	MC	20AMC9901	Biology for Engineers	2	0	0	0	30	0	30
10	INTERNSHIP	20AIN3001	INTERNSHIP	0	0	0	1.5	50	0	50
Total credits							21.5	390	490	880

Semester VI (Third year)

Sl.	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	PC	20APC3020	Artificial Intelligence	3	1	0	3	30	70	100
2	PC	20APC3022	Introduction to Machine Learning	3	0	0	3	30	70	100
3	PC	20APC3024	Natural Language Programming	3	0	0	3	30	70	100
4	PE	20APE3004	Computational Intelligence	3	0	0	3	30	70	100
		20APE3005	Software Engineering	3	0	0				
		20APE3006	Advanced Databases	3	0	0				
5	OE	20AOE0305	Robotic Sensors, Vision And Hardware Implementation	2	0	2	3	30	70	100
		20APE0416	Wireless Sensor Networks	2	0	2				
		20APC0323	Operational Research	2	0	2				
6	PC LAB	20APC3021	Artificial Intelligence Lab	0	0	3	1.5	30	70	100
7	PC LAB	20APC3023	Introduction to Machine Learning Lab	0	0	3	1.5	30	70	100
8	PC LAB	20APC3025	Natural Language Programming Lab	0	0	3	1.5	30	70	100
9	SC	20ASC3004	AI Tools	1	0	2	2	100	0	100
10	MC	20AMC9904	Professional Ethics and Human Values	2	0	0	0	30	0	30
Total credits							21.5	370	560	930

Semester VII (Fourth year)

S I.	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
							C			
1	PE	20APE3007	Business Process Management	3	0	0	3	30	70	100
		20APE3008	Deep Learning	3	0	0				
		20APE3009	Health Care Analytics	3	0	0				
2	PE	20APE3010	Cloud Security and Privacy	3	0	0	3	30	70	100
		20APE3011	Virtual Reality	3	0	0				
		20APE3012	Social Network Analysis	3	0	0				
3	PE	20APE3013	Quantum Computing	3	0	0	3	30	70	100
		20APE3014	Block Chain	3	0	0				
		20APE3015	Cyber Security	3	0	0				
4	OE	20APE0415	Speech Processing	2	0	2	3	30	70	100
		20AOE3004	Internet of Things	2	0	2				
		20AOEMB02	Knowledge Engineering	2	0	2				
5	OE	20AOE3005	Introduction to Watson AI	2	0	2	3	30	70	100
		20AOE3006	Data Science Tools	2	0	2				
		20AOE3007	Deep Learning for Tensorflow	2	0	2				
6	HSE		Universal Human Values	3	0	0	3	30	70	100
7	SC	19MBA0105	Statistical Computing And Data Analysis Using R Programming	1	0	2	2	100	0	100
8	INTERNSHIP	20AIN3002	Internship	0	0	0	3	100	0	100
			Total credits				23	380	420	800

Semester VIII (Fourth year)

Sl .	Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE	TOTAL
				L	T	P				
1	MAJOR PROJECT	PROJ	Project, Project work, seminar and internship in industry	0	0	0	12	60	140	200
			Total credits				12	60	140	200

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:I	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9901	Algebra and Calculus	3	1	0	4

Course Outcomes:

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

Unit I : Matrix Operations and Solving Systems of Linear Equations **12hrs**

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear 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,

Unit II : Quadratic Forms and Mean Value Theorems **9 hrs**

Diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation. 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: Multi variable calculus **9hrs**

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

Unit IV: Multiple Integrals **10hrs**

Double integrals, change of order of integration, double integration in polar coordinates, change of Variables in double integration (Cartesian to polar), areas enclosed by plane curves. Evaluation of triple integrals.

Unit V:Special Functions **10hrs**

Beta and Gamma functions and their properties, relation between beta and gamma functions, Bessel functions, Bessel's equation, Recurrence formulae or $J_n(x)$, Generating function-Orthogonality of Bessels functions.

Textbooks:

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

References:

1. Dr.T.K.Viyengar, B.Krishna Gandhi, S. Ranganathamamd M.V.S.S.N Prasad, Mathematics – 1, S.Chandpublications.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.,2002.
3. B.V.Ramana, Higher Engineering Mathematics, McGrawHillEducation.
4. N.Bali, M.Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity SciencePress.

Year:I	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9902	Applied Physics	3	0	0	3

Course Outcomes

1. Analyze the wave properties of light and the interaction of energy with the matter.
2. Apply electromagnetic wave propagation in different guided media.
3. Asses the electromagnetic wave propagation and its power in different media
4. Analyze the conductivity of semiconductors.
5. Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

Unit I : Optics and EM Theory

Interference of light -principle of superposition-Conditions for sustained Interference-Interference in thin films (reflected light) - Newton's Rings -Determination of Wavelength. Diffraction-Fraunhofer diffraction- Single slit and double slit- Diffraction Grating. Divergence and Curl of Electric and Magnetic Fields - Gauss' theorem for divergence and Stokes' theorem for curl - Maxwell's Equations (Quantitative) – Electromagnetic wave - propagation in non-conducting medium - Poynting's Theorem.

Unit II : Lasers and Fiber Optics

Lasers – Introduction – Characteristics – Spontaneous and Stimulated Emission – Einstein Coefficients – Population Inversion – Excitation Mechanism and Optical Resonator - He-Ne Laser -Nd:YAG Laser – Semiconductor Diode Laser – Applications of Lasers and Holography.

Introduction to Optical Fibers – Total Internal Reflection – Critical angle of propagation –Acceptance angle – Numerical Aperture – Classification of fibers based on Refractive index profile – Propagation of electromagnetic wave through optical fiber – modes – importance of V-number-Attenuation, Block Diagram of Fiber optic Communication – Industrial Applications –Fiber optic Sensors.

Unit III : Dielectric and Magnetic Materials

Introduction—Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations : Electronic and Ionic,(Quantitative), Orientation Polarizations (Qualitative) - Frequency dependence of polarization-Lorentz (internal) field-Claussius-Mosotti equation-Applications of Dielectrics: Ferroelectricity.

Introduction-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 – Magnetic memory device applications .

Unit IV: Semiconductors

Origin of Energy bands (Qualitative)-Intrinsic and Extrinsic semiconductors –Direct and indirect band gap semiconductors- Density of charge carriers – Fermi energy--Dependence of Fermi energy on carrier concentration and temperature – Electrical conductivity – Drift and Diffusion currents – Continuity equation - Hall effect -Applications of Hall effect and Semiconductors.

Unit V: Superconductors and Nanomaterials

Superconductors-Properties-Meissner's effect-BCSTheory(Qualitative) - Josephson effect (AC&DC)-Types of Superconductors-Applications of superconductors.

Nanomaterials–Significance of nanoscale–: Physical, Mechanical, Magnetic, Optical properties of nanomaterials –Synthesis of nanomaterials:Top-down-Ball Milling, Bottom-up-Chemical vapour deposition–Characterization of nanomaterials : X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM)-Applications of Nanomaterials.

Textbooks:

1. M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy | A Text book of Engineering Physics | S. Chand Publications, 11th Edition 2019.
2. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2012.

References:

1. K Thyagarajan -Engineering Physics, -McGraw Hill Publishing Company Ltd, 2016
2. Shatendra Sharma, Jyotsna Sharma, — Engineering Physics, Pearson Education, 2018
3. David J. Griffiths, —Introduction to Electrodynamics, -4/e, Pearson Education, 2014
4. T Pradeep, -A Text book of NanoScience and NanoTechnology, -Tata McGraw Hill 2013.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:I	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9901	Communicative English	0	0	2	2

Course Outcomes:

- At the end of the course, the learners will be able to
1. Identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
 2. Formulate sentences using proper grammatical structures and correct word forms
 3. Speak clearly on a specific topic using suitable discourse markers in informal discussions
 4. Write summaries based on global comprehension of reading/listening texts
 5. Produce a coherent paragraph interpreting a figure/graph/chart/table
 6. Take notes while listening to a talk/lecture to answer questions

Unit 1 :

10 Hours (4L+6P)

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

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

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2:

10 Hours (4L+6P)

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Cohesive devices -linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Unit 3:

10 Hours (4L+6P)

Listening: Listening for global comprehension and summarizing what is listened to.

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

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

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

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

Unit 4:

8 Hours (2L+6P)

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

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

Writing: Information transfer; describe, compare, contrast, identify significance / trends based on information

provided in figures/charts/graphs/tables.

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

Unit 5:

8 Hours (2L+6P)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences.

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

Suggested books:

Text Book: English all round: Communication Skills for Under graduation Learners Vol. I, Orient BlackSwanPublisers, First Edition 2019.

Reference Books

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

Sample Web Resources

Grammar/Listening/Writing, 1-language.com, <http://www.5minuteenglish.com/>,
<https://www.englishpractice.com/>, Grammar/Vocabulary, English Language Learning Online
<http://www.bbc.co.uk/learningenglish/>, <http://www.better-english.com/>, <http://www.nonstopenglish.com/>,
<https://www.vocabulary.com/>, BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

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

Listening

<https://learningenglish.voanews.com/z/3613>, <http://www.englishmedialab.com/listening.html>

Speaking

<https://www.talkenglish.com/>, BBC Learning English – Pronunciation tips, Merriam-Webster – Perfect pronunciation Exercises

All Skills

<https://www.englishclub.com/>, <http://www.world-english.org/>, <http://learnenglish.britishcouncil.org/>
Online Dictionaries, Cambridge dictionary online, MacMillan dictionary, Oxford learner’s dictionaries

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:I	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0301	Engineering Graphics	1	0	4	3

Course Outcomes:

- Draw various curves applied in engineering.
- Show projections of solids and sections graphically.
- Draw the development of surfaces of solids.
- Use computers as a drafting tool.
- Draw isometric and orthographic.

Unit I: Introduction to Engineering graphics: Principles of Engineering Graphics and their significance- Conventions in drawing-lettering - BIS conventions.

- a) Conic sections including the rectangular hyperbola- general method only,
- b) Cycloid, epicycloids and hypocycloid

Unit II: Projection of points, lines: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line.

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

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

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

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

UnitV: Orthographic Projections: Systems of projections, conventions and application to orthographic projections.

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

Text Books and Reference Books:

1. K.L.Narayana&P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers
3. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill
4. Shah and Rana, Engineering Drawing, 2/e, Pearson Education
5. Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Engineering knowledge	1.3	1.3.1
CO: 2	PO 3: Design/Development of Solutions	3.2	3.2.1
CO: 3	PO 1: Engineering knowledge	1.3	1.3.1
CO: 4	PO 3: Design/Development of Solutions	3.2	3.2.2
CO: 5	PO 5: Problem analysis	5.1	5.1.1

Year:I

Semester:I

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0501	Problem Solving and Programming	3	1	0	4

Course Outcomes:

1. Construct his own computer using parts.
2. Recognize the importance of programming language independent constructs
3. Solve computational problems
4. Select the features of C language appropriate for solving a problem
5. Design computer programs for real world problems
6. Organize the data which is more appropriated for solving a problem

Unit 1:

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

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Unit 2:

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.

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

Unit 3:

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

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

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

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Unit 4:

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

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

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

Unit 5:

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

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

Some other Features: Variable-length argument lists, formatted input-Scanf, file access, Error handling-stderr and exit, Line Input and Output, Miscellaneous Functions.

Text Books:

1. PradipDey, and ManasGhosh, -Programming in C++, 2018, Oxford University Press.
2. R.G. Dromey, -How to Solve it by Computer. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, -The C Programming Language, 2nd Edition, Pearson.

