

**BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE**

**COURSE PLAN**

<b>Title of Course</b>	<b>:</b>	<b>Machine Learning</b>	<b>Course Code</b>	<b>:</b>	<b>UCS761C</b>
<b>Credits</b>	<b>:</b>	<b>3</b>	<b>Contact Hours/ Week</b>	<b>:</b>	<b>3</b>
<b>Total Hours</b>	<b>:</b>	<b>40</b>	<b>Tutorial Hours</b>	<b>:</b>	<b>0</b>
<b>CIE Marks</b>	<b>:</b>	<b>50</b>	<b>SEE Marks</b>	<b>:</b>	<b>100</b>
<b>Semester</b>	<b>:</b>	<b>5</b>	<b>Year</b>	<b>:</b>	<b>2023-24</b>

**Prerequisites:**

Mathematics, Data Structures and Algorithms

**Course Objectives:**

	<b>The Course objectives are:</b>
1	To introduce students to the basic concepts and techniques of Machine Learning.
2	To become familiar with regression methods, classification methods, clustering methods.
3	To become familiar with Dimensionality reduction Techniques.

**Course Outcomes:**

	<b>At the end of the course the student should be able to:</b>
1	Define machine learning and types of learning algorithms
2	Explain various machine learning algorithms
3	Apply machine learning algorithm to solve problems of moderate complexity
4	Analyze performance of algorithms by varying some parameters
5	To formulate machine learning model for the simple problems

**Course Articulation Matrix: Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes (PSO)**

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No	<b>Programme Outcomes</b> <b>Course Outcomes</b>															
<b>The students will be able to:</b>																
1	Define machine learning and types of learning algorithms		1	1	1									1		1
2	Explain various machine learning algorithms	1	2	2	2									2		2
3	Apply machine learning algorithm to solve problems of moderate complexity	1	3	3	2	3								3		3
4	Analyze performance of algorithms by varying some parameters	1	3	3	3	3								3		3
5	To formulate machine learning model for the simple problems	1	3	3	3	3								3		3

**Competencies Addressed in the course and Corresponding Performance Indicators**

**Programme Outcome: Any of 1 to 12 PO's:**

<b>Competency</b>	<b>Indicators</b>
1. Identify complex engineering problem	i. Students should be able to identify problems that require ML solutions ii. Identify the domains where ML models may be developed
2. Design a system and identify system requirements	iii. Analysis of the problem, represent the knowledge iv. Encode the knowledge v. Augment the knowledge vi. Analyze the complexity of the solution
3. Consideration for public health, safety	vii. Designing systems for healthcare viii. Employ knowledge representation, search, model building and training, and model validating
4. Cultural, societal and environmental considerations	ix. Applying the ML for societal needs and environmental protection, especially the problems in agriculture,

	forestry, healthcare, telemonitoring, ensuring social and ethical responsibilities.
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**PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Unit Learning Outcomes (ULO):**

	<b>Unit Learning Outcome (ULO)</b>	<b>CO</b>	<b>BLL</b>	<b>PI addressed</b>
	<b>UNIT-I</b>			
1.1	To introduce ML	<b>CO1</b>	<b>2</b>	<b>i, ii</b>
1.2	To identify the real life problems which can be solved by ML	<b>CO1</b>	<b>2</b>	<b>i, ii</b>
1.3	To understand how to formulate a problem by considering design issues of learning system	<b>CO4</b>	<b>4</b>	<b>Vii,viii</b>

1.4	To apply linear regression and concept learning to solve real problems	CO3	3	i, ii, iii, iv, viii, ix,
<b>UNIT-II</b>				
2.1	To explain and apply a decision tree algorithm to solve ML problems	CO3, CO2	3	i, ii, iii, iv, viii, ix
2.1	To explain Neural Network Representations	CO2	2	i,ii,iii
2.2	To identify Appropriate Problems For Neural Network Learning	CO1	1	i, ii
2.3	To derive back propagation algorithm.	CO2	4	viii
2.4	To design an ANN system for face recognition problem	CO5	3	i, ii, iii, iv, viii, ix,
<b>UNIT-III</b>				
3.1	To understand the concept of Baye's learning and identify the problems to be solved by it.	CO1	2	i, ii
3.2	To derive various relationships like Maximum likelihood and least squared hypothesis, Maximum likelihood hypothesis and predicting probabilities,	CO4	4	viii
3.3	To explain and apply a Naive Bayes classifier and design Naive Bayes classifier for text recognition	CO3, CO2, CO5	3	i, ii, iii, iv, viii, ix,
3.4	To understand and apply k-Nearest Neighbor Learning algorithm to various problems	CO3, CO2	2, 3	i, ii, iii, iv, viii, ix,
3.5	To describe Radial Basis function and case based reasoning	CO2	2	Ii, vi
3.6	To acquire knowledge on Dimensionality Reduction (DR) and its categories	CO2	2	iii, iv, v, vi
3.7	To describe and apply various DR techniques/algorithm such as PCA and LDA.	CO3	3	iii, iv, v, vi
<b>UNIT-IV</b>				
4.1	To explain and apply the various clustering algorithm	CO3, CO2	3	iii, iv, v, vi
4.2	To understand the performance evaluation of all ML algorithms	CO4	2	viii
4.3	To evaluate the performance of ML algorithms	CO4	4	viii
<b>UNIT-IV</b>				

