Samrat Ashok Technological Institute (Engg. College), Vidisha (M.P.)
(An autonomous Institute Affiliated to RGPV, Bhopal)
Bachelor of Technology B.Tech in CSE (IOT & Cyber Security with Blockchain Technology)

Semester : VIII

VIII - SEM B.Tech. ICB	Subject Code	Subject Name / Title	Maximum Marks Allotted						Contract Hrs.			Total Credits
			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2181 (A)	Ethical hacking and Information Security	70	20	10	-	-	100	3	-	-	3

Prerequisite: This course introduces ethical hacking concept and application of ethical hacking in network security.

Course Objectives: To provide students about the Ethical hacking Concepts, importance of ethical hacking in IT and Working structure of hacking

Course Contents.

UNIT-I: Introduction to Ethical Hacking: Security Fundamental, Security testing, Hacker and Cracker, Descriptions Test Plans-keeping It legal, Ethical and Legality The Attacker's Process, The Ethical Hacker's Process, Security and the Stack

UNIT-II: Footprinting and Scanning: Information Gathering, Determining the Network range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack Surface,Enumeration, System Hacking

UNIT-III: Malware Threats : Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures, Sniffers, Session Hijacking, Denial of Service and Distributed, Denial of Service

UNIT-IV: Web Server Hacking : Web Server Hacking, Web Application Hacking, Database Hacking, Wireless Technologies, Mobile Device Operation and Security, Wireless LANs

UNIT-V: DS, Firewalls and Honeypots , Intrusion Detection Systems, Firewalls, Honeypots

Physical Security, Social Engineering , Case Studies

References Books:

1.Ec-Council,"Ethical Hacking and Countermeasures: Attack Phases", Delmar Cengage Learning, 2009.
2. Michael T. Simpson, Kent Backman, James E. Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning, 2012
3. Patrick Engebretson, "The Basics of Hacking and Penetration Testing – Ethical Hacking and Penetration Testing Made Easy", Syngress Media, Second Revised Edition, 2013.
4. Jon Erickson, "Hacking: The Art of Exploitation", No Starch Press, Second Edition, 2008.

Course Outcomes: The students would be able to-

CO1: Define the description of ethical Hacking
CO2: Illustrate Types of Ethical Hacking.
CO3: Explain about web and network hacking

CO4: Demonstrate report writing and Mitigation
CO5: Formulate the use of safe techniques on the World Wide Web
CO6: Analyze various digital forensic problems

Mapping of COs and POs:

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	**3**	**3**			**2**			**3**				**3**		
CO-2	**3**	**3**	**2**										**3**	
CO-3	**3**	**3**	**2**		**2**				**2**			**2**		**3**
CO-4	**3**	**3**		**3**	**2**	**3**		**2**						**3**
CO-5	**3**	**2**	**3**					**3**	**3**					

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			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2181 (B)	Software Defined Networks	70	20	10	-	-	100	3	-	-	3

Prerequisite: Nil

Course Objectives: At the end of the course, student will be able to

- To understand the need for SDN and its data plane operations
- To understand the functions of control plane
- To comprehend the migration of networking functions to SDN environment
- To explore various techniques of network function virtualization
- To comprehend the concepts behind network virtualization

UNIT I SDN: INTRODUCTION
Evolving Network Requirements – The SDN Approach – SDN architecture - SDN Data Plane , Control plane and Application Plane

UNIT II SDN DATA PLANE AND CONTROL PLANE
Data Plane functions and protocols - OpenFLow Protocol - Flow Table - Control Plane Functions - Southbound Interface, Northbound Interface – SDN Controllers - Ryu, OpenDaylight, ONOS - Distributed Controllers

UNIT III SDN APPLICATIONS
SDN Application Plane Architecture – Network Services Abstraction Layer – Traffic Engineering–Measurement and Monitoring – Security – Data Center Networking

UNIT IV NETWORK FUNCTION VIRTUALIZATION
Network Virtualization - Virtual LANs – OpenFlow VLAN Support - NFV Concepts – Benefits and Requirements – Reference Architecture

UNIT V NFV FUNCTIONALITY
NFV Infrastructure – Virtualized Network Functions – NFV Management and Orchestration – NFV Use cases – SDN and NFV

Course Outcomes:
After the successful completion of this course, the student will be able to
CO1: Describe the motivation behind SDN
CO2: Identify the functions of the data plane and control plane
CO3: Design and develop network applications using SDN
CO4: Orchestrate network services using NFV
CO5: Explain various use cases of SDN and NFV

