## **B.TECH. – INFORMATION TECHNOLOGY**

## **ACADEMIC CURRICULUM & SYLLABUS**

### (REGULATIONS 2019)

## CHOICE BASED CREDIT SYSTEM

(Applicable to the students admitted from the Academic Year 2020-21 onwards)



### EASWARI ENGINEERING COLLEGE

(Autonomous Institution) Bharathi Salai, Ramapuram, Chennai - 600 089

 [ A Unit of SRM Group of Educational Institutions, Approved by AICTE | Affiliated to Anna University, Chennai | NAAC Accredited 'A' Grade | 2(f) & 12(B) Status (UGC) | ISO 9001:2015 Certified | NBA Accredited Programmes | FIST Funded (DST) | SIRO Certified (DSIR)]

	Semester V							
S No	Course Code	Course Title	Cotogory	Hours / Week		CREDITS		
3.110	Course Code	Course Title	Category	Ц	Т	Ρ	R	
1	191ITO501T	Data Structures using Python	OE	3	-	-	-	3
2	191ITO502T	Database Management Systems	OE	3	-	-	-	3
3	191ITO503T	Artificial Intelligence	OE	3	-	-	-	3
		Semester VI						
1	191ITO601T	Cloud Computing & Virtualization	OE	3	-	-	-	3
2	191ITO602T	Advanced Python Programming	OE	3	-	-	-	3
3	191IT0603T	Computer Networks	OE	3	-	-	-	3
		Semester VII						
1	191ITO701T	XML and Markup Language	OE	3	-	-	-	3
2	191ITO702T	Machine Learning	OE	3	-	-	-	3
3	191ITO703T	Cyber Security	OE	3	-	-	-	3

### LIST OF OPEN ELECTIVES

## SYLLABUS OF

## **OPEN ELECTIVE I**

## COURSES

Course Code	Course Title	Pe	Periods per week			Credite
191ITO501T	DATA STRUCTURES USING PYTHON	L	Т	Р	R	Credits
1011100011		3	0	0	0	3

NIL

	COURSE OBJECTIVES:
1.	To introduce the basics of Python programming language
2.	To introduce the concepts of ADTs
3.	To introduce the concepts of Hashing and Sorting
4.	To Learn linear data structures – lists, stacks, and queues
5.	To test objects and handle changing requirements.

UNIT	TITLE	PE	RIODS	
1	INTRODUCTION TO PYTHON			
Function Sensitive Compreh	Declaration - Import - Objects - Indenting as Requirement - Exceptions - Unbound Varial - Native Data Types - Booleans - Numbers - Lists - Tuples - Sets - Dictionaries - Compre- ensions - Dictionary Comprehensions - Set Comprehensions.	oles - Ca ehensior	ise ns - List	
UNIT	TITLE	PE	RIODS	
2	PYTHON PROGRAMMING ADVANCED FEATURES		9	
Closures - Instance	<ul> <li>List of Functions - List of Patterns - File of Patterns - Generators - Defining Classes - Ir</li> <li>Variables - Iterators – Itertools - Assert - Generator Expressions.</li> </ul>	nstantiati	ng Classes	
UNIT	TITLE	PE	RIODS	
3	LINEAR DATA STRUCTURES – LIST		9	
Abstract I lists- circu (Insertion	Data Types (ADTs) – List ADT – array-based implementation – linked list implementation Ilarly linked lists- doubly-linked lists – applications of lists –Polynomial Manipulation – All , Deletion, Merge, Traversal).	n — sing I operatio	ly linked on	
UNIT	TITLE	PE	RIODS	
4	LINEAR DATA STRUCTURES – STACKS, QUEUES		9	
Stack AD Double er	T – Evaluating arithmetic expressions- other applications- Queue ADT – circular queue inded Queues – applications of queues.	mpleme	ntation –	
UNIT	TITLE	PE	RIODS	
5	SORTING, SEARCHING AND HASH TECHNIQUES		9	
Sorting al Searching Rehashin	gorithms: Insertion sort - Selection sort - Shell sort - Bubble sort - Quick sort - Merge sor g: Linear search –Binary Search Hashing: Hash Functions – Separate Chaining – Open A g – Extendible Hashing	rt - Radix Addressi	sort – ing –	
	TOTAL PERIODS:		45	

COURSE	COURSE OUTCOMES:		
Upon com	Upon completion of this course, student will be able to:		
CO1:	Outline the python data structures.		
CO2:	Handle regular expressions.		

