

Handbook of B.Tech. Programmes

offered by USICT at Affiliated Institutions of the University

Specialization: Computer Science & Engineering (AI & Machine Learning) — CSE-AIML

Detailed Course Syllabus
6th Semester (Semester VI)

Applicable from Batch Admitted in Academic Session 2021-22 Onwards

Contents

1. Principles of Management for Engineers (MS-302)
2. Universal Human Values (HS-304)
3. Advanced Java Programming (CIE-306T)
4. Programming in Python (CIE-332T)
5. Web Technologies (CIE-356T)
6. Artificial Intelligence (AI-302T) — CSE-AIML Core (PC)
7. Statistics, Statistical Modelling & Data Analytics (DA-304T) — CSE-AIML Core (PC)
8. NSS / NCC / Cultural Clubs / Technical Society / Technical Club (HS-352)

Note: Artificial Intelligence (AI-302T) and Statistics, Statistical Modelling & Data Analytics (DA-304T) are Programme Core (PC) papers for the CSE-AI / CSE-AIML specialization in Semester VI.

Principles of Management for Engineers	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	MS-302

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To describe the functions, roles and skills of managers and illustrate how the manager's job is evolving.
2. To evaluate approaches to goal setting, planning and organizing in a variety of circumstances.
3. To evaluate contemporary approaches for staffing and leading in an organization.
4. To analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO)

CO 1 Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.

CO 2 Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.

CO 3 Evaluate contemporary approaches for staffing and leading in an organization.

CO 4 Analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	2	2	1	2	-	2	-	-	1	2	3	2
CO 2	2	2	1	2	-	2	-	-	1	2	3	2
CO 3	2	2	1	2	-	2	-	-	1	2	3	2
CO 4	2	2	1	2	-	2	-	-	1	2	3	2

UNIT-I

Introduction to Managers and Management: Management an Overview: Introduction, Definition of Management, Role of Management, Functions of Managers, Levels of Management, Management Skills and Organizational Hierarchy, Social and Ethical Responsibilities of Management: Arguments for and against Social Responsibilities of Business, Social Stakeholders, Measuring Social Responsiveness and Managerial Ethics, Omnipotent and Symbolic View, Characteristics and importance of organizational culture, Relevance of political, legal, economic and Cultural environments to global business, Structures and techniques organizations use as they go international.

UNIT-II

Planning: Nature & Purpose, Steps involved in Planning, Objectives, Setting Objectives, Process of Managing by Objectives, Strategies, Policies & Planning Premises, Competitor Intelligence, Benchmarking, Forecasting, Decision-Making.

Directing: Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership, Directing, Managers as leaders, Early Leadership Theories — Trait Theories, Behavioral Theories, Managerial Grid, Contingency Theories of Leadership, Path-Goal Theory, contemporary views of Leadership, Cross Cultural Leadership, Leadership Training, Substitutes of Leadership.

UNIT-III

Organizing: Organizing, Benefits and Limitations - Decentralization and Delegation of Authority, Authority versus Power, Mechanistic versus Organic Organization, Common Organizational Designs, Contemporary Organizational Designs and Contingency Factors, The Learning Organization Nature and Purpose, Formal and Informal Organization, Organization Chart, Structure and Process, Departmentalization by different strategies, Line and Staff authority, Staffing, Human Resource Inventory, Job Analysis, Job Description, Recruitment.

UNIT - IV

Controlling: Controlling, Introduction to Controlling System and process of Controlling, Requirements for effective control, The planning-control link, The process of control, types of control, The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Financial Controls, Tools for measuring organizational Performance, Contemporary issues in control — Workplace concerns, employee theft, employee violence.

Textbook(s):

1. Tripathi PC. Principles of management. Tata McGraw-Hill Education; 6th Edition 2017.

References:

1. Koontz H, Weihrich H. Essentials of management: an international, innovation, and leadership perspective. McGraw-Hill Education; 10th Edition 2018.
2. Principles of Management Text and Cases, Pravin Durai, Pearson, 2015.
3. Robbins, S.P. & Decenzo, David A. Fundamentals of Management, 7th ed., Pearson, 2010.
4. Robbins, S.P. & Coulter, Mary Management; 14 ed., Pearson, 2009.

Universal Human Values	L	P	C
	1		1

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	HS	HS-304

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper.

Course Objectives :

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
4. To analyze the value of harmonious relationship based on trust and respect in their life and profession.

Course Outcomes (CO)

- CO 1** Evaluate the significance of value inputs in formal education and start applying them in their life and profession.
- CO 2** Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- CO 3** Examine the role of a human being in ensuring harmony in society and nature.
- CO 4** Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	-	-	-	-	-	3	-	3	1	1	-	1
CO 2	-	-	-	-	-	3	-	3	1	1	-	1
CO 3	-	-	-	-	-	3	-	3	1	1	-	1
CO 4	-	-	-	-	-	3	-	3	1	1	-	1

UNIT-I

Introduction-Basic Human Aspiration, its fulfillment through All-encompassing Resolution: The basic human aspirations and their fulfillment through Right understanding and Resolution, Right understanding and Resolution as the activities of the Self, Self being central to Human Existence; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution.

UNIT-II

Understanding Human Being: Understanding the human being comprehensively as the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Basis for harmony/contradiction in the self.

UNIT-III

Understanding Nature and Existence: A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self-awareness and self-evaluation), particularly awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/order leading to comprehensive knowledge about the existence).

UNIT - IV

Understanding Human Conduct, All-encompassing Resolution & Holistic Way of Living: Understanding Human Conduct, different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All-encompassing Resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work (participation in the larger order) leading to harmony at all levels from Self to Nature and entire Existence.

Textbook(s):

1. R R Gaur, R Asthana, G P Bagaria, 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics. ISBN 978-93-87034-47-1, Excel Books, New Delhi.
2. Premvir Kapoor, Professional Ethics and Human Values, Khanna Book Publishing, New Delhi, 2022.

References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986.
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.

Advanced Java Programming	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-1	CIE-306T
EAE	6	FSD-EAE	FSD-EAE-1	FSD-318T
CSE-in-EA	7	OAE-CSE-EA	OAE-2	OSD-453T
OAE	7	SD-OAE	SD-OAE-5A	OSD-453T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
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3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To learn the ability to design console based, GUI based and web based applications.
2. To learn how to create dynamic web pages, using Servlets and JSP.
3. To learn Designing applications using pre-built framework.
4. To learn how to do distributed programming in Java using RMI, CORBA.

Course Outcomes (CO)

CO 1 Able to Understand advanced programming concepts.

CO 2 Able to Develop server side programs using JSP and Servlets.

CO 3 Able to Develop component-based java software using java beans.

CO 4 Able to develop advanced projects based on java.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	3	2	-	-	-	3	2	2	3
CO 2	3	2	2	3	2	-	-	-	3	2	2	3
CO 3	3	2	2	3	2	-	-	-	3	2	2	3
CO 4	3	2	2	3	2	-	-	-	3	2	2	3

UNIT-I

Introduction to Java, Inheritance, Exception Handling, Multithreading, Applet Programming. Connecting to a Server, Implementing Servers, Making URL Connections, Socket Programming.

UNIT-II

Preparing a Class to be a Java Bean, Creating a Java Bean, Java Bean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling, HTTP GET Requests, Handling HTTP POST Requests, Session Tracking, Cookies.

UNIT-III

JSP- Introduction, Java Server Pages Overview, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

UNIT- IV

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods, Introduction of HB, HB Architecture.

Textbook(s):

1. Kathy Sierra, Head First Servlets and JSP, O'Reilly Media.
2. Kanika Lakhani, Advance Java Programming, S.K. Kataria & Sons

References:

1. Brett Spell, Professional Java Programming, WROX Publication.
2. Harvey. M. Dietal, Advanced Java 2 Platform, How to Program, Prentice Hall.
3. Gajendra Gupta, Advanced Java, Firewall Media.

Programming in Python	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-2	CIE-332T
CSE-IoT/CSE-ICB	6	PC	PC	IOT-320T
EAE	6	IOT-EAE	IOT-EAE-2B	IOT-330T
EAE	6	ICB-EAE	ICB-EAE-2B	IOT-330T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

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4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. Learn the syntax and semantics of Python Programming Language.
2. Write Python functions to facilitate code reuse and manipulate strings.
3. Illustrate the process of structuring the data using lists, tuples and dictionaries.
4. Demonstrate the use of built-in functions to navigate the file system.

Course Outcomes (CO)

CO 1 Demonstrate the concepts of control structures in Python.

CO 2 Implement Python programs using functions and strings.

CO 3 Implement methods to create and manipulate lists, tuples and dictionaries.

CO 4 Apply the concepts of file handling and regEx using packages.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT-I

Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit().

UNIT-II

Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods. Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things. Manipulating Strings - Working with Strings, Useful String Methods.

UNIT-III

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function. Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.

UNIT – IV

Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Textbook(s):

1. Al Sweigart, "Automate the Boring Stuff with Python", William Pollock, 2015, ISBN: 978-1593275990.

References:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.
5. Reema Thareja, "Python Programming using problem solving approach", Oxford University press, 2017. ISBN-13: 978-0199480173.

