

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0701
Course Title:	Artificial Intelligence
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
2	1	0	-	-	-	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. explain the significance of Artificial Intelligence and knowledge representation,
2. demonstrate the design concepts of control and search strategies in AI Applications,
3. compare different search strategies for a given scenario
4. design applications using Artificial Intelligence.

Syllabus:

Total Teaching hours: 20

Unit	Syllabus	Teaching hours
Unit-I	Introduction to Artificial Intelligence Overview: Knowledge: General concepts, definition and importance of knowledge, knowledge-based system, representation, organization, manipulation and acquisition of knowledge.	02
Unit-II	Problems, Problem Spaces and State Space Search: The AI Problems, The Underlying Assumption, What Is an AI Techniques. Defining the Problems as a State Space Search, Production Systems, Production Characteristics, Production System Characteristics, and Issues in The Design of Search Programs. Search and Control Strategies: Uninformed (Blind) and informed search, DFS, BFS, Heuristic Search Techniques: Generate-And-Test, Hill Climbing, Best-First Search, A*, AO*, Problem Reduction, Constraint Satisfaction.	07
Unit-III	Knowledge Representation: Knowledge Representation Issues, Representations and Mappings, Approaches to Knowledge Representation, Using Predicate Logic Representation Simple Facts in Logic, Resolution. Representing Knowledge Using Rules, Procedural versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning.	05
Unit-IV	Weak Slot-And-Filler Structure: Semantic Nets, Frames Reasoning: Symbolic Reasoning under Uncertainty, Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning. Statistical Reasoning, Probability and Bay's Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dumpster-Shafer Theory.	03
Unit-V	Game Playing: Overview and Example Domain, Min-max Search, Adding	03

Alpha-Beta Cutoffs. Introduction of Expert system.

Self-Study:	The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents
Suggested Readings/ References:	<ol style="list-style-type: none">1. Russel and Norvig, Artificial Intelligence: A modern approach, prentice Hall2. Elaine Rich And Kevin Knight, Artificial Intelligence, Tata McGraw-Hill3. D.W.Patterson, Artificial Intelligence And Expert Systems, Prentice Hall4. D.W.Rolston, Artificial Intelligence And Expert System Development, Mcgraw-Hill5. Ivan Bratko, PROLOG Programming for Artificial Intelligence, Addison-Wesley
Suggested List of Experiments:	-NA-
Suggested Case List:	-NA-

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0702
Course Title:	Machine Learning
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
2	0	2	-	-	-	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. comprehend statistical methods as basis of machine learning domain
2. apply variety of learning algorithms for appropriate applications
3. implement machine learning techniques to solve problems in applicable domains
4. evaluate and compare algorithms based on different metrics and parameters.

Syllabus:

Total Teaching hours: 20

Unit	Syllabus	Teaching hours
Unit-I	Introduction: Motivation and Applications, Visualization, Basics of Supervised and Unsupervised Learning	02
Unit-II	Regression Techniques: Basic concepts and applications of Regression, Simple Linear Regression – Gradient Descent and Normal Equation Method, Multiple Linear Regression, Linear Regression with Regularization, Hyperparameters tuning, Loss Functions. Evaluation Measures for Regression Techniques	07
Unit-III	Classification Techniques: Naïve Bayes Classification, Fitting Multivariate Bernoulli Distribution, Gaussian Distribution and Multinomial Distribution, K Nearest Neighbours, Decision trees. Support Vector Machines: Hard Margin and Soft Margin, Kernels and Kernel Trick. Evaluation Measures for Classification Techniques	09
Unit-V	Advanced Concepts: Introduction to SVM, ANN, Basics of Semi-Supervised and Reinforcement Learning, introduction to deep learning.	02

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings:

1. Tom Mitchell, Machine Learning, TMH
2. C. Bishop, Pattern Recognition and Machine Learning, Springer
3. R. O. Duda, P. E. Hart and D. G. Stork, Pattern Classification and Scene Analysis, Wiley
4. Kishan Mehrotra, Chilukuri Mohan and Sanjay Ranka, Elements of Artificial Neural Networks, Penram International
5. Rajjan Shinghal, Pattern Recognition, Techniques and Applications, OXFORD
6. Ethem Alpaydin, Introduction to Machine Learning, PHI

Suggested List of Experiments:

Sr. No.	Title	Hours
1	Introduction to Python and Numpy.	02
2	Introduction to Pandas, Matplotlib and Sklearn.	02
3	Simple and multiple linear regression using Gradient Descent without regularization. (Without using sklearn or equivalent library for both)	02
4	Simple and Multiple linear regression using Gradient Descent and Normal equation with regularization.	02
5	K-nearest Neighbours classifications.	02
6	Naïve bayes classification using Multivariate Bernoulli and Multinomial distribution.	02
7	Naïve bayes classification using Gaussian distribution.	02
8	Decision Tree classification.	02
9	Implementation of Support Vector Machine for linearly separable data.	02
10	Implementation of Support Vector Machine for non-linearly separable data.	02

Suggested Case List: -NA-

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0703
Course Title:	Information Security
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	1	0	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. illustrate principles and problems of cryptosystems for encryption, digital signing and authentication
2. infer the role of mathematics of cryptography
3. choose appropriate cryptographic technique for developing a secured network
4. implement the cryptographic algorithms

Syllabus:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
Unit-I	Security Overview: Significance of Information and network security, what are the hurdles in achieving the same, introduction to Cryptography	02
Unit-II	Classical Encryption Techniques: Caesar Cipher, Monoalphabetic substitution, Playfair Cipher, Polyalphabetic substitution, Transposition Techniques	06
Unit-III	Symmetric Ciphers: Block Ciphers and DES, Advanced Encryption Standard (AES), Block Cipher Operations, Key Distribution	05
Unit-IV	Mathematics: Pseudo Random Number Generation and Stream Ciphers, Mathematical Background (Fermat's Little Theorem, Euler Totient Function, Euler's Theorem Chinese Remainder Theorem etc.)	10
Unit-V	Public Key Cryptography: RSA, Elliptic Curve Cryptography, DiffieHelman Key Exchange, Digital Signatures, Key Distribution	05
Unit -VI	Overview of Hash and MAC Functions and Digital Signature Standards	02

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:	<ol style="list-style-type: none"> 1. William Stallings, “Cryptography and Network Security: Principles and Practice, Pearson 2. D. R. Stinson: Cryptography: Theory and Practice (Discrete Mathematics and Its Applications), CRC Press. 3. B. Schneier: Applied cryptography: protocols, algorithms, and source code in C, John Wiley & Sons. 4. Bernard Menezes: Network Security & Cryptography, 1st Edition
Suggested List of Experiments:	-NA-
Suggested Case List:	-NA-

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0704
Course Title:	Software Project Management and Quality Assurance
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. interpret various phases of software project management and quality assurance
2. apply the feasibility analysis in project management and network analysis tools for cost and time estimation.
3. implement a quality software project through effective team-building, planning, scheduling and risk assessment
4. develop skills to use modern software project management and development tools

Syllabus: Total Teaching hours: 30

Unit	Syllabus	Teaching hours
Unit-I	Software Project Management Concepts: The Management Spectrum, People, The Product, The Process, The W ⁵ HH Principle Project Scheduling: Management Activities, Project Planning, Project Scheduling, The Relationship Between People and Effort, defining a Task Set for the Software Project, Activity Network, Time-Line Chart	06
Unit-II	Process and Project Metrics: Metrics in Process and Project Domains, Software Measurement, Size-Oriented Metrics, Function-Oriented Metrics, UseCase-Oriented Metrics, Metrics in Software Quality, Defect Removal Efficiency, Integrating Metrics within the Software Process Estimation for Software Projects: LOC-based Estimation, FP-based Estimation, UseCase-based Estimation, COCOMO I and II Model, Estimation of Object-Oriented Projects, The Make/Buy Decision	08
Unit-III	Risk Management: Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring, and Management, The RMMM Plan Project Execution and Closure: Reviews, Project Monitoring and Control, Project Tracking, Milestone Analysis, Defect Analysis and Prevention, Project Closure	05

Unit-IV	Quality Concepts: Software Quality, Software Quality Requirements, Software Quality Models, Software Quality Standards Review Techniques: Cost Impact of Software Defects, Defect Amplification and Removal, Review Metrics and Their Use, Informal Reviews, Formal Technical Reviews	05
Unit-V	Software Quality Assurance: Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The SQA Plan Software Configuration Management: SCM Activities, Baselines, Software Repository and Its Branches, Configuration Control, Software Configuration Audit	06

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

- Suggested Readings/References:
1. Roger Pressman, Software Engineering A Practitioner's Approach, McGraw Hill Publication
 2. Claude Y. Laporte, Alain April, Software Quality Assurance, Wiley
 3. PankajJalote, Software Project Management in Practice, Addison-Wesley Professional
 4. Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson Education
 5. Ian Sommerville, Software Engineering, Addison – Wesley

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	Define modules of a software project & design the project plan (Using Microsoft Project) for the same and identify deliverables with time line.	04
	2	To explore and perform software project management using Zepel tool.	02
	3	To explore and perform software project development using JIRA tool.	02
	4	To explore and perform software project management and development using Github tool.	02
	5	To explore and perform project functionalities using Kanbanize tool.	02
	6	To explore and perform testing for quality assurance using Jenkins tool.	04
	7	To explore and perform project management activities using GitLab tool.	04

Suggested Case List: -NA-

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0705
Course Title:	Web Technologies
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
2	0	4	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. interpret the basic structure of web designing technologies
2. apply the concepts of web technologies in designing static and dynamic web pages
3. design interactive web pages incorporating validation techniques

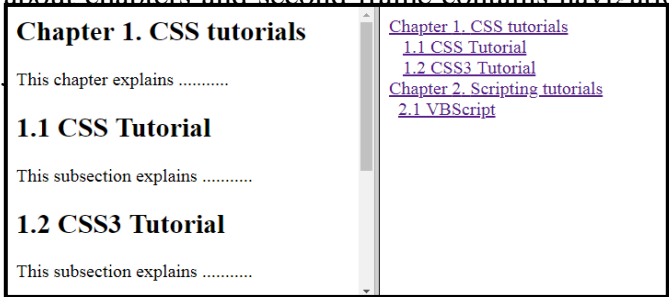
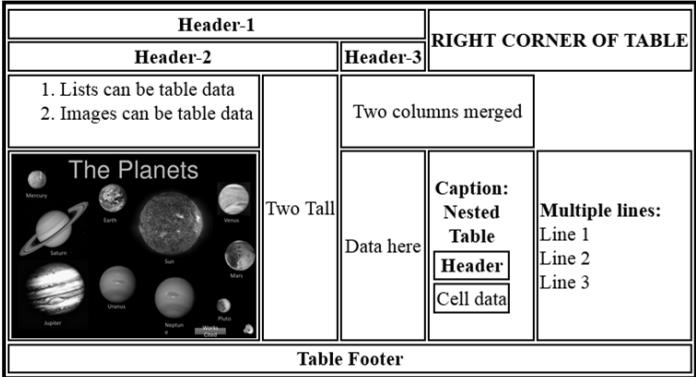
Syllabus:

Total Teaching hours: 20

Unit	Syllabus	Teaching hours
Unit-I	Introduction to various HTML tags: Introduction to HTML, HTML Documents, HTML Structure tags, HTML Block level tags, HTML Text level tags, Different types of Lists, Nesting of lists, Linking HTML Documents, Frames, tables and forms.	07
Unit-II	Cascaded Style Sheets: What are style sheets, importance of CSS, Different approaches to style sheets, Using Multiple approaches, linking to style information in separate file, setting up style information using inline, internal and external style sheet.	06
Unit-III	JavaScript: Introduction to JavaScript, JavaScript syntax, variables and their types, JavaScript operators, arrays and array methods, Control statements, built - in objects in JavaScript, Array, String, Math, Date objects, validation using JavaScript.	07

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/References:	<ol style="list-style-type: none"> 1. Harvey M. Deitel, Paul J. Deitel, Tem R. Nieto, Internet and World Wide Web: How to Program, Pearson 2. Scott Parker, Paperback, The Web Designer's 101 Most Important Decisions Professional Secrets for a Winning Website 3. Html5 Black Book: Covers Css3, Javascript, Xml, Xhtml, Ajax, Php and JQuery, Kogent Learning Solutions Inc. (Dreamtech Press). 4. <u>Jon Duckett</u>, Beginning Web Programming with Html, XHTML andCSS, Wiley
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Suggested List of Experiments:	Sr. No.	Title	Hours
	1	<p>A. Design a home page which will display your information i.e., resume.</p> <p>B. Demonstrate various list types using appropriate example</p>	04
	2	<p>A. Create a HTML page which contains the two frames using frameset tag. First frame contains the details about chapters and second frame contains navigation</p> 	04
		<p>B. Demonstrate an image map using map of India in HTML. Once we click on specific state, it will open another page with stateimage.</p>	
	3	<p>Design a web page for the following:</p> <p>A. Design the table as given below:</p> <p style="text-align: center;">Caption: Table Example</p> 	04
		<p>B. Create a registration form of your choice. Use appropriate form tags.</p>	
	4	<p>Design the web pages that demonstrate following concepts:</p> <p>A. Font properties</p> <p>B. Background properties</p> <p>C. Box shadow, Margin, Padding and Outline properties.</p>	04
	5	<p>Create the web pages that demonstrate following concepts:</p> <p>A) Demonstrate various border styles on HTML elements.</p> <p>B) Write a code on four div elements as shown in below given figure:</p>	04



- 6 Create the web pages that demonstrate following concepts:
- A) Develop HTML code that displays horizontal navigation menu bar using unordered list.
 - B) Demonstrate Table and Column properties. Refer the following figure as sample:

Book Auctions

04

AUTHOR	TITLE	RESERVE PRICE	CURRENT BID
Herbert Schildt	MFC Programming from the GROUND UP	₹ 525.00	₹ 600.00
Julia and Anitha	Programming in Visual Basic .Net		₹ 700.00
B.M. Harwani	Android Programming UNLEASHED	₹ 789.00	₹ 910.00
Cay and Gary	Core Java		₹ 625.00

- 7
- A. Write a JavaScript that takes an integer value and display the number with its digits in reversed order.
 - B. Write a JavaScript that read a set of N single digits and convert them into single decimal integer. For example, the script should convert the set of 4 digits {9,3,1,6} to decimalinteger 9316.
- 8
- A. Write a JavaScript code to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's and 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's).
 - B. Design the web page which have simple guessing number game. Write a JavaScript function which generate random number in between 1 to 200. Give user 5 attempts to guess the random number. If user guess it correctly then change the background color of web page to yellow and if user fail to guess the number after the 5 attempts than change the background color of web page to orange.
- 04

- 9 A. Write a JavaScript function that obtain a list of person names from the user, store each name in an array. When user enters "END", it terminates scanning. Sort the name into ascending order and then display each name in new line on web page. 04
- B. Write a JavaScript to display the current date, current time and display the appropriate greeting message according to time slot (e.g. : Morning, 20/05/2019 08:00:00 AM)
- 10 Design the web page to demonstrate the validation of following fields. Write a JavaScript to validate each field as per its valid format and given validation criteria.
- i) IP address
- ii) Alphanumeric values only 04
- iii) Date in DD/MM/YYYY format
- iv) Special symbol restriction
- v) Email must be in proper form.
- vi) Phone number should be minimum of 10 digits
- vii) Required field validation
- viii) Password and retype password must be same

Suggested
Case List:

-NA-