**Course Content:**

Hours Required	Topic to be covered	Mode of Delivery
01	<b>Introduction:</b> What is Machine Learning? Examples of Machine Learning Applications	i. Chalk and talk in classroom
01	Well posed learning problems	ii. Lecture combined with discussions
01	Designing Learning System	iii. Assignments
01	Perspectives and issues in Machine Learning.	iv. Group Assignment
01	<b>Decision Tree Learning:</b> Introduction, Decision	

	tree representation	
01	Appropriate problems for decision tree learning	
01	the basic decision tree learning algorithm	
01	the basic decision tree learning algorithm Contd..	
01	Hypothesis space search in decision tree learning	
01	Inductive Bias in decision tree learning, Issues in decision tree learning	
01	<b>Artificial Neural Networks (ANN):</b> Introduction, Neural Network Representations	i. Lecture combined with discussions
01	Appropriate Problems For Neural Network Learning	ii. Tutorial
01	Perceptron	iii. Assignments
01	Multilayer Networks And The Back propagation Algorithm	iv. Group Assignment
01	Remarks On The Back propagation Algorithm	v. Presentations on real time applications
01	An Illustrative Example: Face Recognition.	
01	<b>Kernel Machines:</b> Introduction, Optimal Separation Hyper plane	
01	the non separable case: soft margin hyper plane, V-SVM	
01	Kernel Trick, Vectorial Kernels, Defining kernel, Multiple kernel learning	
01	Multiclass kernel machines, kernel machine for regression, One class kernel machine	
01	<b>Bayesian learning:</b> Introduction, Bay's theorem	i. Lecture combined with discussions
01	Maximum likelihood and least squared hypothesis, Maximum likelihood hypothesis for predicting probabilities	ii. Tutorial
01	Minimum Description length principle, Bay's optimal classifier	iii. Demonstration
01	Gibbs algorithm, Naive Bay's Classifier	iv. Group Assignment
01	An Example: Classify Text.	v. Seminars, Presentations
01	An Example: Classify Text Contd..	
01	Bayesian Belief networks, EM Algorithm	
01	<b>Instance Based Learning:</b> Introduction, k-Nearest Neighbor Learning	
01	Locally Weighted Regression	
01	Radial Basis function, and case based reasoning	
01	<b>Dimensionality Reduction:</b> Introduction, Subset Selection	i. Lecture combined with discussions
01	Principal Components Analysis	ii. Assignments
01	Principal Components Analysis Contd..	iii. Demonstration
01	Factor Analysis	iv. Group Assignment
01	Multi dimensional scaling	v. Presentations
01	Linear discrediminant analysis, isomap, Locally Linear Embedding	
01	<b>Clustering:</b> Introduction, Mixture Densities	
01	K-means Clustering	

01	Maximization Algorithm	
01	Mixture Latent Variable models, Supervised learning after clustering	

**Review Questions:**

i. Students should be able to identify problems that require ML solutions																											
ii. Identify the domains where ML models may be developed																											
iii. Analysis of the problem, represent the knowledge																											
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ix. Applying the ML for societal needs and environmental protection, especially the problems in agriculture, forestry, healthcare, telemonitoring, ensuring social and ethical responsibilities.																											
<b>Review Questions</b>		<b>ULO</b>	<b>BLL</b>	<b>PI addressed</b>																							
<b>UNIT-I</b>																											
What do you mean by a well –posed learning problem? Explain with example, the important features that are required to well – define a learning problem.		1.2	<b>2</b>	i																							
Is regression a supervised learning technique? Justify your answer. Compare regression with classification with examples.		1.1	<b>2</b>	i,ii																							
Design a checkers problem as a learning problem using various stages of machine learning		1.3	<b>3</b>	ii, vii																							
Write the steps of ID3 Algorithm. Also explain the structure of its hypothesis space.		1.4	<b>2</b>	vii, viii,ix																							
Explain with an example how ID3 algorithm can be improved to incorporate continuous valued attributes		1.4	<b>4</b>	iii																							
Consider the following set of training examples:		1.4	<b>3</b>	viii																							
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Instance</th> <th>Class</th> <th>A1</th> <th>A2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+</td> <td>T</td> <td>T</td> </tr> <tr> <td>2</td> <td>+</td> <td>T</td> <td>T</td> </tr> <tr> <td>3</td> <td>-</td> <td>T</td> <td>F</td> </tr> <tr> <td>4</td> <td>+</td> <td>F</td> <td>F</td> </tr> <tr> <td>5</td> <td>-</td> <td>F</td> <td>T</td> </tr> </tbody> </table>		Instance			Class	A1	A2	1	+	T	T	2	+	T	T	3	-	T	F	4	+	F	F	5	-	F	T
Instance	Class	A1			A2																						
1	+	T			T																						
2	+	T			T																						
3	-	T			F																						
4	+	F			F																						
5	-	F	T																								
i. What is the entropy of this collection with respect to class?																											
ii. Construct the Decision tree using ID3 algorithm.																											
<b>UNIT-II</b>																											
Explain the concept of a Perceptron with a neat diagram. Is Perceptron can be used to implement XOR gate? Justify your answer with example.		2.1	4	iii, ix																							
What is Gradient Descent? Derive Gradient Descent rule.		2.3	4	vi																							