CO3:	Apply the concept of abstract data types for linear data structures.
CO4:	Apply linear data structures such as lists, Stack and Queue with their related operations.
CO5:	Critically analyze the various sorting algorithms.
CO6:	Design novel algorithms for developing real time applications

TEXT E	BOOKS:
1.	Allen Downey, Jeffrey Elkner, Chris Meyers, "How to Think Like a Computer Scientist - Learning with Python", Green Tea Press, 2002.
2.	Shriram K Vasudevan,Abhishek S Nagarajan, Karthick Nanmaran, "Data Structures using Python", First Edition, Oxford University Press 2021.

REFEF	RENCE BOOKS:
1.	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Mcgraw Hill, 2002.
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
3.	John V. Guttag, "Introduction to Computation and Programming using Python", Prentice Hall of India, 2014.
4.	Mark Lutz, "Learning Python: Powerful Object-Oriented Programming", Fifth Edition, O'Reilly, Shroff Publishers and Distributors, 2013.



Course Code	Course Title	Periods per week			ek	Cradita	
1011TO502T		L	T P R				
1911105021	DATABASE MANAGEMENT STSTEMS	3	0	0	0	3	

COU	RSE OBJECTIVES:
1.	To learn the fundamentals of data models
2.	To learn conceptual modeling using ER diagrams.
3.	To study SQL queries and database programming
4.	To learn proper designing of relational database.
5.	To understand database security concepts

UNIT	TITLE	PERIODS	
1	Data Modeling	9	
Purpose of modeling: Relationa	of Database System – Data independence - Data Models – Database System Architectu ER models - Enhanced-ER Model. Introduction to relational databases – Relational M I Mapping. Modeling of a library management system.	re – Conceptual Data odel – Keys – ER-to-	
UNIT	TITLE	PERIODS	
2	Database Query	11	
SQL: function correlated tables wit	damentals – DDL – Specifying integrity constraints - DML – Basic retrieval queries in S I queries – joins - aggregate functions. Creating a table, populating data, adding integrity h simple and complex queries.	QL-nested queries – constraints, querying	
UNIT	TITLE	PERIODS	
3	Database Programming	7	
Database with front	programming with function calls, stored procedures - views – triggers. Embedded SQL end tools. Implementation using ODBC/JDBC- implementing functions, views, and trigge	ODBC connectivity rs in MySQL / Oracle.	
UNIT	TITLE	PERIODS	
4	Normalization	9	
Functional Normalization	al Dependencies – Design guidelines – Normal Forms: first, second, third – Boyce/C ation algorithms. Design of a banking database system / university database system.	odd Normal Form -	
UNIT	TITLE	PERIODS	
5	Database Security	9	
Database security issues – Discretionary access control – Role based access – Encryption and public key infrastructures – challenges, Case Study-ATM system.			
	TOTAL PE	RIODS: 45	

COURSE	COURSE OUTCOMES:	
Upon com	Jpon completion of this course, student will be able to:	
CO1:	Interpolate Data models for database design.	
CO2:	Populate and query a database using SQL.	
CO3:	Implement procedures and functions to access data from database.	

CO4:	Create triggers and embedded SQL programs.
CO5:	Apply normal forms for database design.
CO6:	Analyze the database security issues in real time scenario.

TEXT	BOOKS:
1.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011
2.	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson, 2011.

REFERENCE BOOKS:				
1.	Date C.J., A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.			
2.	Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.			



Course Code Course Title			Perio	ods pe		
191ITO503T	ARTIFICIAL INTELLIGENCE	L	Т	Ρ	R	Credits
		3	0	0	0	3

### PREREQUISITES:

NIL

COU	COURSE OBJECTIVES:		
1.	Study the basic concepts of Artificial Intelligence		
2.	Learn the methods of solving problems using Artificial Intelligence.		
3.	To understand various knowledge representation techniques.		
4.	To provide knowledge in learning		
5.	Introduce the more advanced topics of AI like Expert system, agents and robotics and planning		