Web Technologies	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-3	CIE-356T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

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2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
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4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To explain web application development with HTML and CSS.
2. To learn about scripting languages — JavaScript and JSP technologies.
3. To learn server-side development with PHP.
4. To develop web applications using PHP and MySQL.

Course Outcomes (CO)

CO 1 Identify and illustrate the basic concepts of HTML and CSS, and apply those concepts to design web pages.

CO 2 Understand various concepts related to dynamic web pages and validate them using JavaScript and JSP.

CO 3 Outline and understand the concepts of PHP for web development.

CO 4 Integrate PHP, MySQL and scripting languages for web applications.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1		3	-	-	-	2	-	2	-	-	3	2
CO 2		-	2	-	-	-	2	-	-	3	-	-
CO 3	-	-	-	2	3	-	-	3	-	-	2	-
CO 4	3	-	3	-	-	3	3	-	3	-	-	3

UNIT-I

HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Markup, HTML Styles, Elements, Attributes, Headings, Layouts, iFrames, Images, Hypertext Links, Lists, Tables, Forms, Dynamic HTML. CSS: Need for CSS, Introduction to CSS, Basic Syntax and Structure, Using CSS, Background Images, Colors and Properties, Manipulating Text, Using Fonts, Borders, Boxes, Margins, Padding, Lists, Positioning using CSS, CSS2, the Box Model. Working with XML: Document Type Definition (DTD), XML Schemas, Document Object Model, Parsers — DOM and SAX. Introduction to XHTML: XML, Meta Tags, Character Entities, Frames and Frame Sets.

UNIT-II

JavaScript — Client-side Scripting, Introduction to JavaScript, Objects, Primitives, Operations and Expressions, Control Statements, Arrays, Functions, Constructors, JavaScript and Objects, JavaScript's own Objects, the DOM and Web Browser Environments, Forms and Validations. Introduction to JSP: the Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, Implicit Objects, Using Beans in JSP Pages, Using Cookies and Sessions for Session Tracking, Connecting to a Database in JSP.

UNIT-III

Introduction to Server-Side Development with PHP, What is Server-Side Development, a Web Server's Responsibilities, Quick Tour of PHP, Introduction and Basic Syntax of PHP, Decisions and Looping with Examples, PHP and HTML, Arrays, Functions, Browser Control and Detection, Strings, Form Processing, Files, Advanced Features: Cookies and Sessions.

UNIT - IV

PHP and MySQL: Basic Commands with PHP Examples, Connection to the Server, Creating a Database, Selecting a Database, Listing Databases, Listing Table Names, Creating a Table, Inserting Data, Altering Tables, Queries, Deleting the Database, Deleting Data and Tables, phpMyAdmin and Database Bugs. Managing State: the Problem of State in Web Applications, Passing Information via Query Strings, Passing Information via the URL Path, Cookies, Serialization, Session State.

Textbook(s):

1. Jackson. Web Technologies: A Computer Science Perspective, Pearson Education India, 2007.
2. Robert W Sebesta. Programming the World Wide Web, 7th Edition, Pearson, 2013.

References:

1. Web Technologies — HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black Book, 1st Edition, Dream Tech, 2009.
2. Paul S Wang, Sanda S Katila. An Introduction to Web Design, Programming, 1st Edition, Cengage Learning, 2003.
3. Luke Welling. PHP and MySQL Web Development, Addison Wesley.

Artificial Intelligence	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-3	CIE-374T
ECE	6	PCE	PCE-1	ECE-318T
CSE-AI/CSE-AIML	6	PC	PC	AI-302T
EAE	6	AI-EAE	AI-EAE-1	AI-302T
EAE	6	AIML-EAE	AIML-EAE-1	AI-302T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

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2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
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4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart the definition and basic knowledge of Artificial Intelligence.
2. To introduces AI by examining the nature of the difficult problems.
3. To understand with AI demonstration that intelligence requires ability to find reason.
4. To understand the latest techniques and the future scope of the technology.

Course Outcomes (CO)

CO 1 Ability to use AI methods and control strategies to solve the problems.

CO 2 Understand the production system and its applications. Also, to understand the properties and applications for the different search algorithms.

CO 3 Applying the different algorithms and the techniques, also analyse the reason for the results.

CO 4 Study the expert systems and the modern approaches.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	2	2	-	-	-	-	2
CO 2	3	3	3	3	3	2	2	-	-	-	-	2
CO 3	3	3	3	3	3	2	2	-	-	-	-	2
CO 4	3	3	3	3	3	2	2	-	-	-	-	2

UNIT-I

AI Definition, Problems, The Foundations of Artificial Intelligence, Techniques, Models, Defining Problem as a state space search, production system, Intelligent Agents: Agents and Environments, Characteristics, Search methods and issues in the design of search problems.

UNIT-II

Knowledge representation issues, mapping, frame problem. Predicate logic, facts in logic, representing instance and relationship, Resolution, procedural and declarative knowledge, matching, control knowledge. Symbolic reasoning under uncertainty, Non monotonic reasoning, statistical reasoning.

UNIT-III

Game Playing, minimax search, Alfa beta cut-offs, Natural Language Processing, Learning, Explanation-based learning, discovery, analogy, Neural net learning and Genetic Learning.

UNIT - IV

Fuzzy logic systems, Perception and action, Expert systems, Inference in Bayesian Networks, K-means Clustering Algorithm, Machine learning.

Textbook(s):

1. Elaine Rich, Kevin Knight, and Shivashankar B Nair, "Artificial Intelligence", Tata McGraw Hill.
2. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson Edu.

References:

1. Deepak Khemani, "A First Choice in Artificial Intelligence", McGraw Hill.
2. K M Fu, "Neural Networks in Computer Intelligence", McGraw Hill.

Statistics, Statistical Modelling & Data Analytics	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE-AI/CSE-AIML/CSE-DS	6	PC	PC	DA-304T
EAE	6	AI-EAE	AI-EAE-2	DA-304T
EAE	6	AIML-EAE	AIML-EAE-2	DA-304T
EAE	6	DS-EAE	DS-EAE-1	DA-304T
EAE	6	SC-EAE	SC-EAE-1	DA-304T
EAE	6	MLDA-EAE	MLDA-EAE-1	DA-304T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

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5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart basic knowledge about statistics, visualisation and probability.
2. To impart basic knowledge about how to implement regression analysis and interpret the results.
3. To impart basic knowledge about how to describe classes of open and closed sets of $\mathbb{R}$, and the concept of compactness; describe metric space — metric in $\mathbb{R}^n$.
4. To impart basic knowledge about how to apply eigenvalues and eigenvectors.

Course Outcomes (CO)

- CO 1** Ability to learn and understand basic concepts of statistics, visualisation and probability.
- CO 2** Ability to implement regression analysis and interpret results; be able to fit a model to data and comment on its adequacy.
- CO 3** Ability to describe classes of open and closed sets of $\mathbb{R}$, the concept of compactness, and metric space — metric in $\mathbb{R}^n$.
- CO 4** Ability to apply eigenvalues and eigenvectors.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	-	-	1	2	-	-	3
CO 2	3	3	3	3	3	-	-	1	2	-	-	3
CO 3	3	3	3	3	3	-	-	1	2	-	-	3
CO 4	3	3	3	3	3	-	-	1	2	-	-	3

UNIT-I

Statistics: Introduction & Descriptive Statistics- mean, median, mode, variance, and standard deviation. Data Visualization, Introduction to Probability Distributions. Hypothesis testing, Linear Algebra and Population Statistics, Mathematical Methods and Probability Theory, Sampling Distributions and Statistical Inference, Quantitative analysis.

UNIT-II

Statistical Modelling: Linear models, regression analysis, analysis of variance, applications in various fields. Gauss-Markov theorem; geometry of least squares, subspace formulation of linear models, orthogonal projections; regression models, factorial experiments, analysis of covariance and model formulae; regression diagnostics, residuals, influence diagnostics, transformations, Box-Cox models, model selection and model building strategies, logistic regression models; Poisson regression models.

UNIT-III

Data Analytics: Describe classes of open and closed set. Apply the concept of compactness. Describe Metric space - Metric in R^n . Use the concept of Cauchy sequence, completeness, compactness and connectedness to solve the problems.

UNIT – IV

Advanced concepts in Data Analytics: Describe vector space, subspaces, independence of vectors, basis and dimension. Describe Eigen values, Eigen vectors and related results.

Textbook(s):

1. Apostol T. M. (1974): Mathematical Analysis, Narosa Publishing House, New Delhi.
2. Malik, S.C., Arora, S. (2012): Mathematical Analysis, New Age International, New Delhi

References:

1. Pringle, R.M. and Rayner, A.(1971): Generalized Inverse of Matrices with Application to Statistics, Griffin, London
2. Peter Bruce, Andrew Bruce (2017), Practical Statistics for Data Scientists Paperback

NSS / NCC / Cultural Clubs / Technical Society / Technical Club	L	P	C
			2

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	HS-352

Nature of the Paper: This is a co-curricular / non-university examination (NUES) activity paper, carrying 2 credits, rather than a conventional lecture-based subject. It does not carry a unit-wise lecture syllabus in the handbook.

****NUES:** Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs, out of 100 as per the evaluation schemes worked out by these activity societies, organizations; the faculty co-ordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and continue through the programme, with the credit reflected in the semester as per the scheme of studies.