Write the significance of gradient descent rule over the perceptron training rule.																																															
Discuss the application of ANN which is used for learning to steer an autonomous vehicle.	2.4	2	viii, ix																																												
Explain encoding input and output in face recognition system (ANN-system)	2.4	4	iv																																												
What is the significance of sigmoid unit? Calculate the output 'O' of 'Y' in the following figure, Where 'Y' is sigmoid unit.	2.2	3	viii																																												
What is hyper plane? Explain multiple kernel learning.	2.5	2	i.ii																																												
<b>UNIT-III</b>																																															
A patient takes lab test and the result comes back positive. It is known that the test returns a correct positive result in Only 98% of the cases and a correct negative result in only 97% of the cases. Furthermore, only 0.008 of the entire population has this disease. I. What is the probability that this patient has cancer? II. What is this probability that he does not have cancer? III. What is the diagnosis?	3.1	6	viii, ix																																												
Derive the relationship between Maximum Likelihood and Least Square Error Hypothesis.	3.2	4	vi																																												
Use the Naïve Bayes classifier to classify the car (red, SUV, Domestic). Given the data.	3.3	4	viii,ix																																												
<table border="1"> <thead> <tr> <th>Color</th> <th>Type</th> <th>Origin</th> <th>Stolen</th> </tr> </thead> <tbody> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>Yellow</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>Yellow</td><td>Sports</td><td>Imported</td><td>Yes</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>No</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>Yes</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Domestic</td><td>No</td></tr> <tr><td>Red</td><td>SUV</td><td>Imported</td><td>No</td></tr> <tr><td>Red</td><td>Sports</td><td>Imported</td><td>Yes</td></tr> </tbody> </table>	Color	Type	Origin	Stolen	Red	Sports	Domestic	Yes	Red	Sports	Domestic	No	Red	Sports	Domestic	Yes	Yellow	Sports	Domestic	No	Yellow	Sports	Imported	Yes	Yellow	SUV	Imported	No	Yellow	SUV	Imported	Yes	Yellow	SUV	Domestic	No	Red	SUV	Imported	No	Red	Sports	Imported	Yes			
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Describe with example K-Nearest Neighbour learning algorithm for the following. i. Discrete valued target function ii. Continues valued target function	3.4	2	iii																																												
Explain CADET System using Case based reasoning	3.5	5	vi																																												

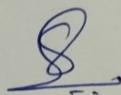
Given the dataset.	3.4	2	vii, ix																														
<table border="1"> <thead> <tr> <th>Age</th> <th>BP</th> <th>Cholestorol</th> <th>Heart rate</th> <th>Chest pain</th> </tr> </thead> <tbody> <tr> <td>29</td> <td>130</td> <td>250</td> <td>187</td> <td>1</td> </tr> <tr> <td>37</td> <td>130</td> <td>204</td> <td>172</td> <td>1</td> </tr> <tr> <td>41</td> <td>120</td> <td>236</td> <td>178</td> <td>0</td> </tr> <tr> <td>56</td> <td>120</td> <td>354</td> <td>163</td> <td>0</td> </tr> <tr> <td>57</td> <td>140</td> <td>192</td> <td>148</td> <td>1</td> </tr> </tbody> </table>	Age	BP	Cholestorol	Heart rate	Chest pain	29	130	250	187	1	37	130	204	172	1	41	120	236	178	0	56	120	354	163	0	57	140	192	148	1			
Age	BP	Cholestorol	Heart rate	Chest pain																													
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37	130	204	172	1																													
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57	140	192	148	1																													
Classify the patient with (age=45, BP=126, Cholestorol=245, heart rate= 175) using weighted KNN algorithm with k=1, k=3.																																	
<b>UNIT-IV</b>																																	
Why we need a dimensionality reduction? Differentiate between feature selection and feature extraction methods of dimensionality reduction	4.1		iii, iv																														
Use the PCA to transform following data.	4.2	2	iii,iv																														
<table border="1"> <tbody> <tr> <td><b>2</b></td> <td><b>4</b></td> </tr> <tr> <td><b>1</b></td> <td><b>3</b></td> </tr> <tr> <td><b>0</b></td> <td><b>1</b></td> </tr> </tbody> </table>	<b>2</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>1</b>																											
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<b>1</b>	<b>3</b>																																
<b>0</b>	<b>1</b>																																
What is non-Linearity in data? Briefly describe Multidimensionality Scaling.	4.2	4	iii,																														
Calculate within-class scatter matrix( $S_w$ ) and between-class scatter matrix ( $S_b$ ) for the following data.	4.2	5	ix																														
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Explain in brief methods of hierarchical clustering.	4.3	2	vi																														

**Evaluation Scheme:**

Assessment	Marks	Weightage
CIE-I	20	20
CIE-II	20	20
Assignments/ Quizzes/ Case Study/ Course Project/ Term Paper/Field Work	10	10
SEE	100	50
<b>Total</b>	<b>150</b>	<b>100</b>

**Details of Assignment:**

Assignment	Marks (10)	CO	PI	CA	PO
Assignment 1: writing answer for review questions on UNIT-I, writing a python program to solve a given problem using decision tree algorithm	2	CO1, CO2, CO3, CO4, CO5	i, ii, lii,iv, v, vi, vii, viii, ix	1, 2, 3,4	1,2, 3, 4, 5, 6, 7, 9
Assignment 2: writing answer for review questions on UNIT-II, writing a python program to solve a given problem using ANN	2	CO1, CO2, CO3, CO4, CO5	i, ii, lii,iv, v, vi, vii, viii, ix	1, 2, 3,4	1,2, 3, 4, 5, 6, 7, 9
Assignment 3: writing answer for review questions on UNIT-III, writing a python program to solve a given problem using Bayes Learning	2	CO1, CO2, CO3, CO4, CO5	i, ii, lii,iv, v, vi, vii, viii, ix	1, 2, 3,4	1,2, 3, 4, 5, 6, 7, 9
Assignment 4: writing answer for review questions on UNIT-IV, writing a python program to solve a given problem using any DR technique	2	CO1, CO2, CO3, CO4, CO5	iii, iv, v, vi	1, 2, 3,4	1,2, 3, 4, 5, 6, 7, 9
Assignment 5: writing a python program to solve a given problem using KNN and Kmean clustering algorithm	2	CO1, CO2, CO3, CO4, CO5	i, ii, lii,iv, v, vi, vii, viii, ix	1, 2, 3,4	1,2, 3, 4, 5, 6, 7, 9