References Books:

1. William Stallings, “Foundations of Modern Networking: SDN, NFV, QoE, IoT and Cloud”,
Pearson Education, 1st Edition, 2015.
REFERENCES:
1. Ken Gray, Thomas D. Nadeau, “Network Function Virtualization”, Morgan Kauffman, 2016.
2. Thomas D Nadeau, Ken Gray, “SDN: Software Defined Networks”, O’Reilly Media, 2013.
3. Fei Hu, “Network Innovation through OpenFlow and SDN: Principles and Design”, 1st Edition, CRC Press, 2014.
4. Paul Goransson, Chuck Black Timothy Culver, “Software Defined Networks: A Comprehensive Approach”, 2nd Edition, Morgan Kaufmann Press, 2016.
5. Oswald Coker, Siamak Azodolmolky, “Software-Defined Networking with OpenFlow”, 2nd Edition, O’Reilly Media, 2017.

Mapping of COs and POs:

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	1	2	3	1	3				2	3	1	3	1	2
CO-2	2	1	2	2	3				2	2	2	2	1	3
CO-3	2	2	2	3	3				3	1	1	2	1	3
CO-4	2	2	2	3	1				1	3	1	2	2	2
CO-5	3	3	1	1	3				1	2	1	2	2	1

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VIII - SEM B.Tech. ICB	Subject Code	Subject Name / Title	Maximum Marks Allotted						Contract Hrs.			Total Credits
			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2181 (C)	Multimedia Security & Forensics	70	20	10	-	-	100	3	-	-	3

Prerequisite: basic understanding of computer systems and networks.

Course Objective:

1. To provide an understanding Computer forensics fundamentals
2. To analyze various computer forensics technologies
3. To provide computer forensics systems
4. To identify methods for data recovery.
5. To apply the methods for preservation of digital evidence.

Unit I:

Definition and Origins of Cybercrime, information Security, Classifications of Cybercrimes. Cyber-cafe and Cybercrimes, Bot-nets, Attack Vector,Introduction to Cyber laws In indian Context- Information technology act 2000,Amendments made in the indian ITA 2000, Positive Aspects of ITA 2000, The Weak Areas of ITA 2000, Challenges in India Law and Cyber-crime scenario in india.

Unit II:

Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Losing.

Unit III :

Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy- Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, expanding privacy rights Technology

Unit IV:

Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

Unit V:

Ethics, Legal Developments, Late 1990 to 2000,Cyber security in Society, Security in cyber laws case studies, General law and Cyber Law-a Swift Analysis.

Reference Books:

1. Law Relating to computer internet and E commerce by Nandan Kamath, 2nd

Edition Universal Law Publishing Co. Pvt Limited.
2. Jonathan Rosenoer,“Cyber Law: The law of the Internet”, Springer-Verlag, 2297.
3. Mark F Grady, Fransesco Parisi, “The Law and Economics of Cyber Security”, Cambridge University Press.

Course Outcomes

CO-1: Understand the definition of computer forensics fundamentals.

CO-2: Describe the types of computer forensics technology**.**

CO-3: Analyze various computer forensics systems.

CO-4: Illustrate the methods for data recovery, evidence collection and data seizure.

CO-5: Summarize duplication and preservation of digital evidence.

Mapping of COs and Pos:

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	1	1	1	1	1							2		
CO-2	1	1	1	1	1			2				1		2
CO-3	1	1	1	3	2			2						
CO-4	1	2	2	2	1			2				2		2
CO-5	1	2	1	1										

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			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assign ment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2182 (A)	Soft Computing	70	20	10	-	-	100	3	-	-	3

Prerequisite: Nil

Course Objectives: To introduce the concepts in Soft Computing such as Artificial Neural Networks,Fuzzy logic-based systems, genetic algorithm-based systems and their hybrids.

Unit-I : Introduction to Soft Computing Artificial neural networks - biological neurons, Basic models of artificial neural networks – Connections, Learning, Activation Functions, McCulloch and Pitts Neuron, Hebb network.

Unit-II : Perceptron networks – Learning rule – Training and testing algorithm, Adaptive Linear Neuron, Back propagation Network –Architecture, Training algorithm.

