



Integral University, Lucknow

Effective from Session: 2026-2027							
Course Code	CA204	Title of the Course	Fundamentals of Database Management System	L	T	P	C
Year	II	Semester	III	3	0	2	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> ● To learn the basic knowledge of Database Management System and various types of data models. ● To learn the concept and syntax of ER Diagram and the extended ER features. ● To learn various constraints and writing SQL queries. ● To learn the basic structure of Oracle system. ● To learn the concept of Normalization. ● To learn the various issues in transaction processing and concurrency control system. 						

Course Outcomes	
CO1	Able to understand the basic concepts of DBMS, Difference between DBMS and File Processing System, applications of DBMS and various DBMS Models.
CO2	Able to understand the basic concepts of ER Model and How to draw ER Diagrams.
CO3	Ability to define various constraints and writing queries using SQL syntax.
CO4	Applying the Relational algebra and Calculus to define expressions for queries and understanding various Normal forms used for Normalization approach.
CO5	Acquainted with the basic issues while implementing the concept of Transaction and recovery.

THEORY				
Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Databases	Introduction to Databases: Advantage of Database System, Database System versus File System, View of Data, Database System Concepts and Architecture: Data Models, Schemas and Instances, Three schema architecture and Data Independence, Database Languages and Interfaces, Classification of Database Management Systems.	8	CO1
2	Entity-Relationship Model	Entity-Relationship Model: Basic Concepts, Constraints, Keys: Primary Key, Super key, Candidate key, Entity Types, Entity Sets, Design issues, Entity-Relationship Diagram, Relations, Relationship types, Roles and Structural Constraints, Weak Entity sets, Extended ER Features, Design of E-R Database Schema, Reduction of an E-R Schema to tables.	8	CO2
3	Relational Model and Constraints	Relational model Concepts, Structure of Relational Databases, Constraints: Entity integrity, Referential Integrity, Domain Constraints, Assertions, Triggers, Security and Authorization, Authentication and Encryption. SQL: Data Definition, Constraints, Schema Changes in SQL, Basic Queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, Views (in SQL), Specifying General Constraints as Assertion, Additional features. Oracle: Basic Structure of the Oracle System.	8	CO3
4	Relational Algebra	The Relational Algebra, Tuple Relational Calculus, Data Normalization. Functional dependencies, Normal form concepts and Types: First Normal Form, Second Normal Form, Boyce-Codd Normal form, Third Normal form and Fourth Normal Form.	8	CO4
5	Transaction Management and Recovery Techniques	Introduction to Transaction Processing, Transaction Concepts and Properties, Schedules, Serializability of Schedules, Conflict and view serializable schedules, Recovery Concepts, Recovery from Transactions, Introduction to Concurrency Control Techniques.	8	CO5

PRACTICAL				
S. No.	Title of Experiments	List of Experiments	Contact Hrs.	Mapped CO
1	Tables	<ul style="list-style-type: none"> ● Creating tables ● Insertion and Deletion in tables ● Updating Tables ● Retrieval of data ● Handling basic data types 	2	CO1
2	Operations	<ul style="list-style-type: none"> ● Arithmetic operations ● Logical operations ● Pattern matching ● Sorting with ORDER BY 	2	CO2
	Aggregate Functions	<ul style="list-style-type: none"> ● COUNT() ● SUM() ● AVG() ● MAX() ● MIN() ● GROUP BY ● HAVING clause 		
3	Permissions	<ul style="list-style-type: none"> ● Granting permissions (Grant, Revoke). 	2	CO3
	Joins	<ul style="list-style-type: none"> ● Write commands for Joins, Union and Intersection. ● INNER join ● LEFT join ● RIGHT join ● SELF join 		
4	Sub query	<ul style="list-style-type: none"> ● Single Row and Multirow Sub queries ● Correlated Subqueries 	2	CO4