Smita Gou



Professor and Head  
Department of Computer Science and Engineering  
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Badaikot 587100

## BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE

### COURSE PLAN

Title of Course	: User Experience Design	Course Code	: UCS073E
Credits	: 3	Contact Hours/ Week	: 3
Total Hours	: 40	Tutorial Hours	: 0
CIE Marks	: 50	SEE Marks	: 100
Semester	: 5	Year	: 2023-224

#### Prerequisites:

#### Course Objectives: Objective of the Course

The aim of the UXDesign course is to provide

Students with the knowledge of user- centred design, user -centred methods in design, graphic design on screens, simulation and prototyping techniques, usability testing methods, interface technologies and user centred design in corporate perspective.

#### Course Outcomes

CO	Students will be able to
CO1	Explain iterative user-centered design of graphical user interfaces and user experience.
CO2	Apply the user Interfaces to different devices and requirements.
CO3	Describe the components of user experience, especially emotional impact.
CO4	Design better user experience through user interfaces
CO5	Create high quality professional documents and artifacts related to the design process.

CO-PO Mapping																
	Subject/Subject Code:	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No	Programme Outcomes Course Outcomes															
The students will be able to:																
1	Explain iterative user-centered design of graphical user interfaces and user experience.		3		2			2	1	2	3		3	3		
2	Apply the user Interfaces to different devices and requirements.		3		2				1	3			3	3		
3	Describe the components of user experience, especially emotional impact.	3							1	2	3		3	3		
4	Design better user experience through user interfaces	3						2	1	2	3		3			
5	Create high quality professional documents and artifacts related to the design process.								1	2	3		3			

#### Competencies Addressed in the course and Corresponding Performance Indicators

**Programme Outcome: Any of 1 to 12 PO's:**

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

<b>Competency</b>	<b>Indicators</b>
1. Identify complex engineering problem	i. Students should be able to identify problems that require better user Experience ii. Identify the domains where smart Systems may be developed
2. Design a system and identify system requirements	iii. Analysis of the problem, represent the knowledge iv. Encode the knowledge v. Augment the knowledge vi. Analyze the complexity of the solution
3. Consideration for public health, safety	vii. Designing systems with better usability . viii. Employ knowledge representation, search, inference, and reasoning abilities
4. Cultural, societal, and environmental considerations	ix. Bringing in Better user experience for all class of users in different domain applications.

**PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Unit Learning Outcomes (ULO):**

Unit Learning Outcome (ULO)	CO	BLL	PI addressed
The user experience (UX) is <b>how a user interacts with and experiences a product, system or service</b> . It includes a person's perceptions of utility, ease of use, and efficiency.	1,2	1,2,4	i, ii, iii, iv, v, and vi
Analyse various control strategies and solve problems considering user characteristics	3	3,5	vii
Apply reasoning under inconsistency and uncertainties	4	3,4	viii
Demonstrate the knowledge of user survey. and intelligent planning	5	2, 6	ix

**Course Content:**

Hours Required	Topic to be covered	Mode of Delivery
01	User Interface Design (UI	i. Chalk and talk in classroom ii. Lecture combined with discussions iii. Assignments iv. Group Assignment
01	) -The Relationship Between UI and UX ,	
01	Roles in UI/UX, A Brief Historical Overview of Interface Design, Interface Conventions	
01	, Approaches to Screen Based UI, Template vs Content,	
01	Formal Elements of Interface Design,	
01	Active Elements of Interface Design.	
02	, Composing the Elements of Interface Design,	
02	UI Design Process	
01	Visual Communication design component in Interface Design	
01	The User Interface Design process-	
01	Obstacles, Usability, Human characteristics in Design,	
01	Human Interaction speeds,	
02	Business functions-Business definition	
02	requirement analysis, Basic business functions,	
02	Design standards	
01	UX Basics- Foundation of UX design,	
01	Good and poor design,	
01	Understanding Your Users,	
01		i. Lecture combined with discussions ii. Tutorial iii. Demonstration iv. Group Assignment

01	Designing the Experience-Elements of user Experience,	v. Seminars, Presentations vi. Group Discussion
01	Visual Design Principles,	
01	Functional Layout,	
01	Interaction design,	
01	Introduction to the Interface,	
01	Navigation Design,	
01	User Testing,	
02	Developing and Releasing Your Design	
01	User Study- Interviews,	i. Lecture combined with discussions ii. Assignments iii. Demonstration iv. Group Assignment v. Seminars, Presentations
01	writing personas:	
01	user and device personas	
01	, User Context, 2	
01	Building Low Fidelity	
01	Wireframe and High-Fidelity	
01	Polished Wireframe Using	
01	wireframing Tools,	
01	Creating the working Prototype using Prototyping tools,	
01	Sharing and Exporting Design	