UNIT	TITLE	PERIODS			
1	Introduction to AI	9			
Introduction Problem of Related	Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics - Problem solving methods -Hill Climbing-Depth first and Breadth first, Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.				
UNIT	TITLE	PERIODS			
2	Knowledge Representation	9			
Game pla calculus, of knowle	lying – Knowledge representation, Knowledge representation using Predic Resolution, Use of predicate calculus, Knowledge representation using otl dge.	ate logic, Introduction to predicate ner logic-Structured representation			
UNIT	TITLE	PERIODS			
3	Knowledge Inference	9			
Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors, Bayesian Theory-Bayesian Network-Dempster – Shafer theory					
UNIT	TITLE	PERIODS			
4	Learning	9			
Forms of Learning - Supervised Learning - Learning Decision Trees – Regression and Classification with Linear Models - Artificial Neural Networks - Support Vector Machines - Statistical Learning - Learning with Complete Data Reinforcement Learning					
UNIT	TITLE	PERIODS			
5	Expert Systems	9			
Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge, Heuristics, Types of expert systems – MYCIN, DART, XOON, Expert systems.					
	TOTAL PERIODS: 45				
L					
COURSE	OUTCOMES:				

Upon completion of this course, student will be able to:

CO1:	Apply the fundamental concepts of artificial intelligence (AI) in problem solving
CO2:	Use the Knowledge representation techniques to deduce the AI solutions
CO3:	Develop solutions for Uncertainty problems by applying Fuzzy and Neuro Fuzzy Inference rules
CO4:	Implement various learning techniques
CO5:	Develop knowledge based expert systems.
CO6:	Outline the applications of AI

TEXT BOOKS:		
1.	Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc GrawHill- 2008. (Units-I, II, IV, & V).	
2.	Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III).	

<b>REFERENCE BOOKS:</b>	
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1.	Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007 (Units-I, III, IV).
2.	Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
3.	Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.

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## **SYLLABUS OF**

# **OPEN ELECTIVE II**

**COURSES** 

Course Code	Course Title	Periods per week			Credite	
1011TO601T		L	Т	Ρ	R	Credits
1911106011	CLOOD COMPOTING AND VICTUALIZATION	3 0 0	0	0	3	

## PREREQUISITES:

COURSE OBJECTIVES:		
1.	To learn about the basic concept of cloud and utility computing.	
2.	To understand the concept of virtualization.	
3.	To have knowledge on the various issues in cloud computing.	
4.	To be familiar with the lead players in cloud.	
5.	To appreciate the emergence of cloud as the next generation computing paradigm	

UNIT	TITLE	PERIODS				
1	CLOUD ARCHITECTURE AND MODEL	9				
Introducti and Risk SaaS – A	Introduction to Cloud Computing – Roots of Cloud Computing – Desired Features of Cloud Computing – Challenges and Risks – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds - IaaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage					
UNIT	TITLE	PERIODS				
2	VIRTUALIZATION	9				
Basics of Tools and Virtualiza	Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization-Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices-Virtual Clusters and Resource management – Virtualization for Data-center Automation					
UNIT	TITLE	PERIODS				
3	CLOUD INFRASTRUCTURE	9				
Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development–Design Challenges - Inter Cloud Resource Management – Resource ProvisioningandPlatformDeployment– GlobalExchangeofCloudResources.						
UNIT	TITLE	PERIODS				
4	CLOUD SECURITY	9				
Security Risk Mar Machine	Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security –Se agement – Security Monitoring – Security Architecture Design–Data Security–Applicati Security - Identity Management and Access Control–Autonomic Security	curity Governance – on Security – Virtual				
UNIT	TITLE	PERIODS				
5	CASE STUDIES	9				
Google App Engine(GAE) – GAE Architecture – Functional Modules of GAE – Amazon Web Services(AWS) – GAE Applications – Cloud Software Environments – Eucalyptus – Open Nebula – Open Stack.						
TOTAL PERIODS: 45						
COURSE OUTCOMES:						
Upon cor	npletion of this course, student will be able to:					
CO1:	Compare the main concepts, strengths and limitations of cloud computing.					

CO3:	Develop the efficient storage system in cloud computing,
CO4:	Examine the basic techniques of Resource Provisioning in cloud resource management.
CO5:	Analyze various security issues in cloud computing.
CO6:	Design the GAE applications in google cloud

TEXT	BOOKS:			
1.	Buyya R., Broberg J., Goscinski A., "Cloud Computing: Principles and Paradigm", First Edition, John Wiley & Sons, 2011.			
2.	Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.			
3.	Rittinghouse, John W., and James F. Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2017.			
REFERENCE BOOKS:				
1.	Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, "Mastering Cloud Computing", Tata Mcgraw Hill,			

	2013.
2.	Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach", Tata Mcgraw Hill, 2009.
3.	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)", O'Reilly, 2009.