5	Constraints	<ul style="list-style-type: none"> • Concept of Data constraints (Unique Key, Primary Key, Foreign Key). • Creating Views and Indexes. • Introduction to PL/SQL 	2	CO5
Reference Books:				
➤ Elmasri, Nawathe, "Fundamentals of Database Systems", Addison Wesley.				
➤ Silberschatz, Korth, Sudarshan, "Database System Concepts", McGraw-Hill.				
e-Learning Source:				
➤ https://nptel.ac.in/courses/106105177				
➤ https://nptel.ac.in/courses/106105175				

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1			1	1							3	1				
CO2	3	1	2			1	1	2					2	1				
CO3		2	3	1	1	2	2						3	1				
CO4	1	3	2	2		2	1						2	2				
CO5		2	2	1	1	1		1					2	2				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2026-27							
Course Code	CA221	Title of the Course	Web Development	L	T	P	C
Year	II	Semester	III	3	0	2	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To learn web development fundamentals and client server architecture with language of internet & WWW. To learn HTML structure to create Web pages and tells the browser how to display them. To learn CSS (Cascading Style Sheets) for giving style and layout to web pages To learn basics of client-side Java Script for controlling the behavior of different elements of HTML To learn Document Object Model (DOM) and its programming interface for web documents. 						

Course Outcomes	
CO1	Know about web development fundamentals and client server architecture with web browsers, internet & www.
CO2	Understand HTML Hyper Text Markup Language used to create Web pages and tells the browser how to display them
CO3	Able to understand CSS (Cascading Style Sheets) used to style and layout web pages
CO4	Hands on practice on client-side Java Script for controlling the behavior of different elements of HTML
CO5	Implement Document Object Model (DOM) to accomplish programming interface for web documents.

THEORY				
Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Web	Web Development Fundamentals, Internet, Protocols, World Wide Web, concept of create, build, and maintain websites and web applications, Fundamentals of Web Design, Webpages and Website, Web applications, Client Server Architecture, Uniform Resource Locator, http and https, IP Addresses and DNS, Domain Names, Static Web Page vs. Dynamic Web Page, Absolute and Relative Paths, Web Browsers	8	CO1
2	Introduction to HTML	HTML: Introduction to HTML, HTML Structure, HTML Tags, Text Formatting, Linking Documents, Hyperlinks and Sections, Lists, Adding Graphics to HTML Documents, HTML Special Characters, Block and Inline Elements, HTML Tables, HTML Forms, HTML Frames DHTML: Introduction to DHTML, DHTML Technologies: XHTML, CSS, JavaScript, Document Object Model (DOM)	8	CO2
3	CSS and CSS3	Introduction to Cascading Style Sheets (CSS), inline, internal and external CSS, CSS coding best practices, Link CSS to HTML web pages, CSS Selectors and Properties, CSS specificity and inheritance, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties, CSS positioning and display properties, CSS media queries, CSS float and clear properties, CSS selector priority, Shorthand Font Property, tools to inspect and diagnose CSS	8	CO3
4	Introduction to JavaScript	Introduction to JavaScript, Advantages, Limitations, Script element, Client-side Script, alert, confirm and prompt, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, String Operations, Objects and Arrays, Date and Time, Conditional Statements, Switch Case, loops in JavaScript, Cookies, Functions, Event handlers, External Script Files, Popup Boxes, Form Handling, Debugging in JavaScript, Firebug, JavaScript Console Object	8	CO4
5	Document Object Model (DOM)	JavaScript DOM API, DOM Manipulation, Common Element Properties, Access Elements through DOM Tree Structure, HTML DOM Event Model, Common DOM Events, Built-in Browser Objects, DOM Hierarchy, Navigator Object, Screen Object, Document and Location, Manipulate and change HTML elements using DOM	8	CO5

PRACTICAL				
S. No.	Title of Experiments	List of Experiments	Contact Hrs.	Mapped CO
1	Table	<ul style="list-style-type: none"> Create a CV using table tag. Create JavaScript page and call it to the HTML Page. 	2	CO1
2	HTML Tag	<ul style="list-style-type: none"> Create Web Page having one audio and one video file. 	2	CO2