Handbook of B.Tech. Programmes

offered by USICT at Affiliated Institutions of the University

Specialization: Machine Learning & Data Analytics — MLDA-EAE

Detailed Course Syllabus
6th Semester (Semester VI)

Applicable from Batch Admitted in Academic Session 2021-22 Onwards

Contents

1. Principles of Management for Engineers (MS-302)
2. Universal Human Values (HS-304)
3. Advanced Java Programming (CIE-306T)
4. Programming in Python (CIE-332T)
5. Artificial Intelligence (CIE-374T)
6. Statistics, Statistical Modelling & Data Analytics (DA-304T) — MLDA-EAE Core (MLDA-EAE-1)
7. Machine Learning (ML-342T) — MLDA-EAE Core (MLDA-EAE-2C)
8. NSS / NCC / Cultural Clubs / Technical Society / Technical Club (HS-352)

Note: Statistics, Statistical Modelling & Data Analytics (DA-304T) and Machine Learning (ML-342T) are the Elective Area (EAE) core papers for the Machine Learning & Data Analytics (MLDA-EAE) specialization in Semester VI.

Principles of Management for Engineers	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	MS-302

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To describe the functions, roles and skills of managers and illustrate how the manager's job is evolving.
2. To evaluate approaches to goal setting, planning and organizing in a variety of circumstances.
3. To evaluate contemporary approaches for staffing and leading in an organization.
4. To analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO)

CO 1 Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.

CO 2 Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.

CO 3 Evaluate contemporary approaches for staffing and leading in an organization.

CO 4 Analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	2	2	1	2	-	2	-	-	1	2	3	2
CO 2	2	2	1	2	-	2	-	-	1	2	3	2
CO 3	2	2	1	2	-	2	-	-	1	2	3	2
CO 4	2	2	1	2	-	2	-	-	1	2	3	2

UNIT-I

Introduction to Managers and Management: Management an Overview: Introduction, Definition of Management, Role of Management, Functions of Managers, Levels of Management, Management Skills and Organizational Hierarchy, Social and Ethical Responsibilities of Management: Arguments for and against Social Responsibilities of Business, Social Stakeholders, Measuring Social Responsiveness and Managerial Ethics, Omnipotent and Symbolic View, Characteristics and importance of organizational culture, Relevance of political, legal, economic and Cultural environments to global business, Structures and techniques organizations use as they go international.

UNIT-II

Planning: Nature & Purpose, Steps involved in Planning, Objectives, Setting Objectives, Process of Managing by Objectives, Strategies, Policies & Planning Premises, Competitor Intelligence, Benchmarking, Forecasting, Decision-Making.

Directing: Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership, Directing, Managers as leaders, Early Leadership Theories — Trait Theories, Behavioral Theories, Managerial Grid, Contingency Theories of Leadership, Path-Goal Theory, contemporary views of Leadership, Cross Cultural Leadership, Leadership Training, Substitutes of Leadership.

UNIT-III

Organizing: Organizing, Benefits and Limitations - Decentralization and Delegation of Authority, Authority versus Power, Mechanistic versus Organic Organization, Common Organizational Designs, Contemporary Organizational Designs and Contingency Factors, The Learning Organization Nature and Purpose, Formal and Informal Organization, Organization Chart, Structure and Process, Departmentalization by different strategies, Line and Staff authority, Staffing, Human Resource Inventory, Job Analysis, Job Description, Recruitment.

UNIT - IV

Controlling: Controlling, Introduction to Controlling System and process of Controlling, Requirements for effective control, The planning-control link, The process of control, types of control, The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Financial Controls, Tools for measuring organizational Performance, Contemporary issues in control — Workplace concerns, employee theft, employee violence.

Textbook(s):

1. Tripathi PC. Principles of management. Tata McGraw-Hill Education; 6th Edition 2017.

References:

1. Koontz H, Weihrich H. Essentials of management: an international, innovation, and leadership perspective. McGraw-Hill Education; 10th Edition 2018.
2. Principles of Management Text and Cases, Pravin Durai, Pearson, 2015.
3. Robbins, S.P. & Decenzo, David A. Fundamentals of Management, 7th ed., Pearson, 2010.
4. Robbins, S.P. & Coulter, Mary Management; 14 ed., Pearson, 2009.

Universal Human Values	L	P	C
	1		1

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	HS	HS-304

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper.

Course Objectives :

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
4. To analyze the value of harmonious relationship based on trust and respect in their life and profession.

Course Outcomes (CO)

- CO 1** Evaluate the significance of value inputs in formal education and start applying them in their life and profession.
- CO 2** Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- CO 3** Examine the role of a human being in ensuring harmony in society and nature.
- CO 4** Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	-	-	-	-	-	3	-	3	1	1	-	1
CO 2	-	-	-	-	-	3	-	3	1	1	-	1
CO 3	-	-	-	-	-	3	-	3	1	1	-	1
CO 4	-	-	-	-	-	3	-	3	1	1	-	1

UNIT-I

Introduction-Basic Human Aspiration, its fulfillment through All-encompassing Resolution: The basic human aspirations and their fulfillment through Right understanding and Resolution, Right understanding and Resolution as the activities of the Self, Self being central to Human Existence; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution.

UNIT-II

Understanding Human Being: Understanding the human being comprehensively as the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Basis for harmony/contradiction in the self.

UNIT-III

Understanding Nature and Existence: A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self-awareness and self-evaluation), particularly awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/order leading to comprehensive knowledge about the existence).

UNIT - IV

Understanding Human Conduct, All-encompassing Resolution & Holistic Way of Living: Understanding Human Conduct, different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All-encompassing Resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work (participation in the larger order) leading to harmony at all levels from Self to Nature and entire Existence.

Textbook(s):

1. R R Gaur, R Asthana, G P Bagaria, 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics. ISBN 978-93-87034-47-1, Excel Books, New Delhi.
2. Premvir Kapoor, Professional Ethics and Human Values, Khanna Book Publishing, New Delhi, 2022.

References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986.
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.

Advanced Java Programming	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-1	CIE-306T
EAE	6	FSD-EAE	FSD-EAE-1	FSD-318T
CSE-in-EA	7	OAE-CSE-EA	OAE-2	OSD-453T
OAE	7	SD-OAE	SD-OAE-5A	OSD-453T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To learn the ability to design console based, GUI based and web based applications.
2. To learn how to create dynamic web pages, using Servlets and JSP.
3. To learn Designing applications using pre-built framework.
4. To learn how to do distributed programming in Java using RMI, CORBA.

Course Outcomes (CO)

CO 1 Able to Understand advanced programming concepts.

CO 2 Able to Develop server side programs using JSP and Servlets.

CO 3 Able to Develop component-based java software using java beans.

CO 4 Able to develop advanced projects based on java.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	3	2	-	-	-	3	2	2	3
CO 2	3	2	2	3	2	-	-	-	3	2	2	3
CO 3	3	2	2	3	2	-	-	-	3	2	2	3
CO 4	3	2	2	3	2	-	-	-	3	2	2	3

UNIT-I

Introduction to Java, Inheritance, Exception Handling, Multithreading, Applet Programming. Connecting to a Server, Implementing Servers, Making URL Connections, Socket Programming.

UNIT-II

Preparing a Class to be a Java Bean, Creating a Java Bean, Java Bean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling, HTTP GET Requests, Handling HTTP POST Requests, Session Tracking, Cookies.

UNIT-III

JSP- Introduction, Java Server Pages Overview, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

UNIT- IV

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods, Introduction of HB, HB Architecture.

Textbook(s):

1. Kathy Sierra, Head First Servlets and JSP, O'Reilly Media.
2. Kanika Lakhani, Advance Java Programming, S.K. Kataria & Sons

References:

1. Brett Spell, Professional Java Programming, WROX Publication.
2. Harvey. M. Dietal, Advanced Java 2 Platform, How to Program, Prentice Hall.
3. Gajendra Gupta, Advanced Java, Firewall Media.

Programming in Python	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-2	CIE-332T
CSE-IoT/CSE-ICB	6	PC	PC	IOT-320T
EAE	6	IOT-EAE	IOT-EAE-2B	IOT-330T
EAE	6	ICB-EAE	ICB-EAE-2B	IOT-330T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. Learn the syntax and semantics of Python Programming Language.
2. Write Python functions to facilitate code reuse and manipulate strings.
3. Illustrate the process of structuring the data using lists, tuples and dictionaries.
4. Demonstrate the use of built-in functions to navigate the file system.

Course Outcomes (CO)

CO 1 Demonstrate the concepts of control structures in Python.

CO 2 Implement Python programs using functions and strings.

CO 3 Implement methods to create and manipulate lists, tuples and dictionaries.

CO 4 Apply the concepts of file handling and regEx using packages.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT-I

Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit().

UNIT-II

Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods. Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things. Manipulating Strings - Working with Strings, Useful String Methods.

UNIT-III

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function. Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.

UNIT – IV

Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Textbook(s):

1. Al Sweigart, “Automate the Boring Stuff with Python”, William Pollock, 2015, ISBN: 978-1593275990.

References:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, “Data Structures and Algorithms in Python”, 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.
5. Reema Thareja, “Python Programming using problem solving approach”, Oxford University press, 2017. ISBN-13: 978-0199480173.