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Course Code	Course Title	Periods per week		week	Cradita	
1011T0602T	Advanced Python Programming	L	Т	Ρ	R	Credits
1911106021		3	0	0	0	3

COU	COURSE OBJECTIVES:		
1.	To introduce Object Oriented Programming using an easy-to-use language.		
2.	To have idea about regular expressions		
3.	To test objects and handle changing requirements.		
4.	To use iterators and generators.		
5.	To understand various file operations		

UNIT	TITLE	PERIODS			
1	Introduction to Python	9			
Function Declaration - Import - Objects - Indenting as Requirement - Exceptions - Unbound Variables - Case Sensitive - Scripts - Native Data Types - Booleans - Numbers - Lists - Tuples - Sets - Dictionaries - Comprehensions - List Comprehensions - Dictionary Comprehensions - Set Comprehensions.					
UNIT	TITLE	PERIODS			
2	STRINGS	11			
Strings - U	nicode - Formatting - String Methods - Bytes - Encoding - Regular Expressions - Verbo	ose - Case Studies			
UNIT	TITLE	PERIODS			
3	CLASSES	7			
Closures - Instance V	List of Functions - List of Patterns - File of Patterns - Generators - Defining Classes - ariables - Iterators – Itertools - Assert - Generator Expressions.	Instantiating Classes -			
UNIT	TITLE	PERIODS			
4	FILES	9			
Reading and Writing Text Files - Binary Files - Stream Objects - Standard Input, Output and Error.					
UNIT	TITLE	PERIODS			
5	XML and SERIALIZATION	9			
XML - Atom Feed - Parsing HTML - Searching for Nodes - html - Generation - Serializing Objects - Pickle Files - Versions - Debugging - Serializing to JSON.					
TOTAL PERIODS: 45					

COURSE OUTCOMES:			
Upon con	npletion of this course, student will be able to:		
CO1:	Summarize the basic concepts of python.		
CO2:	Apply the string methods to handle regular expressions for real time problems.		
CO3:	Analyze the concepts of object oriented programming.		
CO4:	Build Python Programs using generators and iterators		

CO5:	Demonstrate file handling operations in Python.
CO6:	Develop real time applications using XML and Serialization.

TEXT BOOKS:			
1.	Mark Pilgrim, "Dive into Python 3", Apress, 2009.		
2.	Allen Downey, Jeffrey Elkner, Chris Meyers, "How to Think Like a Computer Scientist - Learning with Python", Green Tea Press, 2002.		

REFERENCE BOOKS:				
1.	Allen Downey, Jeffrey Elkner, Chris Meyers, "How to Think Like a Computer Scientist - Learning with Python", Green Tea Press, 2002.			
2.	Mark Lutz, "Learning Python: Powerful Object-Oriented Programming", Fifth Edition, O'Reilly, Shroff Publishers and Distributors, 2013.			



Course Code	Course Code Course Title			Periods per week				
1011TO602T	COMPUTER NETWORKS	L	Т	Ρ	R	Credits		
1911106031		3	0	0	0	3		

COURSE OBJECTIVES:		
1.	To understand the protocol layering and physical level communication.	
2.	To analyze the performance of a network.	
3.	To understand the various components required to build different networks.	
4	To learn the functions of network layer and the various routing protocols.	
5	To familiarize the functions and protocols of the all the OSI layer.	