Unit-III : Fuzzy logic - fuzzy sets - properties - operations on fuzzy sets,fuzzy relations - operations on fuzzy relations.Fuzzy membership functions, fuzzification, Methods of membership value assignments – intuition – inference – rank ordering, Lambda –cuts for fuzzy sets, Defuzzification methods.

Unit-IV : Truth values and Tables in Fuzzy Logic, Fuzzy propositions,Formation of fuzzy rules - Decomposition of rules – Aggregation of rules, Fuzzy Inference Systems - Mamdani and Sugeno

Unit-V : Introduction to genetic algorithm, operators in genetic algorithm -coding - selection - crossover – mutation, Stopping condition for genetic algorithm flow,

Text Books:

1. S. N. Sivanandam and S. N.Deepa, Principles of soft computing – John Wiley & Sons, 2007.
2. Timothy J. Ross, Fuzzy Logic with engineering applications , John Wiley & Sons, 2016

References Books:

1. N. K. Sinha and M. M. Gupta, Soft Computing & Intelligent Systems: Theory & Applications-Academic Press /Elsevier. 2009.
2. Simon Haykin, Neural Network- A Comprehensive Foundation- Prentice Hall International, Inc.1998
3. R. Eberhart and Y. Shi, Computational Intelligence: Concepts to Implementation, Morgan Kaufman/Elsevier, 2007.
4. Driankov D., Hellendoorn H. and Reinfrank M., An Introduction to Fuzzy Control-Narosa Pub., 2001.

5. Bart Kosko, Neural Network and Fuzzy Systems- Prentice Hall, Inc., Englewood Cliffs, 1992
6. Goldberg D.E., Genetic Algorithms in Search, Optimization, and Machine Learning- Addison Wesley, 1989.

Course Outcomes: The students would be able to-

CO-1: Learn soft computing techniques and their applications.
CO-2: Analyze various neural network architectures.
CO-3: Define the fuzzy systems.
CO-4: Understand the genetic algorithm concepts and their applications..
CO-5: Identify and select a suitable Soft Computing technology to solve the problem.

Mapping of COs and POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	2										
CO2	1		2	2	1								2	2
CO3	2	2	2	2	2								2	2
CO4		1	2	2	1								2	2
CO5	2	2	2	2	1						1		2	2

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VIII - SEM B.Tech. ICB	Subject Code	Subject Name / Title	Maximum Marks Allotted						Contract Hrs.			Total Credits
			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2182 (B)	Professional Ethics & human Values	70	20	10	-	-	100	3	-	-	3

Prerequisite : Nil

Course Objective:

- To create an awareness on Engineering Ethics and Human Values.
- To understand the social responsibility of an engineer .
- To appreciate ethical dilemmas while discharging duties in professional life.

UNIT I : HUMAN VALUES
Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence –Character .

UNIT II : ENGINEERING ETHICS 04
Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories. Valuing Time – Cooperation – Commitment

UNIT III : ENGINEERING AS SOCIAL EXPERIMENTATION 03
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT IV : SAFETY, RESPONSIBILITIES AND RIGHTS 03
Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies.

UNIT V : GLOBAL ISSUES 03
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors - moral leadership

Text Books:
1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

References Books:
1. 1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004

2. (Indian Reprint now available).
3. 2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and
4. Cases”, Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
5. 3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
6. 4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001

Course Outcomes: The students would be able to:

CO-1: Understanding basic purpose of profession,professional ethics and various moral and social issues.
CO-2: Awareness of professional rights and responsibilities of a Engineer, safety and risk benefit analysis of a Engineer
CO-3: Acquiring knowledge of various roles of Engineer In applying ethical principles at various professional levels
CO-4: Professional Ethical values and contemporary issues
CO-5: Excelling in competitive and challenging environment to contribute to industrial growth.

Mapping of COs and POs:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO 11	PO_{12}	PSO1	PSO2
CO-1			**2**										**1**	
CO-2	**2**	**2**											**1**	**2**
CO-3	**2**		**1**		**3**								**2**	
CO-4	**1**	**2**											**1**	
CO-5	**1**		**1**										**1**	

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			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2182 (C)	Professional Ethics & human Values	70	20	10	-	-	100	3	-	-	3

Prerequisite : Basic concepts in networking in Blockchain

Course Objectives:
• To provide the knowledge and expertise to become a proficient data scientist;
• Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;
• Produce Python code to statistically analyze a dataset;
• Critically evaluate data visualizations based on their design and use for communicating stories from data;

Course Contents:

UNIT I: Data Science-What is Data Science, Need for Data Science, Difference between Data Science & Business Intelligence, Data Science Components, Tools for Data Science, Data Science Life cycle, Applications of Data Science, Data Science Ethics. Representation of Data- Types of data, primary, secondary, quantitative and qualitative data. Types of Measurements, nominal, ordinal, discrete and continuous data.