Reference Books:

1. RS Bichkar -Programming with C++, 2012, Universities Press.
2. PelinAksoy, and Laura Denardis, -Information Technology in Theory, 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, -Programming with C++, 4th Edition, 2019, McGraw Hill Education.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:I

Semester:I

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9902	Communicative English Lab	0	0	2	1

Course Outcomes

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
2. Apply communication skills through various language learning activities
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Syllabus

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Unit4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Unit 5

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Software Source:

K-Van Solutions Software

Reference:

Teaching English - British Council

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Year:I

Semester:I

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9907	Applied Physics Lab	0	0	3	1.5

Course Outcomes

1. Analyze the wave properties of light and the interaction of energy with the matter.
2. Apply electromagnetic wave propagation in different guided media.
3. Assess the electromagnetic wave propagation and its power in different media
4. Analyze the conductivity of semiconductors.
5. Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

List of Experiments

1. Determination of the thickness of the wire 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. Study of the Magnetic field along the axis of a circular coil carrying current.
6. Study the variation of B versus H of the magnetic material (B-H curve)
7. Determination of the numerical aperture of a given optical fiber and angle of acceptance.
8. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
9. Determination of the energy gap of a semiconductor
10. Determination of crystallite size using X-Ray diffraction spectra.
11. Determination of Wavelength of LASER using diffraction grating.
12. Determination of particle size using LASER.
13. Determination of the resistivity of semiconductor by Four probe method.
14. Determination of dielectric constant by charging and discharging method.
15. Study the temperature dependence of resistance of a thermistor.

References:

1. S. Balasubramanian, M.N.Srinivasan, -A Text book of Practical Physics--S Chand Publishers, 2017.
2. <http://vlab.amrita.edu/index.php-VirtualLabs>, Amrita University.

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(AUTONOMOUS)**

Year:I	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0503	Problem Solving and Programming Lab	0	0	4	2

Laboratory Experiments #

1. Assemble and disassemble parts of a Computer
 2. Design a C program which reverses the number
 3. Design a C program which finds the second maximum number among the given list of numbers.
 4. Construct a program which finds the kth smallest number among the given list of numbers.
 5. Design an algorithm and implement using C language the following exchanges $a \leftarrow b \leftarrow c \leftarrow d \leftarrow a$
 6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
 7. Implement the C program which computes the sum of the first n terms of the series $\text{Sum} = 1 - 3 + 5 - 7 + 9$
 8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
 9. Design an algorithm and implement using a C program which finds the sum of the infinite series $1 - x^2/2! + x^4/4! - x^6/6! + \dots$
 10. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
 11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and viceversa.
 12. Develop an algorithm which computes the all the factors between 1 and 100 for a given number and implement it using C.
 13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
 14. Design a C program which reverses the elements of the array.
 15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The stars for each number should be printed horizontally.
 16. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort d. Partitioning sort.
 17. Illustrate the use of auto, static, register and external variables.
 18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.
 19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
 20. Design a C program which sorts the strings using array of pointers.
- Instructors may add some experiments to the above list. Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

Course outcomes:

1. Construct a Computer given its parts(L6)
2. Select the right control structure for solving the problem(L6)
3. Analyze different sorting algorithms(L4)
4. Design solutions for computational problems(L6)
5. Develop C programs which utilize the memory efficiently using programming constructs like pointers.

References:

1. B. Govindarajulu, -IBM PC and Clones Hardware Trouble shooting and Maintenance, Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, -How to Solve it by Computer, 2014, Pearson.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
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Year:I	Semester:II	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9911	Probability and Statistics	3	1	0	4

Course Outcomes:

1. Interpret the association of characteristics and through correlation and regression tools.
2. Make use of the concepts of probability and their applications.
3. Apply discrete and continuous probability distributions.
4. Design the components of a classical hypothesis test for large sample.
5. Design the components of a classical hypothesis test for small samples.

Unit 1: Descriptive statistics and methods for data science **10 hrs**

Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization, 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 2: Probability **8 hrs**

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

UNIT 3: Probability distributions **8 hrs**

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

Unit4: Estimation and Testing of hypothesis, large sample tests **8 hrs**

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 5: Small sample tests **8 hrs**

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ^2 - test for goodness of fit.

Textbooks:

1. Miller and Friends, 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.

Reference Books:

1. S.Chand ,Probability and Statistics, Dr.T.K.V.Iyengar, Dr.B.Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N.Prasad
2. S. Ross, a First Course in Probability, Pearson Education India, 2002.
3. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

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Year:I	Semester:II	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9921	Numerical Methods	3	0	0	3

Course Outcomes:

- 1) Analyze the concepts of Errors, Relative and Percentage Errors
- 2) Analyze the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
- 3) Analyze Interpolation using the concepts of the Numerical Methods
- 4) Apply the concepts of Integration in Numerical Methods
- 5) Apply the concepts of O.D.E on Numerical Methods

Unit - I

Errors in Numerical computations: Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.

UNIT – III

Interpolation: Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

UNIT – IV

Curve fitting: Fitting of a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT –V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method- Runge - Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

1. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
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Year:I	Semester:II	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0509	Basics of Python Programming	2	0	0	2

Course Outcomes:

Student should be able to

- Apply the features of Python language in various real applications.
- Select appropriate data structure of Python for solving a problem.
- Design object oriented programs using Python for solving real-world problems.
- Apply modularity to programs.

Unit – I

Introduction: What is a program, Running python, Arithmetic operators, Value and Types.

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Unit – II

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types.

Unit – III

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Mapfilter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Unit – IV

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Unit – V

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, Theinit method, The __str__ method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, defaultdict, Named tuples, Gathering keyword Args.

Text books:

1. Allen B. Downey, -Think Python, 2nd edition, SPD/O'Reilly, 2016.

Reference Books:

1. Martin C. Brown, -The Complete Reference: Python, McGraw-Hill, 2018.

2. Kenneth A. Lambert, B.L. Juneja, -Fundamentals of Python, CENGAGE, 2015.

3. R. Nageswara Rao, -Core Python Programming, 2nd edition, Dreamtech Press, 2019

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Year:I	Semester:II	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0502	Data Structures	3	0	0	3

Course Objectives:

1. To teach the representation of solution to the problem using algorithm
2. To explain the approach to algorithm analysis
3. To introduce different data structures for solving the problems
4. To demonstrate modeling of the given problem as a graph
5. To elucidate the existing hashing techniques

Unit 1: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Quick sort, how fast can we sort, Merge sort, Heap sort

Unit – 2: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Unit 3: Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: B- Trees, B +Trees.

Unit – 4 : Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure

Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Unit – 5: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Text Books:

1. Ellis Horowitz and Sartaj Sahni, —Fundamentals of Data Structures in C++, 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.
2. Alan L. Tharp, —File Organization and Processing, Wiley and Sons, 1988.

Reference Books:

1. D. Samanta, —Classic Data Structures, 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Brass, —Advanced Data Structures, Cambridge University Press, 2016
3. Richard F. Gilberg, Behrouz A. Forouzan, —Data Structures A Pseudo code Approach with C++, Second Edition, Cengage Learning 2005.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)**

Year:I	Semester:II	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0507	Web Design	1	0	4	3

Course Outcomes:

- Ability to create dynamic and interactive websites
- Gain knowledge of client side scripting using java sript and DHTML.
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servelets, JSP and PHP.
- Able to design rich client presentation using AJAX.

Unit I :

Where Do I Start-What Does a Web Designer Do, What Languages Do I Need to Learn, What Do I Need to Buy, How the Web Works-The Internet Versus the Web, Serving Up Your Information, A Word About Browsers, Web Page Addresses (URLs), The Anatomy of a Web Page, Some Big Concepts You Need to Know-A Dizzying Multitude of Devices, Sticking with the Standards, Progressive Enhancement, Responsive Web Design, One Web for All (Accessibility), The Need for Speed (Site Performance)

HTML Markup for Structure: Creating a Simple Page-A Web Page, Launch a Text Editor, Step 1: Start with Content, Step 2: Give the Document Structure, Step 3: Identify Text Elements, Step 4: Add an Image, Step 5: Change the Look with a Style Sheet, When Good Pages Go Bad, Validating Your Documents. Marking Up Text-Paragraphs, Headings, Lists, More Content Elements, Organizing Page Content, The Inline Element Roundup, Generic Elements (div and span), Some Special Characters

Unit II :

HTML Markup for Structure: Adding Links-The href Attribute, Linking to Pages on the Web, Linking Within Your Own Site, Targeting a New Browser Window, Mail Links, Telephone Links. Adding Images-First, a Word on Image Formats, The img Element, A Window in a Window. Table Markup-How Tables Are Used, Minimal Table Structure, Spanning Cells, Table Accessibility, Wrapping Up Tables

HTML Markup for Structure: Forms-How Forms Work, The form Element, Variables and Content, The Great Form Control Roundup, Form Accessibility Features, Form Layout and Design. What's Up, HTML5-A Funny Thing Happened on the Way to XHTML 2, In the Markup Department, Meet the APIs, Video and Audio, Canvas

Unit III:

CSS for Presentation: Cascading Style Sheets Orientation-The Benefits of CSS, How Style Sheets Work, The Big Concepts, Moving Forward with CSS.Formatting Text-The Font Properties, Changing Text Color, A Few More Selector Types, Text Line Adjustments, Underlines and Other —Decorations, Changing Capitalization, Spaced Out, Text Shadow, Changing List Bullets and Numbers. Colors and Backgrounds-Specifying Color Values, Foreground Color, Background Color, Playing with Opacity, Introducing...Pseudo-class Selectors, Pseudo-element Selectors, Attribute Selectors, Background Images, The Shorthand background Property, Like a Rainbow (Gradients), External Style Sheets. Thinking Inside the Box-The Element Box, Specifying Box Dimensions, Padding, Borders, Margins, Assigning Display Roles, Adding Drop Shadows to Boxes

Unit IV:

CSS for Presentation: Floating and Positioning- Normal Flow, Floating, Positioning Basics, Relative Positioning, Absolute, Positioning, Fixed Positioning. Page Layout with CSS- Page Layout Strategies, page Layout Techniques, Multicolumn Layouts Using Floats, Positioned Layout, Top-to-Bottom Column Backgrounds. Transitions, Transforms, and Animation- Ease-y Does It (CSS Transitions), CSS Transforms, Keyframe Animation. CSS Techniques- A Clean Slate (CSS Reset), Image Replacement Techniques, CSS Sprites, Styling Forms, Styling Tables, Basic Responsive Web Design, Wrapping Up Style Sheets.

Unit V:

1. Design a page having suitable background colour and text colour with title -My First Web Page using all the attributes of the Font tag.
2. Create a HTML document giving details of your [Name, Age], [Address, Phone] and [Register Number, Class] aligned in proper order using alignment attributes of Paragraph tag.
3. Write HTML code to design a page containing some text in a paragraph by giving suitable heading style.
4. Create a page to show different character formatting (B, I, U, SUB, SUP) tags.
 - i. viz : $\log_b m^p = p \log_b m$
5. Write HTML code to create a Web Page that contains an Image at its centre.

6. Create a web page with an appropriate image towards the left hand side of the page, when user clicks on the image another web page should open.
7. Create web Pages using Anchor tag with its attributes for external links.
8. Create a web page for internal links; when the user clicks on different links on the web page it should go to the appropriate locations/sections in the same page.
9. Write a HTML code to create a web page with pink colour background and display moving message in red colour.
10. Create a web page, showing an ordered list of all second semester courses (Subjects).
11. Create a web page, showing an unordered list of names of all the Diploma Programmes (Branches) in your institution.
12. Create a HTML document containing a nested list showing a content page of any book.
13. Create the following table in HTML

Student	Maths	Physics	Chemistry	Computer
I-R2C1	I-R1C1	I-R4C1	I-C2	
	II-C1		II-C1	II-R1C5
III-R2C2			III-C1	
			IV-C1	

14. Create a web page which divides the page in two equal frames and place the audio and video clips in frame-1 and frame-2 respectively.

i. FRAME-1	ii. FRAME-2
-------------------	--------------------

15. Create a web page which should generate following output:

i. FRAME-1	ii. FRAME-2
	iii. FRAME-3

16. Create a table to show your class time table.
17. Use tables to provide layout to your HTML page describing your college infrastructure.
18. Use and <div> tags to provide a layout to the above page instead of a table layout.
19. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
20. Embed Audio and Video into your HTML web page.
21. Create a webpage with HTML describing your department use paragraph and list tags.
22. Apply various colors to suitably distinguish key words , also apply font styling like italics, underline and two other fonts to words you find appropriate , also use header tags.
23. Create links on the words e.g. —Wi-Fi and —LAN| to link them to Wikipedia pages.
24. Insert an image and create a link such that clicking on image takes user to other page.
25. Change the background color of the page; At the bottom create a link to take user to the top of the page.
26. Develop static pages (using only HTML) of an online book store, the pages should resemble: www.amazon.com, the website should consist the following pages, home page, registration and user login, user profile page, books catalog, shopping cart, payment by credit card, order confirmation.
27. Create a web page using Embedded CSS and multimedia
28. Write an HTML page that contains a selection box with a list of 5 countries, when the user selects a country, its capital should be printed next to the list; Add CSS to customize the properties of the font of the capital (color, bold and font size).
29. Wap in html to design a Bio-Data.
30. Wap in html to create a webpage with four frames (Picture, table, list, and hyperlink).
31. Wap in html to show all character elements in html.
32. Wap in html to create a webpage to show the block level elements and text level elements.
33. Wap in html to create a webpage to show various confectionary items using ordered list and unordered list.
34. Wap in html to create a webpage to show different hobbies.
35. Wap in html to show India map.
36. Wap in html to create a web page using style sheet.
37. Wap in html to create a web page to show registration
38. Wap in html to show books in inventory in different tables by using rowspan and colspan.
39. Create a Web Page in HTML to show Admission form in OITM
40. A Web Page in HTML to show your resume using Appropriate Formatting Elements.
41. A Web Page in HTML to show all the Text, Color, Background and Font Elements
42. Write a Program to Create a Nested List.