Artificial Intelligence	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-3	CIE-374T
ECE	6	PCE	PCE-1	ECE-318T
CSE-AI/CSE-AIML	6	PC	PC	AI-302T
EAE	6	AI-EAE	AI-EAE-1	AI-302T
EAE	6	AIML-EAE	AIML-EAE-1	AI-302T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart the definition and basic knowledge of Artificial Intelligence.
2. To introduces AI by examining the nature of the difficult problems.
3. To understand with AI demonstration that intelligence requires ability to find reason.
4. To understand the latest techniques and the future scope of the technology.

Course Outcomes (CO)

CO 1 Ability to use AI methods and control strategies to solve the problems.

CO 2 Understand the production system and its applications. Also, to understand the properties and applications for the different search algorithms.

CO 3 Applying the different algorithms and the techniques, also analyse the reason for the results.

CO 4 Study the expert systems and the modern approaches.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	2	2	-	-	-	-	2
CO 2	3	3	3	3	3	2	2	-	-	-	-	2
CO 3	3	3	3	3	3	2	2	-	-	-	-	2
CO 4	3	3	3	3	3	2	2	-	-	-	-	2

UNIT-I

AI Definition, Problems, The Foundations of Artificial Intelligence, Techniques, Models, Defining Problem as a state space search, production system, Intelligent Agents: Agents and Environments, Characteristics, Search methods and issues in the design of search problems.

UNIT-II

Knowledge representation issues, mapping, frame problem. Predicate logic, facts in logic, representing instance and relationship, Resolution, procedural and declarative knowledge, matching, control knowledge. Symbolic reasoning under uncertainty, Non monotonic reasoning, statistical reasoning.

UNIT-III

Game Playing, minimax search, Alfa beta cut-offs, Natural Language Processing, Learning, Explanation-based learning, discovery, analogy, Neural net learning and Genetic Learning.

UNIT - IV

Fuzzy logic systems, Perception and action, Expert systems, Inference in Bayesian Networks, K-means Clustering Algorithm, Machine learning.

Textbook(s):

1. Elaine Rich, Kevin Knight, and Shivashankar B Nair, "Artificial Intelligence", Tata McGraw Hill.
2. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson Edu.

References:

1. Deepak Khemani, "A First Choice in Artificial Intelligence", McGraw Hill.
2. K M Fu, "Neural Networks in Computer Intelligence", McGraw Hill.

Statistics, Statistical Modelling & Data Analytics	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE-AI/CSE-AIML/CSE-DS	6	PC	PC	DA-304T
EAE	6	AI-EAE	AI-EAE-2	DA-304T
EAE	6	AIML-EAE	AIML-EAE-2	DA-304T
EAE	6	DS-EAE	DS-EAE-1	DA-304T
EAE	6	SC-EAE	SC-EAE-1	DA-304T
EAE	6	MLDA-EAE	MLDA-EAE-1	DA-304T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart basic knowledge about statistics, visualisation and probability.
2. To impart basic knowledge about how to implement regression analysis and interpret the results.
3. To impart basic knowledge about how to describe classes of open and closed sets of $\mathbb{R}$, and the concept of compactness; describe metric space — metric in $\mathbb{R}^n$.
4. To impart basic knowledge about how to apply eigenvalues and eigenvectors.

Course Outcomes (CO)

- CO 1** Ability to learn and understand basic concepts of statistics, visualisation and probability.
- CO 2** Ability to implement regression analysis and interpret results; be able to fit a model to data and comment on its adequacy.
- CO 3** Ability to describe classes of open and closed sets of $\mathbb{R}$, the concept of compactness, and metric space — metric in $\mathbb{R}^n$.
- CO 4** Ability to apply eigenvalues and eigenvectors.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	-	-	1	2	-	-	3
CO 2	3	3	3	3	3	-	-	1	2	-	-	3
CO 3	3	3	3	3	3	-	-	1	2	-	-	3
CO 4	3	3	3	3	3	-	-	1	2	-	-	3

UNIT-I

Statistics: Introduction & Descriptive Statistics- mean, median, mode, variance, and standard deviation. Data Visualization, Introduction to Probability Distributions. Hypothesis testing, Linear Algebra and Population Statistics, Mathematical Methods and Probability Theory, Sampling Distributions and Statistical Inference, Quantitative analysis.

UNIT-II

Statistical Modelling: Linear models, regression analysis, analysis of variance, applications in various fields. Gauss-Markov theorem; geometry of least squares, subspace formulation of linear models, orthogonal projections; regression models, factorial experiments, analysis of covariance and model formulae; regression diagnostics, residuals, influence diagnostics, transformations, Box-Cox models, model selection and model building strategies, logistic regression models; Poisson regression models.

UNIT-III

Data Analytics: Describe classes of open and closed set. Apply the concept of compactness. Describe Metric space - Metric in R^n . Use the concept of Cauchy sequence, completeness, compactness and connectedness to solve the problems.

UNIT – IV

Advanced concepts in Data Analytics: Describe vector space, subspaces, independence of vectors, basis and dimension. Describe Eigen values, Eigen vectors and related results.

Textbook(s):

1. Apostol T. M. (1974): Mathematical Analysis, Narosa Publishing House, New Delhi.
2. Malik, S.C., Arora, S. (2012): Mathematical Analysis, New Age International, New Delhi

References:

1. Pringle, R.M. and Rayner, A.(1971): Generalized Inverse of Matrices with Application to Statistics, Griffin, London
2. Peter Bruce, Andrew Bruce (2017), Practical Statistics for Data Scientists Paperback

Machine Learning	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
ECE	6	PCE	PCE-3	ECE-350T
EAE	6	MLDA-EAE	MLDA-EAE-2C	ML-342T
CSE/IT/CST/ITE	7	PCE	PCE-5	CIE-421T
CSE-AIML	7	PC	PC	ML-407T
EAE	7	AIML-EAE	AIML-EAE-3	ML-407T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To understand the need of machine learning.
2. To learn about regression and feature selection.
3. To understand about classification algorithms.
4. To learn clustering algorithms.

Course Outcomes (CO)

CO 1 To formulate machine learning problems.

CO 2 Learn about regression and feature selection techniques.

CO 3 Apply machine learning techniques such as classification to practical applications.

CO 4 Apply clustering algorithms.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	2	2	-	-	-	-	2
CO 2	3	3	3	3	3	2	2	-	-	-	-	2
CO 3	3	3	3	3	3	2	2	-	-	-	-	2
CO 4	3	3	3	3	3	2	2	-	-	-	-	2

UNIT-I

Introduction: Machine learning, terminologies in machine learning, Perspectives and issues in machine learning, application of Machine learning, Types of machine learning: supervised, unsupervised, semi-supervised learning. Review of probability, Basic Linear Algebra in Machine Learning Techniques, Dataset and its types, Data preprocessing, Bias and Variance in Machine learning, Function approximation, Overfitting.

UNIT-II

Regression Analysis in Machine Learning: Introduction to regression and its terminologies, Types of regression, Logistic Regression. Simple Linear regression: Introduction to Simple Linear Regression and its assumption, Simple Linear Regression Model Building, Ordinary Least square estimation, Properties of the least-squares estimators and the fitted regression model, Interval estimation in simple linear regression, Residuals. Multiple Linear Regression: Multiple linear regression model and its assumption, Interpret Multiple Linear Regression Output (R-Square, Standard error, F, Significance F, Coefficient P values), Assess the fit of multiple linear regression model (R squared, Standard error). Feature Selection and Dimensionality Reduction: PCA, LDA, ICA.

UNIT-III

Introduction to Classification and Classification Algorithms: What is Classification? General Approach to Classification, k-Nearest Neighbor Algorithm, Random Forests, Fuzzy Set Approaches. Support Vector Machine: Introduction, Types of support vector kernel — (Linear kernel, polynomial kernel, and Gaussian kernel), Hyperplane — (Decision surface), Properties of SVM, and Issues in SVM. Decision Trees: Decision tree learning algorithm, ID-3 algorithm, Inductive bias, Entropy and information theory, Information gain, Issues in Decision tree learning. Bayesian Learning - Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm. Ensemble Methods: Bagging, Boosting and AdaBoost and XBoost. Classification Model Evaluation and Selection: Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Lift Curves and Gain Curves, ROC Curves, Misclassification Cost Adjustment to Reflect Real-World Concerns, Decision Cost/Benefit Analysis.

UNIT – IV

Introduction to Cluster Analysis and Clustering Methods: The Clustering Task and the Requirements for Cluster Analysis, Overview of Some Basic Clustering Methods:- k-Means Clustering, k-Medoids Clustering, Density-Based Clustering: DBSCAN - Density-Based Clustering Based on Connected Regions with High Density, Gaussian Mixture Model algorithm, Balance Iterative Reducing and Clustering using Hierarchies (BIRCH), Affinity Propagation clustering algorithm, Mean-Shift clustering algorithm, Ordering Points to Identify the Clustering Structure (OPTICS) algorithm, Agglomerative Hierarchy clustering algorithm, Divisive Hierarchical, Measuring Clustering Goodness.