UNIT	TITLE	PERIODS	
1	INTRODUCTION	9	
Computer Communi	r Networks – A perspective – Goals – Applications – Classification of Networks - Lay ication – Advantages – Examples - OSI Model – TCP/IP Model – Protocols and Protocol	ered Architecture for Data Units (PDUs).	
UNIT	TITLE	PERIODS	
2	DATA LINK LAYER	8	
Introducti Control.	on – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – F	PPP - Media Access	
UNIT	TITLE	PERIODS	
3	LOCAL AREA NETWORKS (IEEE 802)	9	
Topology (802.3) – Fi, WiMA	: Star – Ring – Bus – Channel Access Techniques: FDM and TDM – CSMA – CSMA/CD Switched LAN - Token BUS LAN (802.4)– Token Ring LAN (802.5) – Industrial Networki X	– Ethernet LAN ing: CAN Bus – Wi-	
UNIT	TITLE	PERIODS	
4	INTERNETWORKING	10	
internet - Transmis	Routers – Gateways – Internet Protocol (IP) – IP Addresses – Classification – Spe sion Control Protocol (TCP) – Internet Applications – Electronic mail : SMTP, Remote Lo	cial IP Addresses – gin : Telnet.	
UNIT	TITLE	PERIODS	
5	NETWORK SECURITY	9	
Network / Digital Au	Attacks – Firewalls – Packet Filtering – Encryption / Decryption Techniques – Public Key thentication – Digital Signatures	Cryptography –	
	TOTAL PERIODS: 45		

COURS	COURSE OUTCOMES:	
Upon co	mpletion of this course, student will be able to:	
CO1:	Understand the basic layers and its functions in computer networks.	
CO2:	Evaluate the performance of a network.	

CO3:	Analyze and design routing algorithms.
CO4:	Design protocols for various functions in the network.
CO5:	Understand the working of various application layer protocols
CO6:	Understand the basics of how data flows from one node to another.

TEXT	TEXT BOOKS:	
1.	Behrouz A Foruzan, —Data Communications and NetworkingII, McGraw-Hill, New York, 2012.	
2.	Behrouz A Foruzan, — TCP/IP Protocol Suitell, Tata McGraw-Hill, New Delhi, 2010.	

REFER	REFERENCE BOOKS:	
1.	William Stallings, —Data and Computer CommunicationII, Pearson Education, New Delhi, 2009.	
2.	Fred Halsall, —Data Communications, Computer Networks and Open SystemsII, Pearson Education, Asia, 2001.	
3.	Stanford H Rowe and Marsha L Schuh, —Computer Networkingl, Pearson Education, New Delhi, 2005.	
4.	Andrew.S Tanen Baum and David T.Wetherall, —Computer Networksll, Pearson Education, 2010	

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SYLLABUS OF

## **OPEN ELECTIVE III**

COURSES

Course Code Course Title Periods per we		eek	Oredite			
1011TO701T		L	Т	Ρ	R	Credits
1911107011	AME AND MARKUP LANGUAGE	3	0	0	0	3

NIL

COU	COURSE OBJECTIVES:	
1.	Construct the web page using XML	
2.	To understand the basics of XML and CSS	
3.	Implement the real time applications using XML technologies.	
4.	Analyze the programming skills using XML.	
5.	Evaluate the security issues in XML.	

UNIT	TITLE	PERIODS	
1	INTRODUCTION TO XML	9	
XML: XM Documen	L basics –Introduction –need for XML –Advantages –Working with an XML Document - t –DTD-XML Schema.	-Structure of an XML	
UNIT	TITLE	PERIODS	
2	XML AND CSS	9	
Working elements based on	with XML Schema-Declaring Attributes –XML namespaces –Reusing Schema Con and attributes.XML Style sheets: Introduction –CSS –eXtensible Style Sheet languag controls –Displaying data in a Tabular Format.	nponents –Grouping ge –Formatting Data	
UNIT	TITLE	PERIODS	
3	XML TECHNOLOGY	9	
XML Tecl XSLT Pre	nnology: Transforming XML Documents with XSLT-Xpath -Xquery . Structuring with Scl sentation Techniques - Transformation.	nemas and DTD -	
UNIT	TITLE	PERIODS	
4	XML PROGRAMMING	9	
XML PRC - XDUCE	OGRAMMING: DOM API -JDOM API -XML Data Binding -SAX API -TypeSafe XML Prog -XACT.	ramming Languages	
UNIT	TITLE	PERIODS	
5	XML SECURITY	9	
Security ( Structure	Dverview - Canonicalization - XML Security Framework - XML Encryption - XML Digital - Guidelines for Signing XML Documents - XML in Practice.	Signature - XKMS	
<u> </u>	TOTAL PERIODS:	45	

COURSE OUTCOMES:		
Upon completion of this course, student will be able to:		
CO1:	Learn the basics and history of XML	
CO2:	Write your own XML documents.	
CO3:	Transform XML documents into documents of other types using XSLT.	