	Multimedia	<ul style="list-style-type: none"> Create Web Page having Media player with Play stop and Pause. 		
3	Frame	<ul style="list-style-type: none"> Create Web Page using Frame (Only three Frame) also link hyperlinks to its target frame. 	2	CO3
	External CSS	<ul style="list-style-type: none"> Create Web Page of Student Registration with proper styling using external CSS. 		
4	Java Script	<ul style="list-style-type: none"> Create Web Page to perform calculation on two numbers (Add, Sub, Mul, Div) using JavaScript. 	2	CO4
	Advanced JavaScript	<ul style="list-style-type: none"> Create a HTML Form with some controls and perform JavaScript Form Validation using client-side data validation. If the form is not valid, the form is not submitted until the errors are fixed. Create Tic Tac Toe Game using JavaScript. 		
5	Advanced JavaScript	<ul style="list-style-type: none"> Design and implement a small website for the University. 	2	CO5

Reference Books:

- Jessica Burdman, "Collaborative Web Development", Pearson Education Asia.
- Ivan Bayross, "HTML, DHTML, JavaScript, Perl CGI", BPB Publication.
- Mark O'Neile, "Web Services – Security", TMH.

e-Learning Source:

- Institutional Learning Management System: Integral Learning Initiative (ILI)
- NPTEL Video Lectures

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO- PSO →	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO ↓																		
CO1	3		1			1		1					1	2				
CO2	3	1	1	1	1								3	1				
CO3	3	1	1					1					1	2				
CO4	2	1	2	1		2							1	1				
CO5	1	1	3			2	1						2	1				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2026-2027

Course Code	CA229	Title of the Course	Java Programming	L	T	P	C
Year	II	Semester	III	3	0	2	4
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To learn the various features of Java and comparing with C++. To learn the Java environment for writing programs and Java program structure. To learn the various Objects oriented features with Java. To learn the Array, String, Exception Handling concepts To learn the concepts of Thread, Package, Applet and implementing them in creating a web page. 						

Course Outcomes

CO1	Able to understand the features of Java Programming Language with Syntax and structure of Java Programs and how to use various operators in Java.
CO2	Able to understand that how to implement the Object-oriented features by writing Java programs.
CO3	Ability to define Arrays, Strings, Vectors, Packages etc. in Java and implementing the Exception handling Mechanism in Java.
CO4	Ability to understand the different concepts to create and use Threads and Packages in Java.
CO5	Ability to understand the different concepts of applets and adding them to a HTML File.

THEORY

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Java Basic	Comparison of C++ and JAVA, JAVA and Internet, JAVA support systems, JAVA environment, JAVA program structure, Tokens, Statements, JVM, Constant and Variables, Data Types, Declaration of variables, Scope of variables, Symbolic constants, Type Casting. Operators: Arithmetic, Relational, Logical assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions and its evaluation.	8	CO1
2	Inheritance	Defining a Class, adding variables and Methods to classes, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control.	8	CO2
3	Arrays	One Dimensional and Two Dimensional, Strings, Vectors, Wrapper Classes. Interface: Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variable. Exception Handling: Concepts of Exceptions, Types of Exception, Try and Catch keyword, Nested Try and Catch.	8	CO3
4	Threads	Creating Threads, Extending Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization. Package: System Packages, Using System Package, adding a Class to a Package, Hiding Classes	8	CO4
5	Applets	Local and Remote Applets, Writing Applets, Applets life cycle, creating an executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing parameters to Applets, Aligning the display, HTML Tags and Applets, Getting input from the user.	8	CO5