UNIT II: Presentation of data by tables, construction of frequency distributions for discrete and continuous data. Graphical representation of a frequency distribution by histogram and frequency polygon, cumulative frequency distributions. Data Pre-processing- Knowing Data, Data Cleaning, Data Integration, Data Selection, Data Transformation

UNIT III: Descriptive Statistics-Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean. Partition values: Quartiles, Deciles and percentiles. Measures of dispersion: Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation. Moments: measures of skewness, Kurtosis

UNIT IV: Correlation-Scatter plot, Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient, multiple and partial correlations. Regression: Concept of errors, Principles of Least Square, Simple linear regression and its properties. Types of Regressions.

UNIT V: Basics of Big Data, Problem handling large data, general techniques for handling large data, Basic concept of Machine Learning, training model, validating model, supervised & unsupervised learning.

Reference Books:

1. 1. Joel Grus, Data Science from Scratch, Shroff Publisher/O'Reilly Publisher Media
2. 2. Annalyn Ng, Kenneth Soo, Num sense Data Science for the Layman, Shroff Publisher Publisher
3. 3. Cathy O 'Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline. O'Reilly Publisher.

Course Outcomes: The students would be able to-

CO1: To explain how data is collected, managed and stored for data science.
CO2: To understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.
CO3: To implement data collection and management scripts using MongoDB.
CO4: Examine the techniques of Data Visualization.
CO5: Identification of various applications of Data Science.

Mapping of CO and PO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	2											3	
CO-2	3	3			1									
CO-3	3	3	1		1							3		3
CO-4	3	3	2	1								1	2	3
CO-5	3	3										1	2	

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			Theory			Practical						
			End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work & Sessional	Total Marks	L	T	P	
	ICB-2183	Major Project Final	-	-	-	400	150	550	-	-	16	8

Procedure:
a) Each defined project needs to befrom Industry/Research organization/Govt organization/socio-technical issues.
b) Project identification should be based on Analysis carried out by the students after completion of B.E Semester 6th Examination but before starting of the 7th Semester
c) Problem definition for the project needs to be submitted by every student in the first week of the 7th Semester to his/her college.
d) Each definition will be evaluated based on merit in the beginning of the 7th semester by the College.

Facilitation:
You may contact your Major Project In charge co-ordinator/Faculty /Department Head for skilful Analysis.

Guidelines for the Students:

1. The project work will be an in-house industry project, where students need to implement projects related to any domain of industry like education, legal, manufacturing, design, pharmaceutical, Ecommerce, etc.

2. Students are required to get approval of project definition from the department.

3. After approval of project definition students are required to report their project work weekly to respective internal guide.

4. Maximum 4 students can be allowed to work in a particular project group.

5. The students are required to identify their projects Within two weeks of Commencement of the classes and they are required to follow all the rules and instructions issued by the department.

6. Each student or student group would work under the guidance of the Faculty from the College. In case any problem/other issue arises for the smooth progress of Inter Departmental project work discovery/Practical Training, it should be immediately brought to the notice of the major project in charge coordinator/Faculty.

7. The students are required to submit Project Report to their Head Of The Department with the remarks of the guide in their College during the Eighth week of the semester.

Major Project CO's:
Part-I-VII Semester

CO1- Identify the problem domain correctly and to represent the problem using mathematical structures and logics.
CO2- Analyze possible solution strategies and investigate problem domain and design feasible solutions for it.

Part-II-VIII Semester

CO3- Make use of cutting edge tools and technologies to derive solutions for the problems and carry out a detailed study about the feasibility and societal impact of solutions.
CO4- Acknowledges the previous work and support required in the solution. Justify the role of individuals in project work. Demonstrate leadership skills in team work.
CO5- Present and communicate the importance of solutions of problem domain. Conduct and accomplish all the subtasks for project completion in time and cost effective manner and conclude the project work with possible Scopes.

Mapping of COs and POs:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3			2								2	2
CO-2	2	3		3		1	2						2	
CO-3			3		3	2	3						2	2
CO-4								3	3					
CO-5					2					3	3	3		2