### Review Questions:

i. Students should be able to identify problems that require better usability solutions			
ii. Identify the domains where user experience is important concern			
iii. Analysis of the problem, represent the visibility design			
iv. Encode the knowledge			
v. Augment the knowledge			
vi. Analyze the usability of the solution			
vii. Designing systems for user comfort			
viii. Employ knowledge out of user survey			
ix. Conduction of user tests			
Review Questions	ULO	BLL	PI addressed
Define the term Usability. Describe the usability assessment process in UI design path.	1	1	i
Write about some practical measures of Usability	1	2	i
a. Write comments on important human characteristics that are to be considered in UI design	1	2	ii
Describe the principles of Interface screen design	4	6	vii
a. What are menus? Describe types of menus highlighting advantages of each type in UI design.	1	3	ii
b. Brief about guidelines for formatting menus.	1	2	i
Give all the details of design of aUI where many types of menus are used. Take a suitable example and describe formatting, content and functions of menus.	1	2	iv
Define user Interface Design. Explain the Importance and benefits of Good Design.	1	2	v

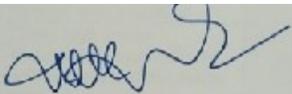
List and Explain Characteristics of Graphical User Interface(GUI).	2	5	viii
Briefly Explain the General Principles of user Interface Design.	2	3	iii
List and Explain the Pitfalls in Development Path of Design process.	4	6	viii
Discuss the advantages and limitations of graphical systems	1	4	iv
Describe the concept of direct manipulation	2	4	iv
Assume that you are suppose to design a college website(Web Interface) give all the design details concept wise. .	2	2	x
What is User Experience (UX) design?	3	5	vi
What is your design process?	3	2	x
describe the difference between user interface (UI) design and UX design?	4	2	iii
What is a user persona and why is it important in UX design?	3	2	viii
How do you approach information architecture?	4	4	vii
What are some common UX design principles?	3	5	x

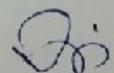
#### Evaluation Scheme:

Assessment	Marks	Weightage
CIE-I	40	20
CIE-II	40	20
Assignments/ Quizzes/ Case Study/ Course Project/ Term Paper/Field Work	10	105
SEE	50	50
<b>Total</b>	<b>100</b>	<b>100</b>

#### Details of Assignment:

Assignment	Marks (10)	CO	PI	CA	PO
Assignment 1:	2	1	i, ii	1	1,2
Assignment 2: Seminar on a given topic related	2	2	lii, iv	2	3,4
Assignment 3:	2	3	v, vi	2	5
Assignment 4: Preparing a PPT for the given topic, related to A design	2	4	vii, viii	3	6
Assignment 5: Designing in Figma environment	2	5	ix	4	12

  
 Dr. Vilas Naik

  
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**BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE**

**COURSE PLAN**

<b>Title of Course</b>	: Software Testing	<b>Course Code</b>	: UCS039E
<b>Credits</b>	: 3	<b>Contact Hours/ Week</b>	: 3
<b>Total Hours</b>	: 40	<b>Tutorial Hours</b>	: 0
<b>CIE Marks</b>	: 50	<b>SEE Marks</b>	: 100
<b>Semester</b>	: VII	<b>Year</b>	: 2023-24

**Prerequisites:** Software Engineering

**Course Objectives:**

	<b>The Course objectives are:</b>
1	<i>Become familiar</i> the importance of software quality/software testing and apply software testing techniques for information systems development.
2	Generate test cases from software requirements using various test processes for continuous quality improvement.
3	Apply software testing techniques in commercial environments and assess the adequacy of test suites using control flow, data flow, and program mutation.
4	<i>Develop the abilities</i> to identify the inputs and deliverables of the testing process and work together as a team in preparing a report.
5	Use industry-standard testing tools for real time applications.

**Course Articulation Matrix: Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes (PSO)**

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No	Programme Outcomes Course Outcomes															
<b>The students will be able to:</b>																
1	<i>Become familiar</i> the importance of software quality/software testing and apply software testing techniques for information systems development.	1	1	1	2	3	0	0	0	0	0	0	1	3	3	1
2	Generate test cases from software requirements using various test processes for continuous quality improvement.	0	3	3	3	3	0	0	0	0	2	0	2	2	2	3
3	Apply software testing techniques in commercial environments and assess the adequacy of test suites using control flow, data flow, and program mutation.	0	2	2	3	3	0	0	0	0	2	0	2	3	2	2

4	Develop the abilities to identify the inputs and deliverables of the testing process and work together as a team in preparing a report.	0	3	3	2	2	0	0	0	0	0	0	0	2	1	1
5	Use industry-standard testing tools for real time applications.	0	2	2	2	3	2					2	3	2	2	3

### Competencies Addressed in the course and Corresponding Performance Indicators

#### Programme Outcome: Any of 1 to 12 PO's:

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Competency	Indicators
4.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding along with research methods	4.1.1 Define a problem, its scope and importance for purposes of investigation 4.1.2 Examine the relevant methods, tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation
4.3 Demonstrate an ability to analyze data and reach a valid conclusion	4.3.1 Use appropriate procedures, tools and techniques to conduct experiments and collect data. 4.3.2 Analyze data for trends and correlations, stating possible errors and limitations 4.3.3 Represent data in tabular and/or graphical forms so as to facilitate analysis and explanation of the data, and drawing of conclusions 4.3.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions
5.1 Demonstrate an ability to identify/ create modern engineering tools, techniques and resources	Identify modern engineering tools such as computer-aided drafting, modeling and analysis; techniques and resources for engineering activities Create/adapt/modify/extend tools and techniques to solve engineering problems
5.2 Demonstrate an ability to select and apply discipline- specific tools, techniques and resources	5.2.1 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs. Demonstrate proficiency in using discipline-specific tools