PRACTICAL

S. No.	Title of Experiments	List of Experiments	Contact Hrs.	Mapped CO
1	Classes and Objects	<ul style="list-style-type: none"> Program illustrating Classes and Objects. Program illustrating Method Overloading and Method Overriding. 	2	CO1
2	Interface	<ul style="list-style-type: none"> Program illustrating concept of Interface. 	2	CO2
	Inheritance	<ul style="list-style-type: none"> Program illustrating use of Final and Super keyword 		
3	Packages	<ul style="list-style-type: none"> Program that illustrates the following a) Creation of simple package. b) Accessing a package. 	2	CO3
4	Threads	<ul style="list-style-type: none"> Program for creating multiple threads a) Using Thread class. b) Using Runnable Interface. 	2	CO4
	Exceptions	<ul style="list-style-type: none"> Program that illustrates the following a) Handling predefined exceptions. b) Handling user defined exceptions. 		
5	Applets	<ul style="list-style-type: none"> Program to illustrate the concept of Applets. 	2	CO5

Reference Books:

- E. Balagurusamy, "Programming in Java", TMH Publications.
- Peter Norton, "Peter Norton Guide to Java Programming", Techmedia Publications.
- Naughton, Schildt, "The Complete Reference JAVA 2", TMH.

e-Learning Source:

- <https://nptel.ac.in/courses/106105191>
- https://onlinecourses.nptel.ac.in/noc22_cs47

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1		1	1								3	1				
CO2	2		1		1	2		2					3	1				
CO3	2	1	3	1		1	2	1					2	2				
CO4	1	1	2	1		3	1	2					3	1				
CO5	1	1	2	1		2	1						2	1				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2026-2027							
Course Code	CA230	Title of the Course	Software Engineering and Project Management	L	T	P	C
Year	II	Semester	III	3	0	0	3
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> To develop knowledge of phases in software development To develop good quality software and able to maintain quality of software To know the team required for project management. To develop knowledge of tools available for software development. Knowledge of testing and maintain robustness of software 						

Course Outcomes	
CO1	To understand about designing model and practical implementation.
CO2	To take decision of project planning on the basis of cost evaluation.
CO3	To understand risk identification and management.
CO4	To use various tools for software design development.
CO5	To understand importance of quality of software.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Software Product and SDLC	Software Engineering Fundamentals, Definition of Software Products, Phases of Software Development Life Cycle, Software Development Paradigm, Software Life Cycles Models: Build and Fix Model, Waterfall Model, Prototype Model, Iterative Model, Evolutionary Model, Spiral Model, Software Requirements Analysis and Specification: SRS, Characteristics of SRS.	8	CO1
2	Software Design Principles	Software Design, Design Process, Design Principles: Abstraction, Refinement, Modularity, Information Hiding, Modular Design: Effective Modular Design and Functional Independence, Cohesion, Coupling, Top down and Bottom-up Strategies, Coding: Coding Standard and Guidelines, Testing: Black Box Testing and White Box Testing.	8	CO2
3	Software Configuration Management	Concept of Configuration Management. Software Maintenance: Categories of Maintenance, Software Reliability: Reliability, Reliability Metrics, Quality Concept: Quality Control, Quality Assurance, Software Quality, Scheduling Tools, Time Estimation, Resource Allocation, Differentiate Projects, Programs and Business Process, Elements of Proposal Process.	8	CO3
4	CASE Tools	Relevance of CASE Tool: Building block for CASE Tools, Integrated Case Tool Environment, Generation of CASE Tool, High End and Low-End CASE Tools. Project Management Fundamentals: Definition of Project, Project Specification and Parameters, Principles of Project Management, Project Management Life Cycle, Program Management Plan: Concept, Elements, Planning Issues, Benefits of Program Management.	8	CO4
5	Software Project Management, Project Activities	Engineering Task, Management Task, Work Break down Structure: Concept of WBS, Meaning of Product Oriented Deliverable, Features of WBS, Comparison of Functional based vs. product Oriented Deliverability, Resource and Cost Requirements, Software Project Plans, Software Project Estimation, Project Monitoring and Progress Control, Risk Management: Risk Management Plan, Risk Mitigation Strategies, Software Measurement, Project Metrics, Project Audit: Data Collection, Analysis.	8	CO5

Reference Books:

- R. Pressman, "Software Engineering", TMH.
- Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa.
- Rajib Mall, "Fundamental of Software Engineering", PHI.
- Pankaj Jalote, "Software Project Management in Practice", Person Education.

e-Learning Source:

- <https://nptel.ac.in/courses/106105182>
- https://onlinecourses.nptel.ac.in/noc19_cs70/preview

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1	2		1		1	1					3	1				
CO2	1	2	1	1		2		1					2	2				
CO3	3	2		1	1	1							3	1				
CO4		1	3		1	2	2	1					2	2				
CO5	2	1	1	1		2							2	1				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2026-2027							
Course Code	CA231	Title of the Course	Introduction to Data Science	L	T	P	C
Year	II	Semester	III	3	0	0	3
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> ● To introduce the evolution, foundations and significance of Data Science in the digital era. ● To develop an understanding of different types, sources and characteristics of data in modern organizations. ● To explain the concept of data-driven decision-making and its impact on organizational performance and governance. ● To familiarize learners with roles, competencies and ethical responsibilities within the Data Science ecosystem. ● To provide knowledge of real-world applications, emerging trends and future prospects of Data Science including. 						

Course Outcomes	
CO1	Understand the evolution, foundations and significance of Data Science in digital era.
CO2	Analyze different types and sources of data and examine their characteristics and strategic value in organizations.
CO3	Understand the concept of data-driven culture and analyze the role of data in organizational decision-making processes.
CO4	Analyze various roles and competencies in the Data Science ecosystem and understand professional and ethical responsibilities.
CO5	Understand applications of Data Science in different domains and analyze emerging trends.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Data Science	Introduction to Data Science: Evolution and emergence of Data Science in the digital era. Data as a strategic organizational resource. Interdisciplinary foundations of Data Science integrating Statistics, Computer Science and domain expertise. Conceptual distinction between Data Science, Data Analytics, Business Intelligence, Machine Learning and Artificial Intelligence. Significance of data in modern enterprises. Data Science lifecycle or workflow, Role of Data Science in innovation and digital transformation.	8	CO1
2	Nature and Sources of Data	Nature and Characteristics of Data: Types of data – structured, semi-structured, unstructured and streaming data. Sources of data – enterprise systems, web platforms, IoT devices, mobile applications and social networks. Characteristics of modern data and data growth. Economic value of data. Open data initiatives and public dataset repositories (Kaggle, UCI, etc). Overview of data as a competitive advantage in organizations.	8	CO2
3	Data-Driven Organizations and Decision Frameworks	Concept of data-driven culture in organizations. Application of data in strategic, tactical and operational decision-making processes. Performance indicators and metrics in organizational analysis, Impact of data adoption on productivity and governance. Data governance and data quality considerations in organizational decision systems. Challenges in implementing data-driven systems.	8	CO3
4	Data Science Ecosystem and Professional Structure	Roles within the data science ecosystem including Data Analyst, Data Scientist, Data Engineer, Machine Learning Engineer and Business Analyst. Functional scope and competencies associated with data-related roles. Structure of data science teams in organizations. Interdisciplinary collaboration in data initiatives. Professional accountability and ethical responsibility in data-centric functions. Career pathways and emerging skill requirements in Data Science.	8	CO4
5	Applications and Emerging Trends in Data Science	Applications of Data Science in Healthcare, Banking and Finance, E-commerce, Education, Governance, Manufacturing and Smart Cities. Organizational value creation through data utilization. Integration of Artificial Intelligence and advanced analytics in business systems. Role of cloud computing in enabling data innovation. Emerging technologies such as Generative AI, Edge AI and Responsible AI in modern data ecosystems. Emerging trends and future prospects of Data Science.	8	CO5

Reference Books:

- Kalita, J. K., Bhattacharyya, D. K., & Roy, S., “Fundamentals of Data Science: Theory and Practice”, Elsevier.
- Steven S. Skiena, “The Data Science Design Manual”, Springer.
- John D. Kelleher, Brendan Tierney, “Data Science”, MIT Press.