CO4:	Write valid XML documents based on a DTD.
CO5:	Evaluate the security issues in XML
CO6:	Design and implement the document using XML

TEXT BOOKS:	
1.	HTML and XML an Introduction", NIIT, Prentice Hall of India Pvt.Ltd.
2.	Anders Moller and Michael Schwartzbach, —An Introduction to XML and Web Technologiesll, Pearson Education Limited, 2006.
3.	Deitel H M, Deitel P J, Nirto T R, Lin T M, XML How to Program, Pearson Edition, 2011.

### **REFERENCE BOOKS:**

1.	Frank. P. Coyle, XML, Web Services and the Data Revolution, Pearson Education, 2007.
2.	David Hunter, Jeff Rafter, Joe Fawcett, Eric Van der Vlist, Danny Ayers, Jon Duckett, Andrew Watt, Linda McKinnon, Beginning XML, Fourth Edition, Wrox publication.

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Course Code	e Code Course Title Periods per we		eek	Cradita		
101ITO702T	Machine Learning	L	Т	Ρ	R	Credits
191107021		3	0	0	0	3

### PREREQUISITES:

**Probability and Statistics** 

COU	COURSE OBJECTIVES:	
1.	To understand the need for machine learning for various problem solving.	
2.	To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning	
3.	To understand the latest trends in machine learning	
4.	To design appropriate machine learning algorithms for problem solving.	
5.	To develop skills of using recent machine learning software for solving practical problems.	
6.	To gain experience of doing independent study and research.	

UNIT	TITLE	PERIODS	
1	INTRODUCTION	9	
Learning - Induct	Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning.		
UNIT	TITLE	PERIODS	
2	NEURAL NETWORKS AND GENETIC ALGORITHMS		9
Neural N – Advar	Network Representation – Problems – Perceptrons – Multilayer Networks and Back Prop nced Topics – Genetic Algorithms – Hypothesis Space Search.	agation	Algorithms
UNIT	TITLE	PE	RIODS
3	BAYESIAN AND COMPUTATIONAL LEARNING		9
Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity.			
UNIT	TITLE	PERIODS	
4	INSTANT BASED LEARNING	9	
K- Near	est Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case	e Based	Learning.
UNIT	TITLE	PERIODS	
5	ADVANCED LEARNING	9	
Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution –Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.			
	TOTAL PER	IODS:	45
L			
COURS	E OUTCOMES:		

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

**CO1:** Describe the basic concepts of machine learning.

**CO2:** Incorporate the decision tree algorithm to overcome the problem of over fitting

CO3:	Apply back propagation and genetic algorithms to solve real time problems
CO4:	Use various classification techniques for data analysis.
CO5:	Apply instance based learning for machine learning applications.
CO6:	Analyze and choose suitable machine learning algorithms for real time problems.

### **TEXT BOOKS:**

1.

Tom M. Mitchell, —Machine Learningll, McGraw-Hill Education (India) Private Limited, 2013.

REFER	REFERENCE BOOKS:		
1.	Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning)II, The MIT Press 2004.		
2.	Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.		
3.	Stephen Marsland, —Machine Learning: An Algorithmic Perspectivell, CRC Press, 2009.		

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Course Code	Course Code Course Title Periods per wee		ek	Credite		
1011TO702T	Cyber Security	L	Т	Ρ	R	Credits
1911107031		3	0	0	0	3

NIL

COUF	COURSE OBJECTIVES:	
1.	Understand the basics of cyber security policy and the importance	
2.	Study Cyber security vulnerabilities and cyber security safeguards management	
3.	Design and develop Securing web application, services and servers	
4.	Develop SSL or Firewall based solutions against security threats, employ access control	
5,	To understand various protocols for network security to protect against the threats in the Networks	
6.	Understand the importance of Cyberspace and the law and cyber forensics	