5.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5,3,1 Discuss limitations and validate tools, techniques and resources Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.
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**PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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**PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### Unit Learning Outcomes (ULO):

Unit Learning Outcome (ULO)	CO	BLL	PI addressed
Identify the problem requirements from the problems for which the test cases and the behaviours are to be generated.	1,2	1,2,4	4.1.1, 4.1.2, 4.1.3
Analyze various software testing techniques to generate test cases using various techniques	2,3	3,4	5.2.1, 5.2.3
Apply software testing techniques in commercial environments and assess the adequacy of test suites using control flow, data	3,4	4	5.2.1, 5.2.2, 5.3.1

flow, and program mutation			
Develop abilities to identify and generate the report	4	3,4	5.3.2
Use industry-standard testing tools for real time applications.	5	5	5.3.3

**Course Content:**

Hours Required	Topic to be covered	Mode of Delivery
	UNIT-I	
1	BASICS OF SOFTWARE TESTING: Human Errors and Testing;	Chalk and talk in classroom Lecture combined with discussions Assignments
2	Software Quality: Quality attributes, Reliability.	
3	Requirements, Behaviour and Correctness; Correctness versus Reliability.	
4	Testing and Debugging; Test Metrics;	
5	Software and Hardware Testing: Testing and Verification	
6	Defect Management; Execution History;	
7	Test generation Strategies,	
8	Static Testing: Walkthroughs, inspections, use of static code analysis tools in static testing.	
9	Model-Based Testing and Model Checking Control-Flow Graph;	
10	Examples for Control Flow Graph, Types of Testing;	
	UNIT-II	
11	TEST GENERATION FROM REQUIREMENTS – 1: Introduction;	Chalk and talk in classroom Lecture combined with discussions Assignments
12	The Test-Selection Problem;	
13	Equivalence Partitioning; Fault Targeted, relations and equivalence partitioning. Solving	
14	Unidimensional versus multidimensional partitioning, Examples on Equivalence partitioning method	
15	Boundary Value Analysis; Solving Examples on Boundary Value Analysis	
16	Category-Partition Method: Solving Examples on Category-Partition Method.	
17	Cause-Effect Graphing: Solving Examples on Cause-Effect Graphing	
18	Test Generation from Predicates: Predicates and Boolean expressions, Fault model for predicate testing.	
19	Predicate constraint, predicate testing criteria, Generating BOR,BRO and BRE-adequate tests.	
20	.Cause effect graphs and predicate testing, Fault Propagation.	
	UNIT-III	
21	STRUCTURAL TESTING: Overview; Statement testing;	Chalk and talk in classroom Lecture combined with discussions Assignments
22	Branch testing; Condition testing,	
23	Path testing; Procedure call testing;	
24	Comparing structural testing criteria; The infeasibility problem.	

25	DEPENDENCE, DATA FLOW MODELS, AND DATA FLOW TESTING: Definition-Use pairs; Data flow analysis;		
26	Classic analyses; From execution to conservative flow analysis;		
27	Data flow analysis with arrays and pointers; Inter-procedural analysis;		
28	DATA FLOW TESTING: Overview of data flow testing;		
29	Data flow coverage with complex structures; The infeasibility problem.		
30	Examples.		
	UNIT-IV		
31	TEST CASE SELECTION AND ADEQUACY, TEST EXECUTION: Overview; Test specification and cases; Adequacy criteria; Comparing criteria.		Chalk and talk in classroom Lecture combined with discussions Assignments ;
32	TEST CASE SELECTION AND ADEQUACY, TEST EXECUTION: Overview; Test specification and cases; Adequacy criteria; Comparing criteria;		
33	Overview of test execution; From test case specification to test cases; Scaffolding;		
34	Generic versus specific scaffolding; Test oracles; Self-checks as oracles; Capture and replay		
35	PROCESS: Test and analysis activities within a software process: The quality process;		
36	Planning and monitoring; Quality goals;		
37	Dependability properties; Analysis; Testing; Improving the process; Organizational factors.		
38	Integration and component-based software testing: Overview; Integration testing strategies;		
39	Testing components and assemblies. Acceptance and Regression Testing: Overview; System testing; Acceptance testing; Usability;		
40	Regression testing; Regression test selection techniques.		

**Review Questions:**

Students should be able to identify the requirements from the problem requirement statement that require AI solutions			
Use different testing techniques			
Analysis of the problem, represent the solution in the form of control diagram, flow diagram.			
Analyze the complexity of the solution generated by using different techniques			
Use different testing tools for real time applications to check for validation.			
<b>Review Questions</b>	<b>ULO</b>	<b>BLL</b>	<b>PI addressed</b>
Define Software testing. Discuss various attributes used for measuring software quality.	1	1,2	4.1.2
Discuss different techniques used for generating the test cases	1	3	4.1.3

of a given problem.			
Show the relationship between human, error and fault with flow diagram	1	2	4.2.3
Generate the test cases for the problem statement given as requirement 1: Write a program that inputs a sequence of integer numbers and outputs sorted list in ascending order for the request character as A , descending order for request character D and invalid request character for any other request character.	2	4	5.2.2, 5.2.3

#### Evaluation Scheme:

Assessment	Marks	Weightage
CIE-I	20	20
CIE-II	20	20
Assignments/ Quizzes/Case Study/ Course Project/Term Paper/Field Work	10	10
SEE	100	50
<b>Total</b>	<b>150</b>	<b>100</b>

#### Details of Assignment:

Assignment	Marks(10)	CO	PI	PO
Assignment 1: Generating test cases for the given problem using various testing techniques.	5	1	4.1.2	4,5
Assignment 2: Identify the requirements needed from the problem statement. Designing the data flow diagrams , control flow diagrams.	5	2	5.3.3	4,5



**BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE**

**COURSE PLAN**

<b>Title of Course</b>	<b>:</b>	<b>Cyber Security</b>	<b>Course Code</b>	<b>:</b>	<b>UCS762C</b>
<b>Credits</b>	<b>:</b>	<b>3</b>	<b>Contact Hours/ Week</b>	<b>:</b>	<b>3</b>
<b>Total Hours</b>	<b>:</b>	<b>40</b>	<b>Tutorial Hours</b>	<b>:</b>	<b>0</b>
<b>CIE Marks</b>	<b>:</b>	<b>50</b>	<b>SEE Marks</b>	<b>:</b>	<b>100</b>
<b>Semester</b>	<b>:</b>	<b>7</b>	<b>Year</b>	<b>:</b>	<b>2023-24</b>

**Prerequisites:**

**Operating System concepts, Linux , Computer Networks**

**Course Objectives:**

	<b>The Course objectives are:</b>
1	To analyse and evaluate the cyber security needs of an organization.
2	To familiarize cybercrime terminologies and perspectives
3	To understand Cyber Offenses and Botnets
4	To gain knowledge on tools and methods used in cybercrimes
5	To understand phishing and computer forensics

**Course Outcomes:**

	<b>At the end of the course the student should be able to:</b>
1	Analyse and evaluate the cyber security needs of an organization.
2	Explain the cybercrime terminologies
3	Describe Cyber offenses and Botnets
4	Illustrate Tools and Methods used on Cybercrime, Phishing and Identity Theft.
5	Justify the need of computer forensics.

**Course Articulation Matrix: Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes (PSO)**

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No	<del>Programme Outcomes</del> Course Outcomes															
<b>The students will be able to:</b>																
1	analyse and evaluate the cyber security needs of an organization.	1			1											
2	Explain the cybercrime terminologies				2											
3	Describe Cyber offenses and Botnets	1							2					1		
4	Illustrate Tools and Methods used on Cybercrime, Phishing, and Identity Theft.		2		3	3									1	
5	Justify the need of computer forensics					2			2					1		

**Competencies Addressed in the course and Corresponding Performance Indicators**

**Programme Outcome: Any of 1 to 12 PO's:**

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

<b>Competency</b>	<b>Indicators</b>
1. Identify complex engineering problem	i. Students should be able to identify cyber security problems that require solutions ii. Identify the security domains where Expert Systems may be developed
2. Design a system and identify system requirements	iii. Analysis of the problem, represent the knowledge iv. Encode the knowledge v. Augment the knowledge vi. Analyse the complexity of the solution
3. Consideration for public health, safety	vii. Designing systems for healthcare, cybersecurity, and safety viii. Employ knowledge representation, search, inference, and reasoning abilities
4. Cultural, societal and environmental	ix. Applying the cyber security for

considerations	societal needs and technical ,human as well as software and hardware protection, especially the problems like hacking, phishing , money laundering, forgery, ensuring techno social and ethical responsibilities.
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**PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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**PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Unit Learning Outcomes (ULO):**

Unit Learning Outcome (ULO)	CO	BLL	PI address ed
Understanding the world of cybercrime and Cyber Security in legal as well as technical perspectives.how criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercafé & cybercrimes,	1,2	1,2,4	i, ii, iii, iv, v, and vi
Identifying modern trends in Mobility, Credit card Frauds in mobile and wireless computing, security challenges posed by mobile devices	3	3,5	li, iii,v,vii
Tools and Methods used in Cybercrime like Anonymizers, Phishing, Password Cracking, Key Loggers and Skyways, Virus	4	3,4	v,vii,viii
Understanding Computer Forensics and Cyber Forensic along with forensic as well as anti-forensic tools and methods.	5	1,2, 4,5	I,iv,v,viii

**Course Content:**

Hours Required	Topic to be covered	Mode of Delivery	
01	<b>Introduction to Cybercrime:</b>	i. PPT's ii. Chalk and talk in classroom iii. Group Assignment iv. Case study	
01	Definition and Origins of the Word, Cybercrime, and Information Security,		
01	who are Cybercriminals?		
01	Classifications of Cybercrimes, the legal perspective		
01	Classifications of Cybercrimes		
01	Hacking and Indian Laws., Global Perspectives		
01	<b>Cyber Offences: How Criminals Plan Them: Introduction</b>		
01	how criminals plan the attacks		
01	Social Engineering, -Cyber Stalking,		
01	Cybercafé & cybercrimes,		
01	<b>Cyber Offences: Botnets: The fuel for cybercrime, Attack Vector</b>		i. ppts ii. Tutorial iii. Assignments iv. Group Assignment v. Seminars, Presentations vi. Case study with device security tools
01	<b>Cybercrime:Mobile and Wireless Devices</b>		
01	Trends in Mobility, Credit card Frauds in mobile and wireless computing		
01	security challenges posed by mobile devices, Registry setting for mobile devices,		
01	Authentication Service security		
01	attacks on mobiles		
01	Mobile Devices: security implications for organizations		
01	Tools on device security		
01	Protection of digital devices		
01	Group discussion of protection and legal issues of device hacking		

01	<b>Tools and Methods used in Cybercrime:</b>	<ul style="list-style-type: none"> <li>i. PPT's</li> <li>ii. Lecture combined with discussions</li> <li>iii. Tutorial</li> <li>iv. Demonstration</li> <li>v. Group Assignment</li> <li>vi. Seminars, Presentations</li> <li>vii. Group Discussion</li> </ul>	
01	Introduction, Proxy Servers, Anonymizers, Phishing,		
01	Password Cracking, Key Loggers and Spyways,		
01	Virus and Worms, Trozen Horses and Backdoors, Steganography,		
01	DoS and DDOS Attacks, Attacks on Wireless networks.		
01	<b>Phishing and Identity Theft:</b> Introduction, methods of phishing,		
01	phasing techniques		
01	spear phishing,		
01	Types of phishing scams,		
01	phishing toolkits and spy phishing,		
01	counter measures, Identity Theft		
01	Case study discussion on cybercrime as phishing.		
01	<b>Understanding Computer Forensics:</b> Introduction, Historical Background of Cyber		<ul style="list-style-type: none"> <li>i. ppts</li> <li>ii. Lecture combined with discussions</li> <li>iii. Assignments</li> <li>iv. Demonstration</li> <li>v. Group Assignment</li> <li>vi. Seminars, Presentations</li> <li>vii. Case study on digital forensic tools.</li> </ul>
01	forensics, Digital Forensics Science, Need for Computer Forensics		
01	Cyber Forensics and Digital Evidence,		
01	Digital Forensic Life cycle,		
01	Chain of Custody Concepts, network forensics.		
01	<b>Approaching a computer forensic investigation:</b> solving a computer forensic case.		
01	computer forensic and steganography		
01	Relevancy of the OSI 7-layer model to computer forensic		
01	Forensic, and social networking sites, challenges in computer forensics,		
01	Spatial tools and techniques. Forensic auditing, ant forensics		

## Review Questions:

Module I to IV			*Bloom's Taxonomy Level	Marks
Q.01	a	Define computer crime. Discuss about Cyberpunk and Cyberwarfare	L2	8
	b	List the various cybercrimes against property and against organization	L1	6
	c	Discuss cybercrime and the Indian ITA 2000	L2	6
Q.02	a	Who are cybercriminals? Discuss the three groups of cybercriminals	L3	8
	b	Discuss about Cyberdefamation in detail.	L3	6
	c	Explain password Sniffing and mail bomb techniques.	L2	6
Q.03	a	What is Social Engineering? Discuss Human Based Social Engineering with a suitable example	L3	8
	b	Explain how criminals plan the attacks? List the phases involved in planning cybercrimes	L2	6
	c	List and briefly explain any six tips for safety and security while using the computers in a cybercafé	L2	6
Q.04	a	Define Cyber Stalking along with its working. Explain two types of Stalkers	L3	8
	b	Differentiate between passive attacks and active attacks	L2	6
	c	Define Bot and Botnet. With a diagram, explain how Botnets create business?	L3	6
Q.05	a	What are hardware keyloggers and Antikeyloggers? List the advantages of using anti-loggers	L2	8
	b	What is a Proxy server? What is its purpose?	L2	6
	c	What is a Backdoor? Discuss any four examples of Backdoor Trojans	L2	6
Q.06	a	Discuss various types of Viruses categorized based on attacks on various elements of the system	L3	8
	b	What is fishing? How fishing works?	L3	6
	c	Discuss four types of DoS attacks	L2	6
Q.07	a	Explain four types of methods used by the phisher to reveal personal information on Internet	L2	10
	b	Discuss various types of Phishing Scams	L3	10
Q.08	a	Discuss the various techniques used by Phisher to launch Phishing attacks	L3	10
	b	Discuss various types of Identity Theft techniques.	L3	10
Q.09	a	Discuss the following phases of Forensics lifecycle i) Preparation and Identification ii) Collection and Recording		
	b	List various Computer Forensics services available, explain any two of them.	L2	6

	c	Briefly explain RFC 2822	L2	4
Q.10	a	Discuss the following phases of Forensics lifecycle i) Storing and Transporting ii) Examination/Investigation	L2	10
	b	Discuss the need for concept of Computer Forensics	L3	6
	c	Briefly explain Network Forensics	L2	4

#### Evaluation Scheme:

Assessment	Marks	Weightage
CIE-I	20	20
CIE-II	20	20
Assignments/ Quizzes/Case Study/ Course Project/Term Paper/Field Work	10	10
SEE	50	50
<b>Total</b>	<b>100</b>	<b>100</b>

#### Details of Assignment:

Assignment	Marks (10)	CO	PI	CA	PO
Assignment 1: Group case study 1: Demonstration of ethical hacking techniques	03	1,2	i, ii	1	1,2
Assignment 2: Group case study 1 Tool's demonstration of cybercrime techniques to detect digital crimes in digital world.	04	3,4	iii, iv	3	3,4
Assignment 3: Review Report Submission by refereeing case study 1 and case study 2.	03	1,2,3,4,5	v, vi	2	5