Textbook(s):

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (India) Private Limited, 2013.
2. M. Gopal, "Applied Machine Learning", McGraw Hill Education

References:

1. C. M. BISHOP (2006), "Pattern Recognition and Machine Learning", Springer-Verlag New York, 1st Edition
2. R. O. Duda, P. E. Hart, D. G. Stork (2000), Pattern Classification, Wiley-Blackwell, 2nd Edition

NSS / NCC / Cultural Clubs / Technical Society / Technical Club	L	P	C
			2

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	HS-352

Nature of the Paper: This is a co-curricular / non-university examination (NUES) activity paper, carrying 2 credits, rather than a conventional lecture-based subject. It does not carry a unit-wise lecture syllabus in the handbook.

****NUES:** Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs, out of 100 as per the evaluation schemes worked out by these activity societies, organizations; the faculty co-ordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and continue through the programme, with the credit reflected in the semester as per the scheme of studies.

Handbook of B.Tech. Programmes

offered by USICT at Affiliated Institutions of the University

Specialization: Full Stack Development — FSD-EAE

Detailed Course Syllabus
6th Semester (Semester VI)

Applicable from Batch Admitted in Academic Session 2021-22 Onwards

Contents

1. Principles of Management for Engineers (MS-302)
2. Universal Human Values (HS-304)
3. Principles of Programming Languages (CIE-320)
4. Programming in Python (CIE-332T)
5. Artificial Intelligence (CIE-374T)
6. Advanced Java Programming (CIE-306T) — FSD-EAE Core (FSD-EAE-1)
7. Web Development using MERN Stack (FSD-322T) — FSD-EAE Core (FSD-EAE-2B)
8. NSS / NCC / Cultural Clubs / Technical Society / Technical Club (HS-352)

Note: Advanced Java Programming (CIE-306T / FSD-318T) and Web Development using MERN Stack (FSD-322T) are the Elective Area (EAE) core papers for the Full Stack Development (FSD-EAE) specialization in Semester VI.

Principles of Management for Engineers	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	MS-302

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To describe the functions, roles and skills of managers and illustrate how the manager's job is evolving.
2. To evaluate approaches to goal setting, planning and organizing in a variety of circumstances.
3. To evaluate contemporary approaches for staffing and leading in an organization.
4. To analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO)

CO 1 Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.

CO 2 Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.

CO 3 Evaluate contemporary approaches for staffing and leading in an organization.

CO 4 Analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	2	2	1	2	-	2	-	-	1	2	3	2
CO 2	2	2	1	2	-	2	-	-	1	2	3	2
CO 3	2	2	1	2	-	2	-	-	1	2	3	2
CO 4	2	2	1	2	-	2	-	-	1	2	3	2

UNIT-I

Introduction to Managers and Management: Management an Overview: Introduction, Definition of Management, Role of Management, Functions of Managers, Levels of Management, Management Skills and Organizational Hierarchy, Social and Ethical Responsibilities of Management: Arguments for and against Social Responsibilities of Business, Social Stakeholders, Measuring Social Responsiveness and Managerial Ethics, Omnipotent and Symbolic View, Characteristics and importance of organizational culture, Relevance of political, legal, economic and Cultural environments to global business, Structures and techniques organizations use as they go international.

UNIT-II

Planning: Nature & Purpose, Steps involved in Planning, Objectives, Setting Objectives, Process of Managing by Objectives, Strategies, Policies & Planning Premises, Competitor Intelligence, Benchmarking, Forecasting, Decision-Making.

Directing: Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership, Directing, Managers as leaders, Early Leadership Theories — Trait Theories, Behavioral Theories, Managerial Grid, Contingency Theories of Leadership, Path-Goal Theory, contemporary views of Leadership, Cross Cultural Leadership, Leadership Training, Substitutes of Leadership.

UNIT-III

Organizing: Organizing, Benefits and Limitations - Decentralization and Delegation of Authority, Authority versus Power, Mechanistic versus Organic Organization, Common Organizational Designs, Contemporary Organizational Designs and Contingency Factors, The Learning Organization Nature and Purpose, Formal and Informal Organization, Organization Chart, Structure and Process, Departmentalization by different strategies, Line and Staff authority, Staffing, Human Resource Inventory, Job Analysis, Job Description, Recruitment.

UNIT - IV

Controlling: Controlling, Introduction to Controlling System and process of Controlling, Requirements for effective control, The planning-control link, The process of control, types of control, The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Financial Controls, Tools for measuring organizational Performance, Contemporary issues in control — Workplace concerns, employee theft, employee violence.

Textbook(s):

1. Tripathi PC. Principles of management. Tata McGraw-Hill Education; 6th Edition 2017.

References:

1. Koontz H, Weihrich H. Essentials of management: an international, innovation, and leadership perspective. McGraw-Hill Education; 10th Edition 2018.
2. Principles of Management Text and Cases, Pravin Durai, Pearson, 2015.
3. Robbins, S.P. & Decenzo, David A. Fundamentals of Management, 7th ed., Pearson, 2010.
4. Robbins, S.P. & Coulter, Mary Management; 14 ed., Pearson, 2009.

Universal Human Values	L	P	C
	1		1

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	HS	HS-304

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper.

Course Objectives :

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
4. To analyze the value of harmonious relationship based on trust and respect in their life and profession.

Course Outcomes (CO)

- CO 1** Evaluate the significance of value inputs in formal education and start applying them in their life and profession.
- CO 2** Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- CO 3** Examine the role of a human being in ensuring harmony in society and nature.
- CO 4** Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	-	-	-	-	-	3	-	3	1	1	-	1
CO 2	-	-	-	-	-	3	-	3	1	1	-	1
CO 3	-	-	-	-	-	3	-	3	1	1	-	1
CO 4	-	-	-	-	-	3	-	3	1	1	-	1

UNIT-I

Introduction-Basic Human Aspiration, its fulfillment through All-encompassing Resolution: The basic human aspirations and their fulfillment through Right understanding and Resolution, Right understanding and Resolution as the activities of the Self, Self being central to Human Existence; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution.

UNIT-II

Understanding Human Being: Understanding the human being comprehensively as the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Basis for harmony/contradiction in the self.

UNIT-III

Understanding Nature and Existence: A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self-awareness and self-evaluation), particularly awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/order leading to comprehensive knowledge about the existence).

UNIT - IV

Understanding Human Conduct, All-encompassing Resolution & Holistic Way of Living: Understanding Human Conduct, different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All-encompassing Resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work (participation in the larger order) leading to harmony at all levels from Self to Nature and entire Existence.

Textbook(s):

1. R R Gaur, R Asthana, G P Bagaria, 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics. ISBN 978-93-87034-47-1, Excel Books, New Delhi.
2. Premvir Kapoor, Professional Ethics and Human Values, Khanna Book Publishing, New Delhi, 2022.

References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986.
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.

Principles of Programming Languages	L	P	C
	4		4

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE	6	PCE	PCE-1	CIE-320

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To understand and describe syntax and semantics of programming languages.
2. To understand data, data types, and bindings.
3. To learn the concepts of functional and logical programming.
4. To explore the knowledge about concurrent programming paradigms.

Course Outcomes (CO)

CO 1 Describe syntax and semantics of programming languages.

CO 2 Explain data, data types, and basic statements of programming languages.

CO 3 Design and implement subprogram constructs; apply object-oriented, concurrency, and event handling programming constructs.

CO 4 Develop programs in various programming languages.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1		3	-	-	-	2	-	2	-	-	3	2
CO 2		-	2	-	-	-	2	-	-	3	-	-
CO 3	-	-	-	2	3	-	-	3	-	-	2	-
CO 4	3	-	3	-	-	3	3	-	3	-	-	3

UNIT-I

Syntax, semantics and pragmatics; Formal translation models, Variables, Expressions & Statements, Binding time spectrum; Variables and expressions; Assignment; l-values and r-values; Environments and stores; Storage allocation; Constants and initialization; Statement-level control structure.

UNIT-II

Primitive Types: Pointers; Structured types; Coercion; Notion of type equivalence; Polymorphism: overloading, inheritance, type parameterization, Abstract data types; Information hiding and abstraction; Visibility, Procedures, Modules, Classes, Packages, Objects and Object-Oriented Programming.

UNIT-III

Storage Management: Static and dynamic, stack-based, and heap-based storage management. Sequence Control: Implicit and explicit sequencing with arithmetic and non-arithmetic expressions; Sequence control between statements. Subprogram Control: Subprogram sequence control, data control and referencing environments; parameter passing; static and dynamic scope; block structure.

UNIT-IV

Concurrent Programming: Concepts, Communication, Deadlocks, Semaphores, Monitors, Threads, Synchronization. Logic programming: Introduction; Rules, Structured Data and Scope of the variables; Operators and Functions; Recursion and recursive rules; Lists, Input and Output; Program control; Logic Program design.

Textbook(s):

1. Programming Languages – Pratt T.V. (Pearson Ed).
2. Introduction to Programming Languages: Programming in C, C++, Scheme, Prolog, C# and SOA – Chen Y., Tsai W-T. (Kendall).
3. Programming Languages: Design & Implementation – Pratt T.W., Zelkowski M.V. (PHI).
4. Programming Languages, Adesh K Pandey, Narosa Publishing House

References:

1. Programming Languages: Principles and Practice – Loudon K.C. (Addison-Wesley).
2. Programming languages – Grover P.S. (S. Chand).
3. Programming Languages: Principles and Paradigms - Tucker A., Noonan R. (TMH).

Programming in Python	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-2	CIE-332T
CSE-IoT/CSE-ICB	6	PC	PC	IOT-320T
EAE	6	IOT-EAE	IOT-EAE-2B	IOT-330T
EAE	6	ICB-EAE	ICB-EAE-2B	IOT-330T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. Learn the syntax and semantics of Python Programming Language.
2. Write Python functions to facilitate code reuse and manipulate strings.
3. Illustrate the process of structuring the data using lists, tuples and dictionaries.
4. Demonstrate the use of built-in functions to navigate the file system.

Course Outcomes (CO)

CO 1 Demonstrate the concepts of control structures in Python.

CO 2 Implement Python programs using functions and strings.

CO 3 Implement methods to create and manipulate lists, tuples and dictionaries.

CO 4 Apply the concepts of file handling and regEx using packages.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT-I

Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit().

UNIT-II

Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods. Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things. Manipulating Strings - Working with Strings, Useful String Methods.

UNIT-III

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function. Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.

UNIT – IV

Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Textbook(s):

1. Al Sweigart, "Automate the Boring Stuff with Python", William Pollock, 2015, ISBN: 978-1593275990.

References:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.
5. Reema Thareja, "Python Programming using problem solving approach", Oxford University press, 2017. ISBN-13: 978-0199480173.

Artificial Intelligence	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-3	CIE-374T
ECE	6	PCE	PCE-1	ECE-318T
CSE-AI/CSE-AIML	6	PC	PC	AI-302T
EAE	6	AI-EAE	AI-EAE-1	AI-302T
EAE	6	AIML-EAE	AIML-EAE-1	AI-302T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart the definition and basic knowledge of Artificial Intelligence.
2. To introduces AI by examining the nature of the difficult problems.
3. To understand with AI demonstration that intelligence requires ability to find reason.
4. To understand the latest techniques and the future scope of the technology.

Course Outcomes (CO)

CO 1 Ability to use AI methods and control strategies to solve the problems.

CO 2 Understand the production system and its applications. Also, to understand the properties and applications for the different search algorithms.

CO 3 Applying the different algorithms and the techniques, also analyse the reason for the results.

CO 4 Study the expert systems and the modern approaches.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	2	2	-	-	-	-	2
CO 2	3	3	3	3	3	2	2	-	-	-	-	2
CO 3	3	3	3	3	3	2	2	-	-	-	-	2
CO 4	3	3	3	3	3	2	2	-	-	-	-	2

UNIT-I

AI Definition, Problems, The Foundations of Artificial Intelligence, Techniques, Models, Defining Problem as a state space search, production system, Intelligent Agents: Agents and Environments, Characteristics, Search methods and issues in the design of search problems.

UNIT-II

Knowledge representation issues, mapping, frame problem. Predicate logic, facts in logic, representing instance and Isa relationship, Resolution, procedural and declarative knowledge, matching, control knowledge. Symbolic reasoning under uncertainty, Non monotonic reasoning, statistical reasoning.

UNIT-III

Game Playing, minimax search, Alfa beta cut-offs, Natural Language Processing, Learning, Explanation-based learning, discovery, analogy, Neural net learning and Genetic Learning.

UNIT - IV

Fuzzy logic systems, Perception and action, Expert systems, Inference in Bayesian Networks, K-means Clustering Algorithm, Machine learning.

Textbook(s):

1. Elaine Rich, Kevin Knight, and Shivashankar B Nair, "Artificial Intelligence", Tata McGraw Hill.
2. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson Edu.

References:

1. Deepak Khemani, "A First Choice in Artificial Intelligence", McGraw Hill.
2. K M Fu, "Neural Networks in Computer Intelligence", McGraw Hill.

Advanced Java Programming	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-1	CIE-306T
EAE	6	FSD-EAE	FSD-EAE-1	FSD-318T
CSE-in-EA	7	OAE-CSE-EA	OAE-2	OSD-453T
OAE	7	SD-OAE	SD-OAE-5A	OSD-453T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To learn the ability to design console based, GUI based and web based applications.
2. To learn how to create dynamic web pages, using Servlets and JSP.
3. To learn Designing applications using pre-built framework.
4. To learn how to do distributed programming in Java using RMI, CORBA.

Course Outcomes (CO)

CO 1 Able to Understand advanced programming concepts.

CO 2 Able to Develop server side programs using JSP and Servlets.

CO 3 Able to Develop component-based java software using java beans.

CO 4 Able to develop advanced projects based on java.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	3	2	-	-	-	3	2	2	3
CO 2	3	2	2	3	2	-	-	-	3	2	2	3
CO 3	3	2	2	3	2	-	-	-	3	2	2	3
CO 4	3	2	2	3	2	-	-	-	3	2	2	3

UNIT-I

Introduction to Java, Inheritance, Exception Handling, Multithreading, Applet Programming. Connecting to a Server, Implementing Servers, Making URL Connections, Socket Programming.

UNIT-II

Preparing a Class to be a Java Bean, Creating a Java Bean, Java Bean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling, HTTP GET Requests, Handling HTTP POST Requests, Session Tracking, Cookies.

UNIT-III

JSP- Introduction, Java Server Pages Overview, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

UNIT- IV

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods, Introduction of HB, HB Architecture.

Textbook(s):

1. Kathy Sierra, Head First Servlets and JSP, O'Reilly Media.
2. Kanika Lakhani, Advance Java Programming, S.K. Kataria & Sons

References:

1. Brett Spell, Professional Java Programming, WROX Publication.
2. Harvey. M. Dietal, Advanced Java 2 Platform, How to Program, Prentice Hall.
3. Gajendra Gupta, Advanced Java, Firewall Media.

Web Development using MERN Stack	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE-in-EA	6	OAE-CSE-EA	OAE-1	FSD-322T
EAE	6	FSD-EAE	FSD-EAE-2B	FSD-322T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To learn the Web Development, Designing and validations using HTML, XHTML, XML, CSS, XSLT and JavaScript.
2. To learn and implement the concept of ReactJS.
3. To learn and implement the concept of NodeJS and ExpressJS.
4. To learn and implement the connectivity of MongoDB with web applications.

Course Outcomes (CO)

- CO 1** To be able to learn the basic implementation and apply HTML, XHTML, XML, CSS, XSLT and JavaScript concepts in web applications.
- CO 2** To be able to develop a Web application using ReactJS.
- CO 3** To be able to develop a Web application based on NodeJS and ExpressJS.
- CO 4** To be able to connect the applications using MongoDB.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	1	2	1	1	3	1	-	1	2	-	3	3
CO 2	1	2	1	1	3	1	-	1	2	-	3	3
CO 3	1	2	1	1	3	1	-	1	2	-	3	3
CO 4	1	2	1	1	3	1	-	1	2	-	3	3

UNIT-I

Introduction: Fundamentals of Web Design, Webpage and Website, Web application, Client-server architecture. Markup languages: Introduction to HTML, basics of XHTML, HTML elements, HTML tags, lists, tables, forms, defining XHTML's abstract syntax, XML. CSS style sheets: Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, XSLT. Client Side Programming: JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVA Script form programming, Intrinsic event handling, modifying element style, document trees, ECMAScript5, ECMAScript6, Express.js, request, response, get, post, routing, cookies, file upload, middleware.

UNIT-II

ReactJS: Introduction, Templating using JSX, Classes using JSX, Components, State and Props, Lifecycle of Components, Rendering List and Portals, Error Handling, Routers, Redux and Redux Saga, Immutable.js, Service Side Rendering, Unit Testing, Webpack.

UNIT-III

NodeJS: Node js Overview, Node js Basics and Setup, Node js Console, Node js Command Utilities, Node js Modules, Node js Concepts, Node js Events, Node js Database Access, Node.js with Express.js, Express.js Request, Express.js Response, Express.js Get, Express.js Post, Express.js Routing, Express.js Cookies, Express.js File Upload, Express.js Middleware, Express.js Scaffolding, Express.js Template.

UNIT - IV

MongoDB: SQL and NoSql concepts, Create and manage MongoDB, Migration of data into MongoDB, MongoDB with NodeJS, Services offered by MongoDB.

Textbook(s):

1. Vasan Subramanian, "Pro MERN Stack", Apress Publisher, 2 Edition, ISBN: 9781484243916
2. Chris Northwood, "The Full Stack Developer", Apress Publisher, ISBN: 978-1484241516

References:

1. Greg Lim, "Beginning MERN Stack Applications", Independently Published, Third Edition.
2. "Road for Being MERN STACK Developer", Independently published, ISBN:9798766684855
3. Shama Hoque, " Full Stack React Projects", O'Reilly Media, 2nd Edition.

NSS / NCC / Cultural Clubs / Technical Society / Technical Club	L	P	C
			2

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	HS-352

Nature of the Paper: This is a co-curricular / non-university examination (NUES) activity paper, carrying 2 credits, rather than a conventional lecture-based subject. It does not carry a unit-wise lecture syllabus in the handbook.

****NUES:** Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs, out of 100 as per the evaluation schemes worked out by these activity societies, organizations; the faculty co-ordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and continue through the programme, with the credit reflected in the semester as per the scheme of studies.

Handbook of B.Tech. Programmes

offered by USICT at Affiliated Institutions of the University

Specialization: Cyber Security — CS-EAE

Detailed Course Syllabus
6th Semester (Semester VI)

Applicable from Batch Admitted in Academic Session 2021-22 Onwards

Contents

1. Principles of Management for Engineers (MS-302)
2. Universal Human Values (HS-304)
3. Advanced Java Programming (CIE-306T)
4. Programming in Python (CIE-332T)
5. Artificial Intelligence (CIE-374T)
6. Information Theory and Coding (CS-310T) — CS-EAE Core (CS-EAE-1)
7. Network Security Issues and Challenges (CS-314T) — CS-EAE Core (CS-EAE-2B)
8. NSS / NCC / Cultural Clubs / Technical Society / Technical Club (HS-352)

Note: Information Theory and Coding (CS-310T) and Network Security Issues and Challenges (CS-314T) are the Elective Area (EAE) core papers for the Cyber Security (CS-EAE) specialization in Semester VI.

Principles of Management for Engineers	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	MS-302

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To describe the functions, roles and skills of managers and illustrate how the manager's job is evolving.
2. To evaluate approaches to goal setting, planning and organizing in a variety of circumstances.
3. To evaluate contemporary approaches for staffing and leading in an organization.
4. To analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO)

CO 1 Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.

CO 2 Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.

CO 3 Evaluate contemporary approaches for staffing and leading in an organization.

CO 4 Analyze contemporary issues in controlling for measuring organizational performance.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	2	2	1	2	-	2	-	-	1	2	3	2
CO 2	2	2	1	2	-	2	-	-	1	2	3	2
CO 3	2	2	1	2	-	2	-	-	1	2	3	2
CO 4	2	2	1	2	-	2	-	-	1	2	3	2

UNIT-I

Introduction to Managers and Management: Management an Overview: Introduction, Definition of Management, Role of Management, Functions of Managers, Levels of Management, Management Skills and Organizational Hierarchy, Social and Ethical Responsibilities of Management: Arguments for and against Social Responsibilities of Business, Social Stakeholders, Measuring Social Responsiveness and Managerial Ethics, Omnipotent and Symbolic View, Characteristics and importance of organizational culture, Relevance of political, legal, economic and Cultural environments to global business, Structures and techniques organizations use as they go international.

UNIT-II

Planning: Nature & Purpose, Steps involved in Planning, Objectives, Setting Objectives, Process of Managing by Objectives, Strategies, Policies & Planning Premises, Competitor Intelligence, Benchmarking, Forecasting, Decision-Making.

Directing: Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership, Directing, Managers as leaders, Early Leadership Theories — Trait Theories, Behavioral Theories, Managerial Grid, Contingency Theories of Leadership, Path-Goal Theory, contemporary views of Leadership, Cross Cultural Leadership, Leadership Training, Substitutes of Leadership.

UNIT-III

Organizing: Organizing, Benefits and Limitations - Decentralization and Delegation of Authority, Authority versus Power, Mechanistic versus Organic Organization, Common Organizational Designs, Contemporary Organizational Designs and Contingency Factors, The Learning Organization Nature and Purpose, Formal and Informal Organization, Organization Chart, Structure and Process, Departmentalization by different strategies, Line and Staff authority, Staffing, Human Resource Inventory, Job Analysis, Job Description, Recruitment.

UNIT - IV

Controlling: Controlling, Introduction to Controlling System and process of Controlling, Requirements for effective control, The planning-control link, The process of control, types of control, The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Financial Controls, Tools for measuring organizational Performance, Contemporary issues in control — Workplace concerns, employee theft, employee violence.

Textbook(s):

1. Tripathi PC. Principles of management. Tata McGraw-Hill Education; 6th Edition 2017.

References:

1. Koontz H, Weihrich H. Essentials of management: an international, innovation, and leadership perspective. McGraw-Hill Education; 10th Edition 2018.
2. Principles of Management Text and Cases, Pravin Durai, Pearson, 2015.
3. Robbins, S.P. & Decenzo, David A. Fundamentals of Management, 7th ed., Pearson, 2010.
4. Robbins, S.P. & Coulter, Mary Management; 14 ed., Pearson, 2009.

Universal Human Values	L	P	C
	1		1

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	HS	HS-304

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks
3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper.

Course Objectives :

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
4. To analyze the value of harmonious relationship based on trust and respect in their life and profession.

Course Outcomes (CO)

- CO 1** Evaluate the significance of value inputs in formal education and start applying them in their life and profession.
- CO 2** Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- CO 3** Examine the role of a human being in ensuring harmony in society and nature.
- CO 4** Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	-	-	-	-	-	3	-	3	1	1	-	1
CO 2	-	-	-	-	-	3	-	3	1	1	-	1
CO 3	-	-	-	-	-	3	-	3	1	1	-	1
CO 4	-	-	-	-	-	3	-	3	1	1	-	1

UNIT-I

Introduction-Basic Human Aspiration, its fulfillment through All-encompassing Resolution: The basic human aspirations and their fulfillment through Right understanding and Resolution, Right understanding and Resolution as the activities of the Self, Self being central to Human Existence; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution.

UNIT-II

Understanding Human Being: Understanding the human being comprehensively as the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Basis for harmony/contradiction in the self.

UNIT-III

Understanding Nature and Existence: A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self-awareness and self-evaluation), particularly awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/order leading to comprehensive knowledge about the existence).

UNIT - IV

Understanding Human Conduct, All-encompassing Resolution & Holistic Way of Living: Understanding Human Conduct, different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All-encompassing Resolution covering all four dimensions of human endeavor viz., realization, thought, behavior and work (participation in the larger order) leading to harmony at all levels from Self to Nature and entire Existence.

Textbook(s):

1. R R Gaur, R Asthana, G P Bagaria, 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics. ISBN 978-93-87034-47-1, Excel Books, New Delhi.
2. Premvir Kapoor, Professional Ethics and Human Values, Khanna Book Publishing, New Delhi, 2022.

References:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986.
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.

Advanced Java Programming	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-1	CIE-306T
EAE	6	FSD-EAE	FSD-EAE-1	FSD-318T
CSE-in-EA	7	OAE-CSE-EA	OAE-2	OSD-453T
OAE	7	SD-OAE	SD-OAE-5A	OSD-453T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
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4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To learn the ability to design console based, GUI based and web based applications.
2. To learn how to create dynamic web pages, using Servlets and JSP.
3. To learn Designing applications using pre-built framework.
4. To learn how to do distributed programming in Java using RMI, CORBA.

Course Outcomes (CO)

CO 1 Able to Understand advanced programming concepts.

CO 2 Able to Develop server side programs using JSP and Servlets.

CO 3 Able to Develop component-based java software using java beans.

CO 4 Able to develop advanced projects based on java.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	3	2	-	-	-	3	2	2	3
CO 2	3	2	2	3	2	-	-	-	3	2	2	3
CO 3	3	2	2	3	2	-	-	-	3	2	2	3
CO 4	3	2	2	3	2	-	-	-	3	2	2	3

UNIT-I

Introduction to Java, Inheritance, Exception Handling, Multithreading, Applet Programming. Connecting to a Server, Implementing Servers, Making URL Connections, Socket Programming.

UNIT-II

Preparing a Class to be a Java Bean, Creating a Java Bean, Java Bean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling, HTTP GET Requests, Handling HTTP POST Requests, Session Tracking, Cookies.

UNIT-III

JSP- Introduction, Java Server Pages Overview, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

UNIT- IV

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods, Introduction of HB, HB Architecture.

Textbook(s):

1. Kathy Sierra, Head First Servlets and JSP, O'Reilly Media.
2. Kanika Lakhani, Advance Java Programming, S.K. Kataria & Sons

References:

1. Brett Spell, Professional Java Programming, WROX Publication.
2. Harvey. M. Dietal, Advanced Java 2 Platform, How to Program, Prentice Hall.
3. Gajendra Gupta, Advanced Java, Firewall Media.

Programming in Python	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-2	CIE-332T
CSE-IoT/CSE-ICB	6	PC	PC	IOT-320T
EAE	6	IOT-EAE	IOT-EAE-2B	IOT-330T
EAE	6	ICB-EAE	ICB-EAE-2B	IOT-330T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. Learn the syntax and semantics of Python Programming Language.
2. Write Python functions to facilitate code reuse and manipulate strings.
3. Illustrate the process of structuring the data using lists, tuples and dictionaries.
4. Demonstrate the use of built-in functions to navigate the file system.

Course Outcomes (CO)

CO 1 Demonstrate the concepts of control structures in Python.

CO 2 Implement Python programs using functions and strings.

CO 3 Implement methods to create and manipulate lists, tuples and dictionaries.

CO 4 Apply the concepts of file handling and regEx using packages.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	2	2	2	3	-	-	-	3	2	2	3
CO 2	3	2	2	2	3	-	-	-	3	2	2	3
CO 3	3	2	2	2	3	-	-	-	3	2	2	3
CO 4	3	2	2	2	3	-	-	-	3	2	2	3

UNIT-I

Introduction, Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Dissecting Your Program. Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit().

UNIT-II

Functions: def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling. Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods. Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things. Manipulating Strings - Working with Strings, Useful String Methods.

UNIT-III

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function. Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module.

UNIT – IV

Web Scraping: Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML.

Textbook(s):

1. Al Sweigart, "Automate the Boring Stuff with Python", William Pollock, 2015, ISBN: 978-1593275990.

References:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.
5. Reema Thareja, "Python Programming using problem solving approach", Oxford University press, 2017. ISBN-13: 978-0199480173.

Artificial Intelligence	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE/IT/CST/ITE	6	PCE	PCE-3	CIE-374T
ECE	6	PCE	PCE-1	ECE-318T
CSE-AI/CSE-AIML	6	PC	PC	AI-302T
EAE	6	AI-EAE	AI-EAE-1	AI-302T
EAE	6	AIML-EAE	AIML-EAE-1	AI-302T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To impart the definition and basic knowledge of Artificial Intelligence.
2. To introduces AI by examining the nature of the difficult problems.
3. To understand with AI demonstration that intelligence requires ability to find reason.
4. To understand the latest techniques and the future scope of the technology.

Course Outcomes (CO)

CO 1 Ability to use AI methods and control strategies to solve the problems.

CO 2 Understand the production system and its applications. Also, to understand the properties and applications for the different search algorithms.

CO 3 Applying the different algorithms and the techniques, also analyse the reason for the results.

CO 4 Study the expert systems and the modern approaches.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	3	3	3	2	2	-	-	-	-	2
CO 2	3	3	3	3	3	2	2	-	-	-	-	2
CO 3	3	3	3	3	3	2	2	-	-	-	-	2
CO 4	3	3	3	3	3	2	2	-	-	-	-	2

UNIT-I

AI Definition, Problems, The Foundations of Artificial Intelligence, Techniques, Models, Defining Problem as a state space search, production system, Intelligent Agents: Agents and Environments, Characteristics, Search methods and issues in the design of search problems.

UNIT-II

Knowledge representation issues, mapping, frame problem. Predicate logic, facts in logic, representing instance and relationship, Resolution, procedural and declarative knowledge, matching, control knowledge. Symbolic reasoning under uncertainty, Non monotonic reasoning, statistical reasoning.

UNIT-III

Game Playing, minimax search, Alfa beta cut-offs, Natural Language Processing, Learning, Explanation-based learning, discovery, analogy, Neural net learning and Genetic Learning.

UNIT - IV

Fuzzy logic systems, Perception and action, Expert systems, Inference in Bayesian Networks, K-means Clustering Algorithm, Machine learning.

Textbook(s):

1. Elaine Rich, Kevin Knight, and Shivashankar B Nair, "Artificial Intelligence", Tata McGraw Hill.
2. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson Edu.

References:

1. Deepak Khemani, "A First Choice in Artificial Intelligence", McGraw Hill.
2. K M Fu, "Neural Networks in Computer Intelligence", McGraw Hill.

Information Theory and Coding	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
CSE-CS	6	PC	PC	CS-310T
EAE	6	CS-EAE	CS-EAE-1	CS-310T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To understand the efficient, error-free and secure delivery of information using binary streams.
2. To have in-depth knowledge of error-control coding.
3. To learn the process of encoding and decoding of digital data streams.
4. To learn and apply the methods of generation of these codes and evaluate the performance of them over the noisy communication channels.

Course Outcomes (CO)

CO 1 To be able to understand the principles behind an efficient and secure transmission of digital data stream.

CO 2 To be able to demonstrate the knowledge of channel capacity and coding.

CO 3 To be able to implement the knowledge of encoding and decoding of digital data stream using Linear & Cyclic Codes.

CO 4 To be able to analyse the encoding and decoding of digital data stream using Convolutional codes.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	1	1	1	-	-	-	2	-	3	-	1
CO 2	3	3	3	3	1	1	-	2	-	2	-	2
CO 3	3	3	3	3	3	1	-	2	-	2	-	2
CO 4	3	3	3	3	3	1	-	2	-	2	-	2

UNIT-I

Introduction to Information Theory, Uncertainty & Information, Mutual Information, Average mutual information, Entropy, Relative Entropy, Extension of an Information source and Markov Source, Maximum Entropy Principle, Information measure of Continuous random Variables, Maximum Entropy Principle, Jensen's Inequality, Fano's Inequality, Introduction to lossless coding, Source coding theorem Block code and its properties, Instantaneous code and its properties, Kraft-McMillan equality, Huffman Coding, Shannon Fano coding, Lempel Ziv Algorithm.

UNIT-II

Introduction to discrete information channels, Equivocation and Mutual Information, Properties of different information channels, Reduction of information channels, Noiseless channel, Properties of Mutual information, Introduction to channel capacity, Shannon's Channel Coding theorem, Bandwidth – S/N Trade Off, Channel capacity theorem, Shannon Limit, Channel capacity for MIMO system.

UNIT-III

Definition of Terms: Redundancy, code efficiency, systematic codes, Hamming distance, Hamming Weight, Hamming Bound, Types of Code: Parity check codes, Hamming codes, Linear Block Codes, Generator and Parity Check matrix, Syndrome decoding. Introduction to Cyclic Codes, Generation and detection of cyclic codes.

UNIT – IV

Burst Error Detecting and correcting codes, Convolutional codes, Code Tree, Trellis and State diagram, Decoding of convolutional codes, Viterbi's Algorithm, Sequential Decoding, Transfer function and Distance properties of convolutional codes, Bound on bit error rate, Coding Gain.

Textbook(s):

1. Ranjan Bose, "Information Theory Coding & Cryptography", 3rd Edition, McGraw Hill, 2017.
2. T.M. Cover and J.A Thomas, "Elements of Information Theory", 2nd Edition, Wiley India Pvt Ltd, 2013.

References:

1. Salvatore Gravano, Introduction to Error Control Codes, Oxford University Press, 2017.

Network Security Issues and Challenges	L	P	C
	3		3

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
EAE	6	CS-EAE	CS-EAE-2B	CS-314T
CSE-CS	7	PC	PC	CS-429T

Marking Scheme:

1. Teachers Continuous Evaluation: 25 marks
2. Term end Theory Examinations: 75 marks

Instructions for paper setter:

1. There should be 9 questions in the term end examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.
4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
5. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives :

1. To explain how various attacks work.
2. To explain how various security mechanisms work, and correlate these security mechanisms with security principles.
3. To compare various security mechanisms, and articulate their advantages.
4. To apply security principles to solve problems.

Course Outcomes (CO)

CO 1 To understand Security goals, attacks, threat and software vulnerabilities.

CO 2 Analyze and design traditional encryption techniques and block ciphers.

CO 3 Understand and analyze public-key cryptography, RSA and other public-key cryptosystems.

CO 4 Understand network management architecture, its standards and to differentiate the management protocols.

Course Outcomes (CO) to Programme Outcomes (PO) mapping (scale 1: low, 2: Medium, 3: High)

	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO 1	3	3	1	2	1	-	-	-	-	1	-	1
CO 2	2	2	2	2	1	-	-	-	-	1	-	1
CO 3	3	3	2	1	1	-	-	-	-	1	-	2
CO 4	3	2	1	1	1	-	-	-	-	1	-	1

UNIT-I

Security Taxonomy, Domain of information security, Security goals, security attacks, threats Vulnerabilities, Malicious Software, Virus, Trojan, Worms, spywares, Security services and Mechanism Security Techniques: Steganography, Digital watermarking, Security Models, Introduction to DB Security. Software vulnerabilities, Buffer and Stack over flow, Phishing.

UNIT-II

Mathematics of Cryptography, Integer Arithmetic, modular arithmetic, Linear congruences, Algebraic structures, $GF(2^n)$ Traditional Symmetric Key ciphers, Substitution, Transposition, Stream and Block Ciphers, Some Classical systems – Statistical theory of cipher systems-Complexity theory of crypto systems – Stream ciphers, Block ciphers.

UNIT-III

Modern Block Ciphers – DES and variant, modes of use of DES. Advanced Encryption Standard Transformations, Key expansion, Public Key Cryptography RSA, ECC, Web security, IP sec, Email Security.

UNIT – IV

Network management Architecture & Applications, Management standards and Models, Network Management Functions- Configurations Configuration Management, Fault management, Identification and Isolation, Management Protocols SNMP v1, SNMP v3, Network management Accounting & Performance Functions: accounting Management, Performance Management, Network Usage, Metrics.

Textbook(s):

1. Behrouz A. Forouzan, “Cryptography and Network Security”, 1st Edition, 2007, The McGraw-Hill
2. William Stallings, “Cryptography and Network security Principles and Practices”, 4th edition, 2005, PHI

References:

1. J. Richard Burkle, “Network Management Concepts and Practice: A hands on approach”, Pearson, 3rd Ed.
2. Gollmann, Dieter, “Computer Security”, 2nd edition, 2005, John Wiley & Sons Ltd.

NSS / NCC / Cultural Clubs / Technical Society / Technical Club	L	P	C
			2

Discipline(s) / EAE / OAE	Semester	Group	Sub-group	Paper Code
All	6	HS/MS	MS	HS-352

Nature of the Paper: This is a co-curricular / non-university examination (NUES) activity paper, carrying 2 credits, rather than a conventional lecture-based subject. It does not carry a unit-wise lecture syllabus in the handbook.

****NUES:** Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs, out of 100 as per the evaluation schemes worked out by these activity societies, organizations; the faculty co-ordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and continue through the programme, with the credit reflected in the semester as per the scheme of studies.