Textbooks:

1. Jennifer Niederst Robbins, -Learning Web Design, OREILLY 4th Edition

References:

1. Uttam K Roy, —Web Technologies, Oxford University Press, 1st Edition, 2010.
2. HTML and CSS: Design and Build Websites 1st Edition by Jon Duckett (Author) india price
3. Steven Holzner, —The Complete Reference PHP, Tata McGraw-Hill, 1st Edition, 2007.
4. HTML & CSS: The Complete Reference, Fifth Edition (Complete Reference Series)
5. Deitel and Deitel and Nieto, —Internet and World Wide Web - How to Program, Prentice Hall, 5 th Edition, 2011.

Web References:

1. <http://www.scoopworld.in>
2. <http://www.sxecw.edu.in>
3. <http://www.technofest2u.blogspot.com>
4. <http://www.ptutorial.com/php-example/php-upload-image>
5. <http://www.ptutorial.com/php-example/php-change-case>

Year:I

Semester:II

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0510	BASICS OF PYTHON PROGRAMMING LAB	0	0	2	1

Course Objectives:

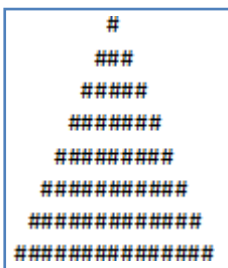
- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problem solving.

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
|         |         |
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
|         |         |
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with # symbols



Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral
6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in -the epoch, which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

```
>>> import time
>>> time.time()
1437746094.5735958
```

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given $n+r+1 \leq 2r$.n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.
9. Write a program that evaluates Ackermann function
10. The mathematician SrinivasaRamanujan found an infinite series that can be used to generate a numerical approximation of $1/\pi$:
Write a function called estimate_pi that uses this formula to compute and return an estimate of π .

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than $1e^{-15}$ (which is Python notation for 10^{-15}). You can check the result by comparing it to `math.pi`.

11. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

13. Given a word which is a string of characters. Given an integer say `_n`, Rotate each character by `_n` positions and print it. Note that `_n` can be positive or negative.

14. Given rows of text, write it in the form of columns.

15. Given a page of text. Count the number of occurrences of each letter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same

16. Write program which performs the following operations on list's. Don't use built-in functions

a) Updating elements of a list

b) Concatenation of list's

c) Check for member in the list

d) Insert into the list

e) Sum the elements of the list

f) Push and pop element of list

g) Sorting of list

h) Finding biggest and smallest elements in the list

i) Finding common elements in the list

17. Write a program to count the number of vowels in a word.

18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

20. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.

20. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.

21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

23. Write a program illustrating the object oriented features supported by Python.

24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorizing them into distinction, first class, second class, third class and failed.

25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format ($0 \leq \text{YYYY} \leq 9999$, $1 \leq \text{MM} \leq 12$, $1 \leq \text{DD} \leq 31$) following the leap year rules.

26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format. ($0 \leq \text{HH} \leq 23$, $0 \leq \text{MM} \leq 59$, $0 \leq \text{SS} \leq 59$)

Lab Outcomes:

Student should be able to

1. Design solutions to mathematical problems.
2. Organize the data for solving the problem.
3. Develop Python programs for numerical and text based problems.
4. Select appropriate programming construct for solving the problem.
5. Illustrate object oriented concepts.

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, -How to Think Like a Computer Scientist: Learning with Python 3, 3rd edition,
Available at <http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf>
2. Paul Barry, -Head First Python a Brain Friendly Guide, 2nd Edition, O'Reilly, 2016
3. DainelY.Chen -Pandas for Everyone Python Data Analysis, Pearson Education, 2019

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:II	Semester:I	Branch of Study:AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9918	Computational Lab	0	0	4	1

COURSE OUTCOMES

- To understand solving problems in linear algebra using MS-Excel's Tools.
 - To analyse Central Tendency, Dispersion, Correlation and Regression analysis as basics of Statistics using Ms- Excel's Tools.
 - To understand properties of probability distributions and to perform using Ms- Excel'sTools.
 - Solving problems in Definite integrals numerically using Trapezoidal and Simpson's methods in Ms-Excel's Tools.
- To analyse Statistics to solve large samples and Small samples problems using Statistical Tools practising in Ms-Excel's Tools.

CONCEPTS TO BE COVERED

1. Algebraic operations on matrices, transpose of a matrix.
2. Finding determinant, inverse of a matrix.
3. Solving system of equations and consistency – Non Homogeneous equations
4. Rank of a matrix - Row reduced Echelon form.
5. Practice theory behind the descriptive statistics like measures of central tendency with examples.
6. Solving Measures of dispersion concepts with examples.
7. Practicing concept of Correlation with some examples.
8. Solving Regression analysis with some examples.
9. Solving Skewness concept with examples.
10. 10. Practising the Concept of Kurtosis with examples.
11. Solving the Numerical Integration by Trapezoidal rule and Simpson's 1/3 rule .
12. Fitting a Straight line and power curve using Ms-Excel Tools.
13. Using functions in MS-Excel to calculate the probabilities for Binomial distribution.
14. 14. Using functions in MS-Excel to calculate the probabilities for Poisson distribution.
15. Using functions in MS-Excel to calculate the probabilities for Normal distribution.
16. Using functions in MS-Excel to calculate the probabilities for Geometric distribution.
17. Using functions in MS-Excel to calculate the probabilities for Uniform distribution.
18. 18. Testing Single mean in large samples and difference between two means large samples using Z – test.
19. Testing Single proportion in large samples and difference between two proportions in large samples using Z – test.
20. Testing Single mean in small samples using t- test.
21. Testing Student's t-Test for difference of means.
22. Testing Paired - Sample t' - test in small samples using t- test.
23. 23. Testing difference between two means in small samples using t- test.
24. Solving problems on Chi- square test for testing goodness of fit .

References

1. Higher Engineering in Mathematics, Dr. B.S. Grewal of Khanna Publishers, 42nd Edition .
2. Miller and Friends, Probability and Statistics for Engineers, 7/e, Pearson, 2008.
3. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
4. S.Chand ,Probability and Statistics, Dr.T.K.V.Iyengar, Dr.B.Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N.Prasad

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:I

Semester:II

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AES0504	Data Structures Lab	0	0	3	1.5

Course Outcomes:

1. Select the data structure appropriate for solving the problem
2. Implement searching and sorting algorithms
3. Design new data types
4. Illustrate the working of stack and queue
5. Organize the data in the form of files

Laboratory Experiments

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements.

The time for other operations like I/O etc should not be considered while computing time.

4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file
15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table data type and support different operations on it.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)**

Year: I

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AMC9903	Environmental Studies	2	0	0	0

Course Outcomes:

- CO: 1 Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
- CO: 2 Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
- CO: 3 Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
- CO: 4 Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
- CO: 5 To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting

UNIT I

Multidisciplinary Nature of Environmental Studies: Introduction – 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 sub-surface – 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-pesticides problems, water logging, salinity, case studies.

Energy resources: Renewable and non-renewable energy resources

UNIT II

Ecosystems: Concept of an ecosystem. – Structure and functions of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity And Its Conservation : Introduction- 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-spots 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: Definition, Causes, effects and its control measures of : Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and 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, Tsunami and landslides.

UNIT IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management – Resettlement

and rehabilitation of people – 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 – Public awareness.

UNIT V

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Kaushik, New Age Publishers.
3. Environmental Studies by Sri Krishna Hitech publishing Pvt. Ltd.

Reference Books:

1. Environmental studies by R. Rajagopalan, Oxford University Press.
2. Comprehensive Environmental studies by J.P. Sharma, Laxmi publications.
3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela -Printice hall of India Private limited.
4. Environmental studies by A. Ravi Krishnan, G. Sujatha Sri Krishna Hitech publications.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: I

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ABS9914	Discrete Mathematical Structures (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COURSE OUTCOMES

After completion of the course, students will be able to

- Apply mathematical logic to solve problems.
- Understand the concepts and perform the operations related to sets, relations and functions.
- Gain the conceptual background needed and identify structures of algebraic nature.
- Apply basic counting techniques to solve combinatorial problems.
- Formulate problems and solve recurrence relations.
- Apply Graph Theory in solving computer science problems

UNIT-I

Mathematical Logic: Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, Functionally complete set of connectives, Inference Theory of Statement Calculus, Predicate Calculus, Inference theory of Predicate Calculus.

UNIT-II

Set theory: Basic Concepts of Set Theory, Relations and Ordering, The Principle of Inclusion- Exclusion, Pigeon hole principle and its application, Functions composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties. Algebraic structures: Algebraic systems-Examples and General Properties, Semi groups and Monoids, groups, sub groups, homomorphism, Isomorphism.

UNIT-III

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

UNIT-IV

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution and Generating functions, The Method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations

UNIT-V

Graphs: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem

TEXT BOOKS

1. Joe L. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education, 2008
2. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2017.

REFERENCE BOOKS

1. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited, 2017
2. Graph Theory with Applications to Engineering and Computer Science by Narsingh Deo, 1979.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics	1.2	1.2.1
CO2	PO1:Apply the knowledge of mathematics	1.2	1.2.1
CO3	PO1: Apply the knowledge of mathematics	1.2	1.2.2
CO4	PO1: Apply the knowledge of mathematics	1.6	1.6.1
CO5	PO1: Apply the knowledge of mathematics	1.6	1.6.1
CO6	PO1: Apply the knowledge of mathematics	1.6	1.6.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3001	DIGITAL ELECTRONICS & MICROPROCESSORS (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COURSE OUTCOMES:

After Completion of this course, the student will be able to:

- Design any Logic circuit using basic concepts of Boolean Algebra.
- Design any Logic circuit using basic concepts of PLDs.
- Design and develop any application using 8086 Microprocessor.
- Design and develop any application using 8051 Microcontroller.

UNIT - I

Number Systems & Code Conversion

Number Systems & Code conversion, Boolean Algebra & Logic Gates, Truth Tables, Universal Gates, Simplification of Boolean functions, SOP and POS methods – Simplification of Boolean functions using K-maps, Signed and Unsigned Binary Numbers.

UNIT - II

Combinational Circuits

Combinational Logic Circuits: Adders & Subtractors, Multiplexers, Demultiplexers, Encoders, Decoders, Programmable Logic Devices.

UNIT - III

Sequential Circuits:

Sequential Logic Circuits: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops, Shift Registers, Types of Shift Registers, Counters, Ripple Counter, Synchronous Counters, Asynchronous Counters, Up-Down Counter

UNIT - IV

Microprocessors - I:

8085 microprocessor Review (brief details only), 8086 microprocessor, Functional Diagram, register organization 8086, Flag register of 8086 and its functions, Addressing modes of 8086, Pin diagram of 8086, Minimum mode & Maximum mode operation of 8086, Interrupts in 8086.

UNIT - V

Microprocessors - II:

Instruction set of 8086, Assembler directives, Procedures and Macros, Simple programs involving arithmetic, logical, branch instructions, Ascending, Descending and Block move programs, String Manipulation Instructions. Overview of 8051 microcontroller, Architecture, I/O ports and Memory organization, addressing modes and instruction set of 8051(Brief details only), Simple Programs.

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013
2. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, John Wiley & Sons, Ltd., 2007.
3. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Microprocessor and Microcontrollers, Oxford Publishers, 2016.

4. Advanced microprocessors and peripherals-A.K Ray and K.M.Bhurchandani, TMH, 2nd edition, 2006.

REFERENCE BOOKS:

1. Thomas L. Floyd, Digital Fundamentals – A Systems Approach, Pearson, 2013.
2. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 5th, Edition, 2004.
3. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition, 2006.
4. Kenneth.J.Ayala, The 8051 microcontroller, 3rd edition, Cengage Learning,2010.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO2	PO3: Design system components	3.4	3.4.3
CO3	PO2: Analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics	2.2	2.2.3
CO4	PO2: Analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics	2.2	2.2.3

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: I

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3002	DATABASE MANAGEMENT SYSTEMS (Common to : CSE, CIC, AIM, AID, ECE)	3	0	0	3

COUSE OUTCOMES:

After completion of the course, students will be able to

- Design a database for a real-world information system
- Define transactions that preserve the integrity of the database
- Generate tables for a database
- Organize the data to prevent redundancy
- Pose queries to retrieve the information from the database.

UNIT-I

Introduction: Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database users and Administrators, **Introduction to Relational Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations

UNIT-II

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database. **Intermediate SQL:** Joint Expressions, Views, Transactions, Integrity Constraints, SQL Data types and schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, OLAP, Formal relational query languages

UNIT-III

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues.

Relational Database Design:

Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms.

UNIT-IV

Query Processing: Overview, Measures of Query cost, Selection operation, sorting, Join Operation, other operations, Evaluation of Expressions.

Query optimization: Overview, Transformation of Relational Expressions, Estimating statistics of Expression results, Choice of Evaluation Plans, Materialized views, Advanced Topics in Query Optimization.

UNIT-V

Transaction Management: Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Concurrency Control: Lock-based Protocols, Deadlock Handling, Multiple granularity, Timestamp-based Protocols, and Validation-based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations

TEXT BOOKS:

1. A.Silberschatz, H.F.Korth, S.Sudarshan, -Database System Concepts, 6/e, TMH 2019
2. Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA

REFERENCES:

1. Database Principles Fundamentals of Design Implementation and Management, Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.
2. Database Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, TMH.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.4	1.4.1
CO2	PO 2: Problem analysis	2.2	2.2.3
CO3	PO 3: Design/Development of Solutions	3.2	3.2.1
CO4	PO 4: Conduct investigations of complex problems	4.2	4.2.1
CO5	PO 2: Problem analysis	2.3	2.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3004	Object Oriented Programming through Java (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COUSE OUTCOMES:

- Understanding the Syntax, Semantics and features of Java Programming Language.
- To gain knowledge on Object Oriented Programming concepts.
- Design the method of creating Multi-threading programs and handle exceptions.
- Understanding the concepts of java Collection Framework, Applets.
- Ability to create GUI applications & perform event handling.

Unit-I

Object Oriented Thinking: History of Java, Java Buzzwords, Overview of OOP CLASSES AND **Objects:** Classes, Objects, Simple Java Program, Methods, Constructors, this Keyword, Garbage Collection, Data Types, Variables, Arrays, Operators, Control Statements Overloading of Methods and Constructors, Parameter Passing, Recursion, String Class and String handling methods.

Unit- II

Inheritance: Inheritance Basics, Using Super, Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Using final with Inheritance, Object Class.

Packages: Packages, Access Protection, Importing Packages.

Interfaces: Defining an Interface, Implementing Interface, Applying Interface, Variables in Interfaces, Interfaces can be extended.

Unit-III

Exception Handling: Exception Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built in Exceptions, Creating Own Exception Sub Classes.

Input and Output Operations: I/O basics, reading console input, writing console output, the PrintWriter class, reading and writing files, automatically closing a file.

Generic Programming — Generic classes — generic methods — Bounded Types — Restrictions and Limitations.

Unit-IV

Multithreading: Java Thread Model, The Main Thread, Thread Life Cycle, Creating Thread and Multiple Threads, isAlive() and join(), Thread Priorities, Synchronization, Inter thread Communication, Suspending, Resuming and Stopping Threads.

Collection Framework: Collection Overview, Collection Interfaces: The Collection Interface, the List Interface, the Queue Interface, Collection Classes: Array List Class, Linked List Class, String Tokenizer, Scanner.

Unit-V

Applets: Applet Basics, Life Cycle of an Applet, Simple Applet Display Methods, The HTML APPLET tag, Passing Parameters to Applets.

Swing: Introduction to Swing Model-View-Controller design pattern button, layout management, Swing Components

Text Books:

1. Herbert Schildt.Java. The complete reference, TMH. 9thEdition, 2014

2. Cay. S. Horstmann and Gary Cornell Core Java 2, Vol 2, Advanced Features, Pearson Education, 7thEdition, 2004

Reference Books:

1. J.Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wiley & sons.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education 6th Edition
3. R.A. Johnson- Thomson, An introduction to Java programming and object oriented application development.
4. P. Radha Krishna, Object Oriented Programming through Java, University Press.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Understand Basics of concepts	1.4	1.4.1
CO2	PO1: Demonstrate competence in engineering fundamentals	1.3	1.3.1
CO3	PO3: Demonstrate an ability to generate a diverse set of alternative design solutions	3.2	3.2.1
CO4	PO1: Understand Basics of concepts	1.4	1.4.1
CO5	PO5: ability to identify / create modern engineering tools, techniques and resources	5.1	5.1.2

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:II

Semester:I

Branch of Study:AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3006	Computer Organization (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COURSE OUTCOMES:

After completion of the course, students will be able to

- Understand computer architecture concepts related to the design of modern processors, memories and I/Os
- Identify the hardware requirements for cache memory and virtual memory
- Design algorithms to exploit pipelining and multiprocessors
- Understand the importance and trade-offs of different types of memories.
- Identify pipeline hazards and possible solutions to those hazards

UNIT - 1: Basic Structure of Computer, Machine Instructions and Programs

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

UNIT - 2: Arithmetic, Basic Processing Unit

Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, and Multi programmed Control.

UNIT - 3: The Memory System

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

UNIT - 4: Input/Output Organization

Input/Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

UNIT - 5: Pipelining, Large Computer Systems

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Textbooks:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, -Computer Organization, 5th Edition, McGraw Hill Education, 2013.
2. M.Morris Mano, -Computer System Architecture, 3rd Edition, Pearson Education, 2017.

References

1. Themes and Variations, Alan Clements, -Computer Organization and Architecture, CENGAGE Learning.
2. Smruti Ranjan Sarangi, —Computer Organization and Architecture, McGraw Hill Education.
3. John P.Hayes, —Computer Architecture and Organization, McGraw Hill Education

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering fundamentals	1.4	1.4.1
CO2	PO3: Design solutions for complex engineering problems	3.4	3.4.1
CO3	PO3: Design solutions for complex engineering problems	3.4	3.4.1
CO4	PO1: Engineering fundamentals	1.4	1.4.1
CO5	PO3: Design solutions for complex engineering problems	3.4	3.4.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year:II

Semester:I

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3003	Database Management Systems Laboratory (Common to : CSE, CIC, AIM, AID)	0	0	3	1.5

Course Objective:

1. To implement the basic knowledge of SQL queries and relational algebra.
2. To construct database models for different database applications.
3. To apply normalization techniques for refining of databases.
4. To practice various triggers, procedures, and cursors using PL/SQL.
5. To design and implementation of a database for an organization

Course Outcomes:

After completion of the course, students will be able to

- Design database for any real world problem
- Implement PL/SQL programs
- Define SQL queries
- Decide the constraints
- Investigate for data inconsistency

List of Experiments:

Week-1: CREATION OF TABLES

1. Create a table called Employee with the following structure.

Name	Type
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

- a. Add a column commission with domain to the Employee table.
 - b. Insert any five records into the table.
 - c. Update the column details of job
 - d. Rename the column of Employ table using alter command.
 - e. Delete the employee whose empno is19.
2. Create department table with the following structure.

Name	Type
Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

- a. Add column designation to the department table.
 - b. Insert values into the table.
 - c. List the records of emp table grouped bydeptno.
 - d. Update the record where deptno is9.
 - e. Delete any column data from the table
3. Create a table called Customertable

Name	Type
Cust name	Varchar2(20)

Cust street	Varchar2(20)
Cust city	Varchar2(20)

- a) Insert records into thetable.
- b) Add salary column to thetable.
- c) Alter the table columndomain.
- d) Drop salary column of the costumertable.
- e) Delete the rows of customer table whose ust_city is '_hyd'.
- f) Create a table called branchtable.

Name	Type
Branch name	Varchar2(20)
Branch city	Varchar2(20)
asserts	Number

4. Increase the size of data type for asserts to the branch.
 - a) Add and drop a column to the branch table.
 - b) Insert values to the table.
 - c) Update the branch name column
 - d) Delete any two columns from the table
5. Create a table called sailor table

Name	Type
Sid	Number
Sname	Varchar2(20)
rating	Varchar2(20)

- a) Add column age to the sailor table.
- b) Insert values into the sailor table.
- c) Delete the row with rating>8.
- d) Update the column details of sailor.
- e) Insert null values into the table.
6. Create a table called reserves table

Name	Type
Boat id	Integer
sid	Integer
day	Integer

- a) Insert values into the reservestable.
- b) Add column time to the reservestable.
- c) Alter the column day data type todate.
- d) Drop the column time in thetable.
- e) Delete the row of the table with somecondition.

Week-2: QUERIES USING DDL AND DML

1.
 - a. Create a user and grant all permissions to theuser.
 - b. Insert the any three records in the employee table and use rollback. Check theresult.
 - c. Add primary key constraint and not null constraint to the employeetable.

- d. Insert null values to the employee table and verify the result.
2.
 - a. Create a user and grant all permissions to the user.
 - b. Insert the any three records in the employee table and use rollback. Check the result.
 - c. Add primary key constraint and not null constraint to the employee table.
 - d. Insert null values to the employee table and verify the result.
3.
 - a. Create a user and grant all permissions to the user.
 - b. Insert the any three records in the employee table and use rollback. Check the result.
 - c. Add primary key constraint and not null constraint to the employee table.
 - d. Insert null values to the employee table and verify the result.
4.
 - a. Create a user and grant all permissions to the user.
 - b. Insert values in the department table and use commit.
 - c. Add constraints like unique and not null to the department table.
 - d. Insert repeated values and null values into the table.
5.
 - a. Create a user and grant all permissions to the user.
 - b. Insert values into the table and use commit.
 - c. Delete any three records in the department table and use rollback.
 - d. Add constraint primary key and foreign key to the table.
6.
 - a. Create a user and grant all permissions to the user.
 - b. Insert records in the sailor table and use commit.
 - c. Add save point after insertion of records and verify save point.
 - d. Add constraints not null and primary key to the sailor table.
7.
 - a. Create a user and grant all permissions to the user.
 - b. Use revoke command to remove user permissions.
 - b. Change password of the user created.
 - c. Add constraint foreign key and not null.
8.
 - a. Create a user and grant all permissions to the user.
 - b. Update the table reserves and use savepoint and rollback.
 - c. Add constraint primary key, foreign key and not null to the reserves table
 - d. Delete constraint not null to the table column

Week-3: QUERIES USING AGGREGATE FUNCTIONS

1.
 - a. By using the group by clause, display the enames who belongs to deptno 10 along with average salary.
 - b. Display lowest paid employee details under each department.
 - c. Display number of employees working in each department and their department number.
 - d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert deptname to dept table and insert deptname for each row, do the required thing specified above.
 - e. List all employees which start with either B or C.
 - f. Display only these ename of employees where the maximum salary is greater than or equal to 5000.
2.
 - a. Calculate the average salary for each different job.
 - b. Show the average salary of each job excluding manager.
 - c. Show the average salary for all departments employing more than three people.
 - d. Display employees who earn more than the lowest salary in department 30
 - e. Show that value returned by sign (n) function.
 - f. How many days between day of birth to current date
3.
 - a. Show that two substring as single string.
 - b. List all employee names, salary and 15% rise in salary.
 - c. Display lowest paid emp details under each manager
 - d. Display the average monthly salary bill for each deptno.

- e. Show the average salary for all departments employing more than two people.
 - f. By using the group by clause, display the eid who belongs to deptno 05 along with average salary.
4.
 - a. Count the number of employees in department 20
 - b. Find the minimum salary earned by clerk.
 - c. Find minimum, maximum, average salary of all employees.
 - d. List the minimum and maximum salaries for each job type.
 - e. List the employee names in descending order.
 - f. List the employee id, names in ascending order by empid.
 5.
 - a. Find the sids, names of sailors who have reserved all boats called—INTERLAKE Find the age of youngest sailor who is eligible to vote for each rating level with at least two such sailors.
 - b. Find the sname, bid and reservation date for each reservation.
 - c. Find the ages of sailors whose name begin and end with B and has at least 3 characters.
 - d. List in alphabetic order all sailors who have reserved redboat.
 - e. Find the age of youngest sailor for each rating level.
 6.
 - a. List the Vendors who have delivered products within 6 months from order date.
 - b. Display the Vendor details who have supplied both Assembled and Subparts.
 - c. Display the Sub parts by grouping the Vendor type (Local or NonLocal).
 - d. Display the Vendor details in ascending order.
 - e. Display the Sub part which costs more than any of the Assembled parts.
 - f. Display the second maximum cost Assembled part

Week-4: PROGRAMS ON PL/SQL

1.
 - a. Write a PL/SQL program to swap two numbers.
 - b. Write a PL/SQL program to find the largest of three numbers.
2.
 - a. Write a PL/SQL program to find the total and average of 6 subjects and display the grade.
 - b. Write a PL/SQL program to find the sum of digits in a given number.
3.
 - a. Write a PL/SQL program to display the number in reverse order.
 - b. Write a PL/SQL program to check whether the given number is prime or not.
4.
 - a. Write a PL/SQL program to find the factorial of a given number.
 - b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius and area.
5.
 - a. Write a PL/SQL program to accept a string and remove the vowels from the string. (When 'hello' passed to the program it should display 'Hll' removing e and o from the world Hello).
 - b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than or equal to 10. Else display an error message. Otherwise Display the remainder in words.

Week-5: PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as a single column.
2. Accept year as parameter and write a Function to return the total net salary spent for a given year.
3. Create a function to find the factorial of a given number and hence find NCR.
4. Write a PL/SQL block to print prime Fibonacci series using local functions.
5. Create a procedure to find the lucky number of a given birthdate.
6. Create function to the reverse of given number

Week-6: TRIGGERS

1. Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between

the old values and newvalues:

CUSTOMERS table:

ID	NAME	AGE	ADDRESS	SALARY
1	Alive	24	Khammam	2000
2	Bob	27	Kadappa	3000
3	Catri	25	Guntur	4000
4	Dena	28	Hyderabad	5000
5	Eeshwar	27	Kurnool	6000
6	Farooq	28	Nellore	7000

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the passenger database. Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50)NotNULL, Age Integer Not NULL, Sex Char, Address VARCHAR (50) NotNULL);
 - a. Write a Insert Trigger to check the Passport_id is exactly six digits ornot.
 - b. Write a trigger on passenger to display messages '_1 Record is inserted', '_1 record is deleted', '_1 record is updated' when insertion, deletion and updation are done on passengerrespectively.
3. Insert row in employee table using Triggers. Every trigger is created with name any trigger have same name must be replaced by new name. These triggers can raised before insert, updateor delete rows on data base. The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETEoccurs.
4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire before the insert orupdate.
5. Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called delete _emp and also record user who has deleted the record and date and time ofdelete.
6. Create a transparent audit system for a table CUST_MSTR. The system must keep track of the records that are being deleted orupdated

Week-7:PROCEDURES

1. Create the procedure for palindrome of given number.
2. Create the procedure for GCD: Program should load two registers with two Numbers and thenapply the logic for GCD of two numbers. GCD of two numbers is performed by dividing the greater number by the smaller number till the remainder is zero. If it is zero, the divisor is the GCD if not the remainder and the divisors of the previous division are the new set of two numbers. The process is repeated by dividing greater of the two numbers by the smaller number till the remainder is zero and GCD is found.
3. Write the PL/SQL programs to create the procedure for factorial of given number.
4. Write the PL/SQL programs to create the procedure to find sum of N naturalnumber.
5. Write the PL/SQL programs to create the procedure to find Fibonacciserries.
6. Write the PL/SQL programs to create the procedure to check the given number is perfect ornot

Week-8: CURSORS

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is already present in the item master then update operation is performed to decrease the balance stock bythe quantity specified in the item transaction in case the item id is not present in the item master table then the record is inserted in the item mastertable.
2. Write a PL/SQL block that will display the employee details along with salary usingcursors.
3. To write a Cursor to display the list of employees who are working as a ManagersorAnalyst.
4. To write a Cursor to find employee with given job anddeptno.

5. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the `_employee` table are updated. If none of the employee's salary are updated we get a message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in `_employee` table

Week-9: CASE STUDY: BOOK PUBLISHING COMPANY

A publishing company produces scientific books on various subjects. The books are written by authors who specialize in one particular subject. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more publications.

A publication covers essentially one of the specialist subjects and is normally written by a single author. When writing a particular book, each author works with one editor, but may submit another work for publication to be supervised by other editors. To improve their competitiveness, the company tries to employ a variety of authors, more than one author being a specialist in a particular subject for the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-10: CASE STUDY GENERAL HOSPITAL

A General Hospital consists of a number of specialized wards (such as Maternity, Pediatric, Oncology, etc.). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do the following.

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-11: CASE STUDY: CAR RENTAL COMPANY

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephone number, driving license, number about each customer are kept in the database. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-12: CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons.) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre-requisites modules and some degree programs have compulsory modules. The database is also contain some information about students including their numbers, names, addresses, degrees they read for, and their past performance i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.
3. Create the logical data model i.e., ER diagrams.
4. Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys wherever required.
5. Insert values into the tables created (Be vigilant about Master- Slave tables).
6. Display the Students who have taken M.Sc course
7. Display the Module code and Number of Modules taught by each Lecturer.
8. Retrieve the Lecturer names who are not Module Leaders.
9. Display the Department name which offers _English_ module.
10. Retrieve the Prerequisite Courses offered by every Department (with Department names).
11. Present the Lecturer ID and Name who teaches _Mathematics_.
12. Discover the number of years a Module is taught.
13. List out all the Faculties who work for _Statistics_ Department.
14. List out the number of Modules taught by each Module Leader.
15. List out the number of Modules taught by a particular Lecturer.
16. Create a view which contains the fields of both Department and Module tables. (Hint- The fields like Module code, title, credit, Department code and its name).

Update the credits of all the prerequisite courses to 5. Delete the Module _History_ from the Module table.

References:

1. Ramez Elmasri, Shamkant, B. Navathe, -Database Systems, Pearson Education, 6th Edition, 2013.
2. Peter Rob, Carles Coronel, -Database System Concepts, Cengage Learning, 7th Edition, 2008.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO 3: Design/Development of Solutions	3.2	3.2.2
CO2	PO 3: Design/Development of Solutions	3.2	3.2.1
CO3	PO 3: Design/Development of Solutions	3.2	3.2.1
CO4	PO 3: Design/Development of Solutions	3.2	3.2.2
CO5	PO 4: Conduct investigations of complex problems	4.1	4.1.2

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3005	Object Oriented Programming through Java Lab (Common to : CSE, CIC, AIM, AID)	0	0	3	1.5

Course Outcomes

- To experiment with the syntax and semantics of java language and gain experience with java programming
- Learn to use object orientation to solve problems and use java language to implement them.

Week-1: (Unit-1)

Installation of Java software, study of any integrated development environment, Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class and run it.

- a) Practice Java Basic Programs on Classes and Objects.

Week-2: (Unit-1)

- a) Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Compute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

First 100 units - Rs. 1 per unit; 101-200 units - Rs. 2.50 per unit; 201 -500 units - Rs. 4 per unit;

501 units - Rs. 6 per unit.If the type of the EB connection is commercial, calculate the amount to be paid as follows: First 100 units - Rs. 2 per unit; 101-200 units - Rs. 4.50 per unit; 201 -500 units - Rs. 6 per unit; > 501 units - Rs. 7 per unit

- b) Write a java program to illustrate the concept of class with method overloading. C) Write a java program to illustrate the concept of class with Constructors overloading.

Week-3:(Unit-2)

- a) Write a program to create a class named shape. It should contain 2 methods, draw() and erase() that prints -Drawing Shape\ and -Erasing Shape\ respectively. For this class, create three sub classes, Circle, Triangle and Square and each class should override the parent class functions - draw () and erase (). The draw() method should print -Drawing Circle\, -Drawing Triangle\ and -Drawing Square\ respectively. The erase() method should print -Erasing Circle\, -Erasing Triangle\ and -Erasing Square\ respectively. Create objects of Circle, Triangle and Square in the following way and observe the polymorphic nature of the class by calling draw() and erase() method using each object. Shape c=new Circle(); Shape t=new Triangle(); Shape s=new Square();

- b) Write a Java Program to demonstrate inheritance &usage of super

Week-4:(Unit-2)

- a) Write a Java Program to implement multilevel inheritance.
b) Write a Java program to implement the method overriding
c) Write a Java program to implement dynamic method dispatch.

Week-5:(Unit-2)

- a) Write a Java program to implement abstract class.
b) Write a Java Program to implement Packages.
c) Write a Java Program to implement Access Protection in Packages.

Week-6:(Unit-2)

- a) Write a Java program to demonstrate interfaces.

- b) Write a Java program to implement the multiple inheritance using interfaces.

Week-7:(Unit-3)

- a) Write a Java program to implement the exception handling mechanism.
 b) Write a Java program to implement the nested try statement.
 c) Write a Java program to implement your own exception class.

Week-8:(Unit-3)

- a) Write a Java Program to demonstrate the following String Handlings.
 i. String Length& Concatenation.
 ii. Character Extraction.
 iii. String Comparison.
 iv. Searching and modifying String.
 b) Write a Java Program to demonstrate String Buffer Class.

Week-9:(Unit-4)

- a) Write a Java program for multi-thread implementation.
 b) Write a Java program to implement producer consumer problem using inter-thread communication mechanism.

Week-10:(Unit-4)

- a) Practice any two Programs on Collections.
 b) Practice any two Programs on String Tokenizer & Scanner.

Week-11:(Unit-5)

- a) Write a Java Program to develop an applet that displays a simple message.
 b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named —Compute! is clicked.
 c) Write a java program to handle keyboard events.
 d) Write a java program to handle Mouse events

Week-12:(Unit-5)

- a) Write a Java Program to demonstrate AWT Label & Button.
 b) Write a Java Program to demonstrate JLabel, JTextField & JButton.
 c) Write a program to design a calculator using event driven programming paradigm of java

Text Books:

1. HerbertSchildt.Java. The complete reference, TMH. 9thEdition, 2014.
2. H.M.Dietel and P.J.Dietel, Java How to Program 6thEdition,PearsonEducation/PHI, 2004
3. Y.DanielLiang, Introduction to Java programming, Pearson Education, 6thEdition.
4. Cay Horstmann,Big Java, 2ndedition, Wiley Student Edition, Wiley India Private Limited.

List of CO's	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO2	PO1:Apply the knowledge of mathematics	1.1	1.1.1
CO3	PO2:Analyse complex engineering problems	2.1	2.1.3
CO4	PO2:Analyse complex engineering problems	2.4	2.4.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: I

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3007	Computer Organization Lab (Common to : CSE, CIC, AIM, AID)	0	0	3	1.5

COURSE OUTCOMES:

- Represent numbers and perform arithmetic operations.
- Minimize the Boolean expression using Boolean algebra and design it using logic gates
- Analyze and design combinational circuit.
- Design and develop sequential circuits
- Understand and apply the working of different operations on binary numbers.

List of Experiments:

Exercises in Digital Electronics:

- Implement Logic gates using NAND and NOR gates
- Design a Full adder using gates
- Design and implement the 4:1 MUX, 8:1 MUX using gates /ICs.
- Design and Implement a 3 to 8 decoder using gates
- Design a 4 bit comparator using gates/IC
- Design and Implement a 4 bit shift register using Flip flops
- Design and Implement a Decade counter

Microprocessors (8086 Assembly Language Programming)

- 8 Bit Addition and Subtraction.
- 16 Bit Addition.
- BCD Addition.
- BCD Subtraction.
- 8 Bit Multiplication.
- 8 Bit Division.
- Searching for an Element in an Array.
- Sorting in Ascending and Descending Orders.
- Finding Largest and Smallest Elements from an Array.

Exercises in Computer Organization:

- Implement a C program to perform Binary Addition & Subtraction.
- Implement a C program to perform Multiplication of two binary numbers
- Implement a C program to perform Multiplication of two binary numbers (signed) using Booth's Algorithms.
- Implement a C program to perform division of two binary numbers (Unsigned) using restoring division algorithm.
- Implement a C program to perform division of two binary numbers (Unsigned) using non-restoring division algorithm.

Reference Books:

1. Switching theory and logic design –A. Anand Kumar PHI, 2013
2. Advanced microprocessor & Peripherals-A. K. Ray and K. M. Bherchandavi, TMH, 2nd edition, 2016.
3. Switching and Finite Automatic theory-Zvi Kohavi, Niraj K.Jha Cambridge, 3rd edition, 2009
4. Digital Design –Morris Mano, PHI, 3rd edition, 2010
5. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2nd edition, 2017

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics PO2: Analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics	1.1, 2.4	1.1.1, 2.4.1
CO2	PO1: Apply the knowledge of mathematics PO3: Design system components	1.1, 3.4	1.1.1, 3.4.3
CO3	PO1: Apply the knowledge of mathematics PO3: Design system components	1.1, 3.4	1.1.1, 3.4.3
CO4	PO1: Apply the knowledge of mathematics PO2: Analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics	1.1, 2.4	1.1.1, 2.4.1
CO5	PO1: Apply the knowledge of mathematics PO2: Analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics	1.1, 2.4	1.1.1, 2.4.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ASC3001	Client side Scripting (Common to : CSE, CIC, AIM, AID)	1	0	2	2

COURSE OUTCOMES:

Upon the completion of Data Mining practical course, the student will be able to:

CO1: Analyze and understand the basic concepts of web programming.

CO2: Apply techniques of form validation using Java Script.

CO3: Describe important concepts related to client side Web Security.

CO4: Demonstrate the function of Hypertext Markup Language (HTML) in Web communications.

CO5: Develop the function of JavaScript as a dynamic webpage creating tool

UNIT-1 Basics of JavaScript Programming

Features of JavaScript, Object Name, Property, Method, Dot Syntax, Main Event, Values and Variables, Operators and Expressions – Primary Expressions, Object and Array Initializers, Function Definition Expression, Property Access Expressions, Invocation Expressions, If Statement, if...else, if..elseif, Nested if Statement, Switch... Case Statement, Loop Statement – for Loop, for...in Loop, while Loop, do...while Loop, continue Statement, Querying and Setting Properties and Deleting Properties, Property Getters and Setters.

- WAP to print hello world
- WAP to use comments in JavaScript.
- WAP to add a noscript block.
- Write a Script in <head>...</head> section.
- Write a Script in <body>...</body> section.
- Write a Script in <body>...</body> and <head>...</head> sections.
- Write a Script using arithmetic, Comparison, Logical, Bitwise, and Assignment operators
- Write code to understand how the Conditional Operator and typeof operator works in JavaScript.
- Write code to understand the working of if statement, if...else statement, and if...else if... statement.
- Implement switch-case statement.
- Implement while loop, do-while and for loop in JavaScript.
- WAP to print the web browser's Navigator object using for loop.
- WAP To implement break, continue and label in JavaScript.
- Write code to call the function that displays the text message on clicking a button.

UNIT - 2 Array, Function and String

Array – Declaring an Array, Initializing an Array, Defining an Array Elements, Looping an Array, Adding an Array Element, Sorting an Array Element, Combining an Array Elements into a String, Changing Elements of an Array, Objects as Associative Arrays, Function – Defining a Function, Writing a Function, Adding an Arguments, Scope of Variable and Arguments, Calling a Function – Calling a Function With or Without an Argument, Calling Function from HTML, Function Calling another Function, Returning the Value from a Function, String – Manipulate a String, Joining a String, Retrieving a Character from given Position, Retrieving a Position of Character in a String, Dividing Text, Copying a Sub-string, Converting String to Number and Numbers to String, Changing the Case of String, Finding a Unicode of a Character – charCodeAt(), fromCharCode().

- Write code to call the function that displays the text message on clicking a button.
- WAP to call a function that takes two parameters, name and age. Print the same.
- Define a function that takes two parameters and concatenates them before returning the resultant in the calling program.

Unit- 3 Form and Event Handling

Building Blocks of a Form, Properties and Methods of Form, Button, Text, Text Area, Checkbox, Radio Button, Select Element, Form Events – Mouse Event, Key Events, Form Objects and Elements, Changing Attribute Value Dynamically, Changing Option List Dynamically, Evaluating Checkbox Selection, Changing a Label Dynamically, Manipulating Form Elements, Intrinsic JavaScript Functions, Disabling Elements, Read Only Elements.

- Write code to implement the following events – onclick, onsubmit, onmouseover and onmouseout.
- Design a Registration form (include email id and password) and perform validation to all its fields.

Unit-4: Objects

Window Object, Math, Number, and Date Objects, Handling Strings Using Regular Expressions.

Implement Number, Date, Math, Boolean, Strings, Arrays, RegEx, and HTML DOM objects with all its properties and methods.

Unit-5: Cookies and Browser Data

Cookies – Basic of Cookies, Reading a Cookie Value, Writing a Cookie Value, Creating a Cookies, Deleting a Cookies, Setting the Expiration Date of Cookie, Browser – Opening a Window, Giving the New Window Focus, Window Position, Changing the Content of Window, Closing a Window, Scrolling a Web Page, Multiple Windows at Once, Creating a Web Page in New Window, JavaScript in URLs, JavaScript Security, Timers, Browser Location and History.

- Set a customer name in an input cookie.
- WAP to get all the cookies.
- Extend the expiry date of a cookie by 1 Month.
- Delete a cookie by setting its expiry date to one month behind the current date.
- Do a page redirect using JavaScript at client side.
- Show an appropriate message to your site visitors before redirecting them to a new page. WAP with a time delay to load a new page.
- Redirect your site visitors onto a different page based on their browsers.
- Use an alert box to give a warning message.
- Implement a confirmation dialog box to take user's consent on any option.
- Use a prompt dialog box.
- Use of void is to purposely generate the undefined value.
- Demonstrates how to create an Object.
- Create an object with a User-Defined Function.
- Write code to add a function along with an object.
- Demonstrate with keyword in JavaScript.

Text Books:

1. Javascript Beginners Guide, John Pollock, TMH, 4th Edition, 2013
2. JavaScript. Demystified, JIM KEOGH , McGraw-Hill, 2005

Reference Books:

1. JavaScript™ For Dummies,® 4th Edition, by Emily Vander Veer, Published by Wiley Publishing, Inc © 2005.
2. JavaScript for impatient programmers (beta), by Dr. Axel Rauschmayer © 2019.
3. Javascript: Beginners Guide on Javascript Programming, by Nick Goddard © 2016.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2:Problem Analysis	2.4	2.4.3
CO2	PO1:Engineering Knowledge	1.4	1.4.1
CO3	PO1:Engineering Knowledge	1.4	1.4.1
CO4	PO5:Modern tool Usage	5.2	5.2.2
CO5	PO3:Design/Development	3.1	3.1.6

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::TIRUPATI
(Autonomous)

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AMC9902	Constitution Of India	2	0	0	0

Course Outcome:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the Powers and functions of Governor, President, Judiciary.
5. Discuss the functions of local administration bodies

UNIT - I

History of Making of the Indian Constitution - History Drafting Committee, (Composition & Working).

UNIT - II

Philosophy of the Indian Constitution - Preamble Salient Features

UNIT – III

Contours of Constitutional Rights & Duties - Fundamental Rights - Right to Equality- Right to Freedom - Right against Exploitation - Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies - Directive Principles of State Policy - Fundamental Duties.

UNIT – IV

Organs of Governance - Parliament - Composition - Qualifications and Disqualifications - Powers and Functions - Executive •President •Governor - Council of Ministers - Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions

UNIT – V

Local Administration - District's Administration head: Role and Importance - Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation- Pachayati raj: Introduction, PRI: ZillaPachayat - Elected officials and their roles, CEO Zilla Panchayat: Position and role - Block level: Organizational Hierarchy (Different departments) - Village level: Role of Elected and Appointed officials - Importance of grass root democracy.

Suggested books for reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO 6: The engineer and society	6.2	6.2.1
CO2	PO 6: The engineer and society	6.2	6.2.1
CO3	PO 6: The engineer and society	6.2	6.2.1
CO4	PO 6: The engineer and society	6.2	6.2.1
CO5	PO 6: The engineer and society	6.2	6.1.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3008	Formal Languages And Automata Theory (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COURSE OUTCOMES:

- Demonstrate knowledge on Automata Theory, Analyze and Design of finite automata, and prove equivalence of various finite automata.
- Demonstrate knowledge on Regular Expression, Analyze and design of regular expressions from regular languages, and prove the equivalence
- Demonstrate knowledge on context free grammar, Analyze and design of CFG from CFL, simplifications of CFG by applying various Normal Forms
- Analyze and design of PDA and prove the equivalence of languages described by pushdown automata and context free grammars.
- Demonstrate knowledge on Turing Machine, analyze & design of Turing machine, problems with undecidability

UNIT - 1: Introduction to Finite Automata

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

Finite Automata: An Informal picture of Finite Automata, Deterministic Finite Automata (DFA), Non Deterministic Finite Automata (NFA), Finite Automata with Epsilon transitions (ϵ -NFA or NFA- ϵ), Finite Automata with output, Conversion of one machine to another, Minimization of Finite Automata, Myhill-Nerode Theorem.

UNIT - II: Regular Language

Regular Languages: Regular Expressions (RE), Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic laws for Regular Expressions, The Arden's Theorem, Using Arden's theorem to construct RE from FA, Pumping Lemma for RLs, Applications of Pumping Lemma, Equivalence of Two FAs, Equivalence of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Closure properties of RLs, Decision problems of RLS, Applications of REs and FAs

UNIT III - Context Free Grammars and Languages

Context Free Grammars and Languages: Definition of Context Free Grammars (CFG), Derivations and Parse trees, Ambiguity in CFGs, Removing ambiguity, Left recursion and Left factoring, Simplification of CFGs, Normal Forms, Linear grammars, Closure properties for CFLs, Pumping Lemma for CFLs, Decision problems for CFLs, CFG and Regular Language..

UNIT IV - Push Down Automata

Push Down Automata (PDA): Informal introduction, The Formal Definition, Graphical notation, Instantaneous description, The Languages of a PDA, Equivalence of PDAs and CFGs, Deterministic PushDown Automata, Two Stack PDA.

UNIT V - Turing Machines and Undecidability

Turing Machines and Undecidability: Basics of Turing Machine (TM), Transitional Representation of TMs, Instantaneous description, Non Deterministic TM, Conversion of Regular Expression to TM, Two stack PDA and TM, Variations of the TM, TM as an integer function, Universal TM, Linear Bounded Automata, TM Languages, Unrestricted grammar, Properties of Recursive and Recursively enumerable languages, Undecidability, Reducibility, Undecidable problems about TMs, Post's Correspondence Problem(PCP),

Modified PCP.

Text Books:

1. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013
2. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.
- 3.

References

1. J.P. Trembley and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw Hill Book Co.
2. Michael Sipser, Introduction to The Theory of Computation, Thomson Course Technology.
3. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia. John E. Hopcroft and J.D. Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Pub, 2021
4. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
5. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
6. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering Knowledge	1.3	1.3.1
CO2	PO 1: Engineering Knowledge	1.3	1.3.1
CO3	PO 1: Engineering Knowledge	1.3	1.3.1
CO4	PO 1: Engineering Knowledge	1.3	1.3.1
CO5	PO 1: Engineering Knowledge	1.3	1.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3009	Computer Networks (Common to : CSE, CIC, AIM, AID)	3	0	0	3

Course Outcomes:

Student will be able to

- Understand the basics of data communications and networking
- Classify the functionalities of two sub layers of Data link Layer
- Know briefly about Network Layer through algorithms and protocols
- Distinguish the services provided by Transport Layer
- Recognize the services offered by Application Layer to the user

Unit I

Introduction: Data Communications, Networks, Network Types, Internet History, Standards and Administration.

Network Models: Protocol Layering, TCP/IP Protocol Suite, The OSI Model

Introduction to Physical Layer: Data and Signals, Transmission Impairment, Data Rate Limits, Performance.

Transmission Media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet Switching

Unit II

The Data Link Layer: Introduction, Link layer addressing, Error detection and Correction: Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol.

Media Access control: Random Access, Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

Unit III

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking.

The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

Unit IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

Unit V

The Application Layer: Introduction, Client-Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Secure Shell, Domain Name System, SNMP.

Text Books:

1. -Data communications and networking, Behrouz A. Forouzan, Mc Graw Hill Education, 5th edition, 2017.
2. -Computer Networks, Andrew S. Tanenbaum, Wetherall, Pearson, 5th edition, 2011.

References:

1. Data Communication and Networks, Bhushan Trivedi, Oxford, 2016
2. Internetworking with TCP/IP – Principles, protocols, and architecture - Volume 1, Douglas E. Comer, 5th edition, PHI, 2015
3. –Computer Networks, 5E, Peterson, Davie, Elsevier.
4. –Introduction to Computer Networks and Cyber Security, Chawan- Hwa Wu, Irwin, CRC Publications.
5. –Computer Networks and Internets with Internet Applications, Comer.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1. Engineering knowledge	1.3	1.3.1
CO2	PO2. Problem Analysis	2.2	2.2.2
CO3	PO1. Engineering knowledge	1.3	1.3.1
CO4	PO1. Engineering knowledge	1.4	1.4.1
CO5	PO2. Problem Analysis	2.1	2.1.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3011	Data warehousing and Mining (Common to : CSE, CIC, AIM, AID)	3	0	0	3

COURSE OUTCOMES:

- Understand the basic concepts of data warehouse and data mining
- Apply pre-processing techniques for data cleansing
- Analyze and evaluate performance of algorithms for Association Rules
- Analyze Classification and Clustering algorithms.
- Enhance the knowledge on mining different streams.

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. **Data Preprocessing:** Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining. Data Cube Computation and **Data Generalization:** Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

UNIT III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining, **Classification and Prediction:** Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

UNIT IV

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

UNIT V

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multi relational Data Mining, Mining Object, Spatial, Multimedia, **Text and Web Data:** Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

TEXT BOOKS:

1. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2012.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education, 2016.

REFERENCES:

1. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory& Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI,2008.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2:Problem Analysis	2.2	2.2.3
CO2	PO3:Design/development of Solutions	3.3	3.3.2
CO3	PO4:Conduct Investigations of Complex Problems	4.3	4.3.2
CO4	PO2:Problem Analysis	2.2	2.2.3
CO5	PO2:Problem Analysis	2.2	2.2.3

Year: II	Semester: II	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3013	Operating Systems (Common to : CSE, CIC, AIM, AID)	3	0	0	3

Course Outcomes

- Distinguish between the different types of operating system environments.
- Apply the concepts of process synchronization & CPU scheduling
- Develop solutions to deadlock and memory management
- Analyze various disk scheduling algorithms and file system interfaces
- Analyze the various security issues and goals of protection

UNIT - 1:

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Computing Environments, Open- Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT - 2:

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT - 3:

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

Virtual memory: Demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT - 4:

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT - 5:

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems,

Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley, Eight Edition, 2018.
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI, 2001.

Reference Books:

1. Operating systems by A K Sharma, Universities Press,
2. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Operating Systems, A.S.Godbole, Second Edition, TMH.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
6. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
7. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
8. Operating System Desgin, Douglas Comer, CRC Press, 2nd Edition.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO3. Design/development of solutions	3.1 & 3.3	3.1.6 & 3.3.1
CO2	PO3. Design/development of solutions	3.1	3.1.6
CO3	PO2. Problem Analysis	2.2	2.2.1 & 2.1.3
CO4	PO5. Modern tool usage	5.1	5.1.1
CO5	PO2. Problem Analysis	2.1, 2.2	2.1.3 & 2.2.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHSMB01	Managerial Economics And Financial Analysis	3	0	0	3

Course Outcomes (CO):

- Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
- Apply the Concept of Production cost and revenues for effective Business decision
- Analyze how to invest their capital and maximize returns.
- Evaluate the capital budgeting techniques.
- Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.

UNIT I: MANAGERIAL ECONOMICS

Introduction – meaning, nature, significance, functions, and advantages, ME and its role in other fields. Demand - Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing forecasting, Methods.

UNITII: PRODUCTION AND COST ANALYSIS

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale. Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

UNITIII: BUSINESS ORGANIZATIONS AND MARKETS

Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

UNIT IV: CAPITAL BUDGETING

Introduction to Capital, Sources of Capital. Short-term and Long-term Capital : Working capital, types, Estimating Working capital requirements. Capital Budgeting – Features, Proposals, Time value of money. Methods and Evaluation of Projects – Pay Back Method, Accounting Rate of Return (ARR), Net Present Value (NPV), and Internal Rate Return (IRR) Method (simple problems).

UNITV: FINANCIAL ACCOUNTING AND ANALYSIS

Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

TEXTBOOKS:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

REFERENCES

1. Ahuja Hl Managerial economics Schand,3/e,2013

2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, NewDelhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

Online Learning Resources:

<https://www.slideshare.net/123ps/managerial-economics-ppt>
<https://www.slideshare.net/rossanz/production-and-cost-45827016>
<https://www.slideshare.net/darkyla/business-organizations-19917607>
<https://www.slideshare.net/balarajbl/market-and-classification-of-market>
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396>
<https://www.slideshare.net/ashu1983/financial-accounting>.

List of Cos	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.2	1.2.1
CO2	PO 1: Engineering knowledge	1.2	1.2.1
CO3	PO 1: Engineering knowledge PO 6: The engineer and society	1.2 6.2	1.2.1 6.2.1
CO4	PO 11: Project management and finance	11.2	11.2.1
CO5	PO 11: Project management and finance	11.1	11.1.2

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI
(AUTONOMOUS)**

Year: II

Semester: II

Branch of Study: AID

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9905	Universal Human Values	3	1	0	3

Course Objectives

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

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

- Purpose and motivation for the course, recapitulation from Universal Human Values-I
- Self-Exploration–what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current. scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

UNIT II: Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility
- Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

UNIT III: Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship.

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Resolution,

Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals

- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

UNIT IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all- pervasive space
- Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film –Home can be used), pollution, depletion of resources and role of technology etc.

Include practice sessions to discuss human being as cause of imbalance in nature (film “Home” can be used), pollution, depletion of resources and role of technology etc.

UNIT- V: Implications of the above Holistic Understanding of Harmony on Professional Ethics.

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
- Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Course Outcomes:

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

- Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
- They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
- They would have better critical ability.
- They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
- It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

TEXT BOOKS

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

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

REFERENCE BOOKS

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.
2. N. Tripathi, —Human Values, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi —The Story of My Experiments with Truth
5. E. F. Schumacher. –Small is Beautiful
6. Slow is Beautiful –Cecile Andrews
7. J C Kumarappa –Economy of Permanence
8. Pandit Sunderlal —Bharat Mein Angreji Raj
9. Dharampal, –Rediscovering India
10. Mohandas K. Gandhi, –Hind Swaraj or Indian Home Rule
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland (English)

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO 1	PO 7: Environment and sustainability : Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development	7.1	7.1.2
CO 2	PO 7: Environment and sustainability : Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development	7.1	7.1.2
CO 3	PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2
CO 4	PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2
CO5	PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: II	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3010	Computer Networks Lab (Common to : CIC, AIM, AID)	0	0	3	1.5

Course Outcomes:

CO1: Deal with Error detection/ correction techniques

CO2: Learn about Data link layer protocols

CO3: Learn about network layer protocols

CO4: Able to get knowledge about simulator

List of Experiments

1. Implementation of Error Detection / Error Correction Techniques
2. Implementation of Stop and Wait Protocol and sliding window
3. Implementation and study of Goback-N and selective repeat protocols
4. Implementation of High Level Data Link Control
5. Write a socket Program for Echo/Ping/Talk commands.
6. To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
7. Implementation of Link state routing algorithm
8. Implement the data link layer framing methods such as character, character-stuffing and bitstuffing.
9. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
10. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
11. Implement Dijkstra's algorithm to compute the shortest path through a network
12. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
13. Implement distance vector routing algorithm for obtaining routing tables at each node.
14. Write a program for congestion control using Leaky bucket algorithm.
15. Do the following using NS2 Simulator
 - a. NS2 Simulator-Introduction
 - b. Simulate to Find the Number of Packets Dropped
 - c. Simulate to Find the Number of Packets Dropped by TCP/UDP
 - d. Simulate to Find the Number of Packets Dropped due to Congestion
 - e. Simulate to Compare Data Rate & Throughput.
 - f. Simulate to Plot Congestion for Different Source/Destination
 - g. Simulate to Determine the Performance with respect to Transmission of Packets

Reference Books:

1. Shivendra S.Panwar, Shiwen Mao, Jeong-dong Ryoo, and Yihan Li, -TCP/IP Essentials A Lab-Based Approach, Cambridge University Press, 2004.
2. Cisco Networking Academy, -CCNA1 and CCNA2 Companion Guide, Cisco Networking Academy Program, 3rd edition, 2003.
3. Ns Manual, Available at: <https://www.isi.edu/nsnam/ns/ns-documentation.html>, 2011.
4. Elloitte Rusty Harold, -Java Network Programming, 3rd edition, O'REILLY, 2011.

List of Cos	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO4. Conduct investigations of complex problems	4.1	4.1.1
CO2	PO 1: Engineering knowledge	1.3	1.3.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: I	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3012	Data warehousing and Mining Lab (Common to : CSE, CIC, AIM, AID)	0	0	3	1.5

COURSE OUTCOMES:

- Upon the completion of Data warehousing and Mining practical course, the student will be able to:
- Learn how to use different data mining tools.
- Learn to execute data mining tasks using a data mining toolkit (Orange data mining tool kit) and visualize the results.
- Understanding linear regression model in the orange environment.
- Demonstrate the working of algorithms for data mining tasks such association rule mining, classification and clustering.
- Demonstrate the usage of Silhouettes.

Data Warehousing Experiments:

Build Data Warehouse and Explore WEKA

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).

- (i). Identify source tables and populate sample data
- (ii). Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
- (iii). Write ETL scripts and implement using data warehouse tools
- (iv). Perform various OLAP operations such slice, dice, roll up, drill up and pivot (v). Explore visualization features of the tool for analysis like identifying trends etc.

B. Explore WEKA Data Mining/Machine Learning Toolkit

- (i). Downloading and/or installation of WEKA data mining toolkit,
- (ii). Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
- (iii). Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
- (iv). Study the arff file format
- (v). Explore the available data sets in WEKA.
- (vi). Load a data set (ex. Weather dataset, Iris dataset, etc.)
- (vii). Load each dataset and observe the following:
 - i. List the attribute names and they types
 - ii. Number of records in each dataset
 - iii. Identify the class attribute (if any)
 - iv. Plot Histogram
 - v. Determine the number of records for each class.
 - vi. Visualize the data in various dimensions

Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

- A. Explore various options available in Weka for preprocessing data and apply (like Discretization

Filters, Resample filter, etc.) on each dataset

B. Load each dataset into Weka and run Apriori algorithm with different support and confidence values. Study the rules generated.

C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

Demonstrate performing classification on data sets

A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.

B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.

C. Load each dataset into Weka and perform Naïve-bayes classification and k- Nearest Neighbour classification. Interpret the results obtained.

D. Plot RoC Curves

E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

Demonstrate performing clustering on data sets

A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.

B. Explore other clustering techniques available in Weka.

C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

Demonstrate performing Regression on data sets

A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.

B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.

C. Explore Simple linear regression technique that only looks at one variable

Resource Sites:

1. <http://www.pentaho.com/>
2. <http://www.cs.waikato.ac.nz/ml/weka/>

Data Mining Experiments:

Weka Programs:

1. Create data in .csv and .arff formats to import in weka
2. Perform Data Preprocessing on a sample dataset - Discretization, Dimensionality Reduction, Data Transformation, Data Normalization
3. Perform Association Rule Mining and generate top 10 rules for supermarket.arff
4. Build a tree classifier on weather data to decide on the playing conditions.
5. Build a Naïve Bayes classifier on weather data to decide on the playing conditions.
6. Evaluate the performance of a classifier in knowledge flow environment.
7. Perform Clustering on any sample dataset on different algorithms and compare the results.

8. Using Experimenter in Simple mode, compare different classifiers with respect to the results generated for iris.arff.
9. Using Experimenter in advanced mode, demonstrate how to analyze the results from an experiment and the importance of statistical significance when interpreting results.
10. Plot Multiple ROC curves on a dataset using J48 and Random Forest Classifiers.
11. Perform training and testing of Naive Bayes incrementally. The results are sent to a TextViewer and predictions are plotted by a StripChart component.
12. Demonstrate how to Access a database using WEKA tool.
13. Use Knowledge flow canvas and develop a directed graph for C4.5 execution.

Orange Programs

Datasets to be used: (but not limited to)

1. brownselected.tab
2. heartdisease.tab
3. housing.tab
4. iris.tab
5. titanic.tab
6. zoo.tab

Task 1:

Installation of Orange Data mining Tool kit in Windows/Linux environment and creating basic workflows to read, process, and visualize the data. The visualization includes data table and scatter plots. Apply the task for all the 6 datasets and compare the results.

Task 2:

Demonstrate the usage of workflows in orange tool kit using widgets. Apply the task for all the 6 datasets and compare the results.

Task 3:

Demonstrate the visualization of widgets Box plot, Linear projection, and the data distributions by reading iris and heart disease datasets. Apply the task for all the other 4 datasets and compare the results.

Task 4:

Demonstrate the visualization of widgets scatter plot, line plot, bar plot by reading iris and heart disease datasets. Apply the task for all the other 4 datasets and compare the results.

Task 5:

Data Exploration using various widgets, understanding the data distributions and saving the results as HTML or PDF, or to a file that includes all workflows that are related to the report items and which you can later open in Orange. Apply the task for all the 6 datasets and compare the results.

Task 6:

Demonstrate the usage of loading the spreadsheets from the local computer and applying Data filtering and pre-processing to the given data. Apply the task for all the 6 datasets and compare the results.

Task 7:

Loading the spreadsheets from the local computer and applying the classification model to the given data. Apply the task for all the 6 datasets and compare the results.

Task 8:

Demonstrate the usage of classification by reading heart disease data, and predict which persons have clogged arteries and visualize the results using tree viewer. Observe the information gain, information gain ratio and gini decrease measures.

Task 9:

Load a sailing.tab dataset that records the conditions under which a friend skipper went sailing, build a tree and visualize it in the Tree Viewer.

Task 10:

Demonstrate the usage of combination of classification tree viewer and scatter plot. Identify the best visualization of iris dataset, that is the one best separates the instances from different classes, then connect the tree viewer with scatter plot and visualize the results. Apply the task for all the other datasets and compare the results.

Task 11:

Apply principal component analysis on the given dataset as a pre-processing and compare the results. Apply the task for all the 6 datasets and compare the results.

Task 12:

Understanding the quality of the models by analysing the prediction results using classification accuracy. Apply the task for all the 6 datasets and compare the results.

Task 13:

Increasing the robustness of the models by splitting the dataset using cross-validation through the Test & Score widget. Apply the task for all the 6 datasets and compare the results.

References:

1. Zupan, Demsar.; Introduction to Data Mining; Introduction to Data Mining Working notes for the hands-on course with Orange Data Mining, May 2018
2. Orange Data Mining Library Documentation Release 3 – Orange Data mining

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2:Problem Analysis	2.2	2.2.3
CO2	PO3:Design/development of Solutions	3.3	3.3.2
CO3	PO4:Conduct Investigations of Complex Problems	4.3	4.3.2
CO4	PO2:Problem Analysis	2.2	2.2.3
CO5	PO2:Problem Analysis	2.2	2.2.3
CO6	PO3:Design/development of Solutions	3.3	3.3.2

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: II	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC3014	Operating Systems Lab (Common to : CSE, CIC, AIM, AID)	0	0	3	1.5

Course Outcomes:

CO1: Ensure the development of applied skills in operating systems related areas.

CO2: Able to write software routines modules or implementing various concepts of operating system.

List of Tasks

1. Practicing of Basic UNIX Commands.
2. Write programs using the following UNIX operating system calls Fork, exec, getpid, exit, wait, close, stat, opendir and readdir
3. Simulate UNIX commands like cp, ls, grep, etc.,
4. Simulate the following CPU scheduling algorithms
 - a) Round Robin b) SJF c) FCFS d) Priority
5. Simulate all file allocation strategies
 - a) Sequential b) Indexed c) Linked
6. Simulate MVT and MFT
7. Simulate all File Organization Techniques
 - a) Single level directory b) Two level c) Hierarchical d) DAG
8. Simulate Bankers Algorithm for Dead Lock Avoidance
9. Simulate Bankers Algorithm for Dead Lock Prevention
10. Simulate all page replacement algorithms
 - a) FIFO b) LRU c) LFU Etc. ...
11. Simulate Paging Technique of memory management
12. Control the number of ports opened by the operating system with
 - a) Semaphore b) monitors
13. Simulate how parent and child processes use shared memory and address space
14. Simulate sleeping barber problem
15. Simulate dining philosopher's problem
16. Simulate producer and consumer problem using threads (use java)
17. Simulate little's formula to predict next burst time of a process for SJF scheduling algorithm.
18. Develop a code to detect a cycle in wait-for graph
19. Develop a code to convert virtual address to physical address
20. Simulate how operating system allocates frame to process
21. Simulate the prediction of deadlock in operating system when all the processes announce their resource requirement in advance.

Reference Books:

1. -Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley, 2018.
2. -Operating Systems: Internals and Design Principles, Stallings, Sixth Edition- 2009, Pearson Education
3. -Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4. -Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
5. -Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.2013-2014
6. -Operating Systems, A.S.Godbole, Second Edition, TMH.
7. -An Introduction to Operating Systems, P.C.P. Bhatt, PHI.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO3. Design/development of solutions	3.3	3.3.1
CO2	PO5. Modern tool usage	5.1	5.1.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI
(AUTONOMOUS)**

Year: II	Semester: II	Branch of Study: AID			
COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ASC3002	Server side Scripting (Common to : CSE, CIC, AIM, AID)	1	0	2	2

Course Outcomes:

- Learn the installation guide of MY SQL,XAMP,APACHE and PHP
- Able to design code for simple dynamic web pages
- Design PHP and MySQL Integration.
- Design Basic Projects like Creating an Online Address Book - Creating a Simple Discussion Forum etc.
- Able to provide protection to web server

Unit-1: Getting Up and Running, PHP Language Structure

Getting Up and Running: Installation Quick Start Guide with XAMPP5 - Installing and Configuring MySQL - Installing and Configuring Apache - Installing and Configuring PHP -

PHP Language Structure: The Building Blocks of PHP - Flow Control Functions in PHP - Working with Functions - Working with Arrays - Working with Objects

1. Installation of XAMPP server
2. Write PHP code to print Hello World program
3. Demonstrate 8 basic data types in PHP.
4. Demonstrate the scope of variables declared in PHP code.
5. Demonstrate Arithmetic, Comparison, Logical (or Relational), Assignment and Conditional (or ternary) Operators.
6. Demonstrate if, elseif ...else and switch statements.
7. Demonstrate for, while, do – while, and for each loop.
8. Write code to create and access numeric arrays.
9. Demonstrate the usage of associative arrays.
10. Implement Multi-dimensional arrays
11. Create a multidimensional array of movies organized by genre. This should take the form of an associative array with genres as keys, such as Science Fiction, Action, Adventure, and so forth. Each of the array's elements should be an array containing movie names, such as Alien, Terminator 3, Star Wars, and so on. After creating your arrays, loop through them, printing the name of each genre and its associated movies.
12. Create a function that accepts four string variables and returns a string that contains an HTML table element, enclosing each of the variables in its own cell.
13. Create a class called baseCalc() that stores two numbers as properties. Next, create a calculate() method that prints the numbers to the browser.
14. Create classes called addCalc(), subCalc(), mulCalc(), and divCalc() that inherit functionality from baseCalc() but override the calculate() method and print appropriate totals to the browser.

Unit-2: Getting Involved with the Code,

Working with Strings, Dates, and Time - Working with Forms - Working with Cookies and User Sessions - Working with Files and Directories - Working with Images

1. Create a feedback form that accepts a user's full name and an email address. Use case-conversion functions to capitalize the first letter of each name the user submits and print the result back to the browser. Check that the user's email address contains the @ symbol and print a warning otherwise.
2. Create an array of doubles and integers. Loop through the array, converting each element to a floating-point number with a precision of 2. Right-align the output within a field of 20 characters.
3. Create a birthday countdown script. Given form input of month, day, and year, output a message that tells the user how many days, hours, minutes, and seconds until the big day.
4. Create a calculator script that enables the user to submit two numbers and choose an operation (addition, multiplication, division, or subtraction) to perform on them.
5. Use hidden fields with the script you created in activity 1 to store and display the number of requests that the user submitted.
6. Create a script that uses session functions to track which pages in your environment the user has visited.
7. Create a new script that will list for the user all the pages he/she has visited within your environment, and when.
8. Create a form that accepts a user's first and second name. Create a script that saves this data to a file.

9. Create a script that reads the data file you created in the first activity. In addition to writing its contents to the browser (adding a tag to each line), print a summary that includes the number of lines in the file and the file's size.
10. Draw a New Image, shapes and lines.
11. Create a New Image with Color Fills.
12. Draw A Basic Pie Chart and 3D Pie Chart
13. Creating a New Image from an Existing Image.
14. Creating an Image from User Input.
15. Creating an Image with Custom Font and Text

Unit-3: PHP with database connectivity

Understanding the Database Design Process - Learning Basic SQL Commands - Using Transactions and Stored Procedures in MySQL - Interacting with MySQL Using PHP

1. to open and close a database connection.
2. to select a database. to select a database.
3. to create a table
4. to drop a database.
5. to drop a table
6. to insert record into employee table.
7. take input using HTML Form and insert records into table.
8. to display all the records from employee table.
9. to display all the records from employee table using `mysql_fetch_assoc()` function.
10. to display all the records from employee table using `MYSQL_NUM` argument.
11. to release cursor memory at the end of `SELECT` statement.
12. to display 10 records per page.
13. to take user input of employee ID and update employee salary.
14. to take user input of employee ID and delete an employee record from employee table.
15. Use `SELECT INTO OUTFILE` query for creating table backup.

Unit-4: Basic Projects

Managing a Simple Mailing List - Creating an Online Address Book - Creating a Simple Discussion Forum - Creating an Online Storefront - Creating a Shopping Cart Mechanism - Creating a Simple Calendar - Restricting Access to Your Applications - Logging and Monitoring Web Server Activity - Application Localization - Working with XML and JSON

1. Common Functions in an Included File
2. Subscribe and Unsubscribe with `manage.php`
3. Send Mail to Your List of Subscribers
4. Modify the `manage.php` script to display the user's email as part of the response message for any action that is taken.
5. Modify the `sendmymail.php` script to add additional form fields that will correspond to section headings in the message string itself. Remember that when the form is submitted, those strings will have to be concatenated into one message string that is sent to the `mail()` function.

Unit-5: Administration and Fine-Tuning

Apache Performance Tuning and Virtual Hosting - Setting Up a Secure Web Server - Optimizing and Tuning MySQL - Performing Software Upgrades - Using Application Frameworks

Text Books:

1. Sams Teach Yourself PHP, MySQL and Apache All in One, by Julie C. Meloni, Pearson Education, Inc © 2012.
2. Beginning PHP6, Apache, MySQL Web Development, by Timothy Boronczyk, Elizabeth Naramore,

Reference Books:

1. Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass, Wiley Publishing, Inc © 2009
2. PHP 6 and MySQL 6 Bible, by Steve Suehring, Tim Converse, Joyce Park, Wiley Publishing, Inc © 2009.
3. PHP & MySQL Web Development All-in-One Desk Reference For Dummies, by Janet Valade with Tricia Ballard and Bill Ballard, Wiley Publishing, Inc © 2008.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2: Apply the knowledge of algorithms	2.1	2.1.1
CO2	PO1:Apply the knowledge of modules	2.1	2.1.1
CO3	PO1:Apply the knowledge to design database connection process	1.1	1.1.1
CO4	PO3: Design solutions for complex engineering problems	3.2	3.2.1
CO5	PO1:Apply the knowledge of modules	1.4	1.4.1