1       INTRODUCTION       9         Overview of Cyber Security – Challenges and Constraints- Cyber Threats-Cyber Warfare-Cyber Crime-Cyber te Cyber Espionage - Need for a Comprehensive Cyber Security Policy - Need for a Nodal Authority- Need International convention on Cyberspace.       International convention on Cyberspace.         UNIT       CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS       9         Cyber Security       Vulnerabilities-Overview, vulnerabilities in software,System administration - Complex M       Complex M         Architectures - Open Access to Organizational Data - Weak Authentication-Cyber Security Safeguards- Over Access control – Audit –Authentication – Biometrics – Deception - Denial of Service Filters - Ethical Hacking.       PERIOD	errorism- d for an DS Network erview - DS		
Overview of Cyber Security – Challenges and Constraints- Cyber Threats-Cyber Warfare-Cyber Crime-Cyber te Cyber Espionage - Need for a Comprehensive Cyber Security Policy - Need for a Nodal Authority- Need International convention on Cyberspace.         UNIT       TITLE       PERIO         2       CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS       9         Cyber Security Vulnerabilities-Overview, vulnerabilities in software,System administration - Complex Marchitectures - Open Access to Organizational Data - Weak Authentication-Cyber Security Safeguards- Over Access control – Audit –Authentication – Biometrics – Deception - Denial of Service Filters - Ethical Hacking.	Prrorism- d for an DS Network erview - DS		
UNIT     TITLE     PERIO       2     CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS     9       Cyber Security Vulnerabilities-Overview, vulnerabilities in software,System administration - Complex If Architectures - Open Access to Organizational Data - Weak Authentication-Cyber Security Safeguards- Over Access control - Audit - Authentication - Biometrics - Deception - Denial of Service Filters - Ethical Hacking.       UNIT     TITLE     PERIO	DS Network erview - DS		
2       CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS       9         Cyber Security Vulnerabilities-Overview, vulnerabilities in software,System administration - Complex I       - Complex I         Architectures - Open Access to Organizational Data - Weak Authentication-Cyber Security Safeguards- Over Access control - Audit -Authentication - Biometrics - Deception - Denial of Service Filters - Ethical Hacking.       PERIOD	Network erview - <b>DS</b>		
Cyber Security Vulnerabilities-Overview, vulnerabilities in software,System administration - Complex I Architectures - Open Access to Organizational Data - Weak Authentication-Cyber Security Safeguards- Over Access control – Audit – Authentication – Biometrics – Deception - Denial of Service Filters - Ethical Hacking.	Network erview - <b>DS</b>		
	DS		
3 SECURING WEB APPLICATION, SERVICES AND SERVERS 9			
Introduction - Basic security for HTTP Applications and Services -Basic Security for SOAP Services - Identity Management and Web Services - Authorization Patterns - Security Considerations - Challenges.			
UNIT TITLE PERIO	PERIODS		
4 CRYPTOGRAPHY AND NETWORK SECURITY 9			
Introduction to Cryptography - Symmetric and Asymmetric key Cryptography - Message Authentication - Digital Signatures - Applications of Cryptography - Intrusion Detection and Prevention- Overview of Firewalls- Types of Firewalls - Security Protocols - security at the Application Layer: PGP and S/MIME - Security at Transport Layer: SSL and TLS			
UNIT TITLE PERIO	DS		
5 CYBERSPACE LAW AND CYBER FORENSICS 9			
Introduction - Cyber Security Regulations - Roles of International Law - The INDIAN Cyberspace - National Cyber Security Policy 2013- Introduction to Cyber Forensics - Handling Preliminary Investigations - Controlling an Investigation - Conducting disk based analysis - Investigating Information hiding - Tracing Internet access- Case Study – Personal Security.			
TOTAL PERIODS: 45			

COURSE OUTCOMES:

Upon completion of this course, student will be able to:	
CO1:	Outline the basics of cyber security.
CO2:	Evaluate and classify Cyber security vulnerabilities and cyber Security Safeguards.
CO3:	Apply various security measures for web based applications and services
CO4:	Knowledge about basic cryptographic based techniques
CO5:	Understand, employ, design and implement appropriate security technologies.
CO6:	Demonstrate the use of standards and cyber laws to enhance information security

TEXT BOOKS:		
1.	Dr. Jeetendra Pande, "Introduction to Cyber Security", 9th Edition, Uttarakhand Open University, 2017.	
2.	Mayank Bhushan, Rajkumar singh Rathore, Aatif Jamshed, "Fundamentals of Cyber Security", BPB Publications.	
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REFERENCE BOOKS:	
1.	Pankaj Sharma, "Information Security and Cyber Laws", Kataria, S. K., & Sons publication.
2.	Nina Godbole, Sunit Belapure,"Cyber Security", Wiley India Pvt. Ltd publication.