e-Learning Source:

- <https://nptel.ac.in/courses/106106179>
- <https://nptel.ac.in/courses/106105186>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1				2		1					2	2				
CO2	3	3		2		1							3	2				
CO3	2	3	2	2	1		1						2	2				
CO4	2	2			3	2		2					2	3				
CO5	2	2	2	2	1	3	2	3					2	2				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2026-2027							
Course Code	CA232	Title of the Course	Introduction To Artificial Intelligence	L	T	P	C
Year	II	Semester	III	3	0	0	3
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> Explain the fundamental concepts, history, and significance of Artificial Intelligence. Use search algorithms for solving problems in Artificial Intelligence. Describe knowledge representation and reasoning techniques in AI. Understand the basic concepts of machine learning in Artificial Intelligence. Recognize real-world applications of AI and the ethical concerns associated with it. 						

Course Outcomes	
CO1	Understand the basic concepts and history of Artificial Intelligence.
CO2	Apply search algorithms for problem-solving in AI.
CO3	Explain knowledge representation and reasoning techniques.
CO4	Understand the fundamentals of machine learning approaches.
CO5	Identify real-world AI applications and ethical considerations

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Fundamentals of Artificial Intelligence	Introduction to Artificial Intelligence, History and Evolution of Artificial Intelligence, AI Techniques and Characteristics of AI Systems, Applications of Artificial Intelligence, Artificial Intelligence vs Human Intelligence, Intelligent Agents and Agent Environment, Types of Agents (Simple Reflex, Model-Based, Goal-Based, Utility-Based), The Turing Test and the Concept of Machine Intelligence.	8	CO1
2	Search Techniques in AI	Problem Formulation and State Space Representation, Production Systems, Uninformed Search Strategies, Breadth First Search (BFS), Depth First Search (DFS), Uniform Cost Search, Informed Search Strategies- Heuristic Search Techniques, A* Algorithm and Best-First Search.	8	CO2
3	Knowledge Representation and Reasoning	Introduction to Knowledge Representation, Types of Knowledge Representation, Propositional Logic, Predicate Logic (First Order Logic), Inference Rules and Reasoning, Semantic Networks, Frames and Scripts, Rule-Based Expert Systems.	8	CO3
4	Advanced AI Concepts and Intelligent Systems	Introduction to Machine Learning and Natural Language Processing (NLP) in AI, Expert Systems: Concept and Components, Game Playing in AI, Introduction to Logical Representation in AI, Basics of Propositional Logic and Predicate Logic (First Order Logic) in Artificial Intelligence, An overview of Pattern Recognition in Artificial Intelligence	8	CO4
5	AI Applications, Ethics and Tools	Artificial Intelligence in Healthcare, Business and Finance, Education and Smart Systems, Ethical Issues in Artificial Intelligence, Challenges and Risks in AI Deployment, AI Governance, Fairness and Responsible AI, Popular AI Tools and Platforms (TensorFlow, Scikit-Learn, Chatbots, AI APIs), Future Trends of Artificial Intelligence.	8	CO5

Reference Books:

- Rich, E., Knight, K., & Nair, S. B. (2009). Artificial intelligence (3rd ed.). McGraw-Hill Education.
- Nilsson, Nils J. Artificial Intelligence: A New Synthesis. San Francisco: Morgan Kaufmann Publishers, 1998.
- Patterson, D. W. Introduction to Artificial Intelligence and Expert Systems. Prentice Hall of India, 1990.

e-Learning Source:

- <http://kongu.digimat.in/nptel/courses/video/106106126/L01.html>
- <http://kongu.digimat.in/nptel/courses/video/106106126/L02.html>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																		
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO																	
CO1	3	1				2							1	2				
CO2	3	3	2	2		1							3	2				
CO3	3	3	2	2		1							3	2				
CO4	3	3	3	2		2							3	3				
CO5	2	2	2	2	3	2	1	2					2	3				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation