Nirma University
Institute of Technology
Teaching & Examination Scheme
M Tech Computer Science and Engineering (Cyber Security)
Semester - I

Course Code:	3CS5101
Course Title:	Machine and Deep Learning

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. appraise the need of machine learning and deep learning
2. evaluate variety of machine learning algorithms for appropriate applications
3. adapt different deep learning algorithms appropriate to solve problems in various domains
4. make use of machine learning and deep learning techniques to solve problems in applicable domains

Course Code:	3CS5102
Course Title:	Data Structures and Algorithms

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize different data structures
2. identify appropriate data structures and methodologies for efficient algorithm design
3. analyse various data structures and their applicability
4. design and implement efficient algorithms using various approaches

Course Code:	3CS5103
Course Title:	Cryptography Essentials

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. explain the fundamentals of classical and advanced cryptography techniques
2. apply the mathematical foundations to modern cryptographic techniques
3. evaluate symmetric, asymmetric cryptographic techniques
4. apply security mechanisms for application development

Course Code:	3CS5104
Course Title:	Data Privacy

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. explain the concepts of web security and privacy, hardware and software vulnerabilities and protection mechanisms
2. infer the need for data privacy and the related technologies
3. analyze the requirements of attacks and secure data sharing practices with privacy preservation policies
4. make use of the protection mechanisms against several data-related attacks

Course Code:	3CS5105
Course Title:	Secured Cloud Computing

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. explain the fundamentals of cloud computing architectures based on current standards, protocols, and best practices
2. illustrate the concepts and guiding principles for designing and implementing security in Cloud Computing
3. infer the safeguards and countermeasures for Cloud-based IT services

4. identify the known threats, risks, vulnerabilities and privacy issues associated with Cloud-based IT services

Course Code:	3SP1104
Course Title:	Cyber Laws

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
1	-	-	-	-	-	-

Course Learning Outcomes (CLO):

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

1. compare traditional legal regimes due to the inherent characteristics of internet
2. discuss the legal and privacy issues as well as data protection
3. relate the role of Information Technology laws in governing e-commerce, e-governance and e-contracting and the challenges
4. formulate different types of e-Contracts

Semester - II

Course Code:	3CS5201
Course Title:	Digital Forensics

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. identify the need of digital forensic and role of digital evidences
2. illustrate forensic duplication and file system analysis
3. make use of various tools for data recovery
4. apply network forensics to collect digital evidences

Course Code:	3CSDE151
Course Title:	Hacking and Counter Hacking

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. summarize the core concepts related to system security and software vulnerabilities and their causes
2. choose state-of-the-art tools to exploit the vulnerabilities related to computer system and networks
3. examine security and trust in hardware
4. solve the security issues in computer systems

Course Code:	3CSDE152
Course Title:	Intrusion Detection and Prevention Systems

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. explain the practical aspects of intrusion detection systems
2. apply machine learning techniques to optimize performance of intrusion detection

system
3. relate user profile, attacks, reactions and responses in network systems
4. develop customized IDS/IPS/Firewalls for organizational requirements.

Course Code:	3CS42D105
Course Title:	Data Mining and Visualization

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –
1. identify a number of common data domains and corresponding analysis tasks, including multivariate data, networks, text and cartography
2. comprehend the key processes of data mining, data warehousing and knowledge discovery process
3. implement data mining techniques to solve problems in other disciplines in a mathematical way
4. exercise building and evaluating visualization systems

Course Code:	3CS12D104
Course Title:	Internet of Things

Credit Scheme

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

Course Learning Outcomes (CLOs):
At the end of the course, students will be able to –
1. summarize the architectural components and platforms of IoT ecosystem
2. apply appropriate access technology and protocol as per the application requirement
3. identify data analytics and data visualization tools as per the problem characteristics
4. develop a secured IoT network

Course Code:	3CSDE153
Course Title:	System and Website Audit

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain the role of IT governance and Information Security Policy
2. identify components of information systems and the concept of critical data
3. evaluate the system and websites to carry out the audit processes
4. develop various reports after audit process for information systems, web applications and information assets

Course Code:	3CS12D201
Course Title:	Blockchain Technology

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain the concept of Blockchain technology
2. develop the structure of a Blockchain network
3. evaluate security issues relating to Blockchain and cryptocurrency
4. design the applications based on Blockchain technology.

Course Code:	3CSDE251
Course Title:	Secured Application Testing and Quality Assurance

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. identify various security threats in the system
2. evaluate the potential vulnerabilities of the system
3. assess the security risks in the system
4. solve the security problems through coding.

Course Code:	3CSDE252
Course Title:	Quantum Computing

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –
1. explain the basics of quantum operation and gates
2. interpret the models for quantum computing
3. analyze the classes of problems that are solvable by quantum computers
4. design quantum circuits and algorithms on related problems in Computer Science

Course Code:	3CSDE253
Course Title:	Mobile and Wireless Network Security

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –
1. explain the fundamental concepts of mobile and wireless network security
2. design a wireless network with all required configurations
3. identify security threats in wireless networks and design strategies to manage network security
4. design secured network application considering all possible threats

Course Code:	3CSDE351
Course Title:	Surveillance and Analytics

Credit Scheme

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

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –
1. illustrate types of surveillance systems, their components and summarize objectives of analyzing surveillance data
2. identify important components of a surveillance system and its analytical pipeline and apply various preprocessing techniques on a video
3. create intelligent models using machine learning and deep learning for different surveillance task
4. assess different analytics tasks on surveillance data and adapt existing techniques and models for them.

Course Code:	3CSDE352
Course Title:	Microservices Architecture and Programming

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. define the key advantages and complexities present in microservice architectures
2. apply appropriate architectural approach for the design of microservices
3. make use of microservice applications effectively with the suitable techniques and technologies
4. test the deployment of microservice applications on cloud platforms

Course Code:	3CSDE353
Course Title:	Embedded System Security

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. explain the basics of embedded firmware, hardware and software vulnerabilities and their causes
2. design hardware based trust platforms and implement physically Unclonable functions
3. make use of tools and technologies to exploit the vulnerabilities related to embedded systems
4. apply countermeasures against the introduced attacks

Course Code:	3CSDE354
Course Title:	Secured Application Development

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. identify the need of secured application Development and its role
2. illustrate building blocks for secured application development
3. show various tools for application testing

4. apply concepts of security in developing software applications

Course Code:	3SS1201
Course Title:	Research Methodology and IPR

Credit Scheme

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

Course Learning Outcomes (CLO):

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

1. formulate a research problem for a given engineering domain
2. analyse the available literature for given research problem
3. develop technical writing and presentation skills
4. comprehend concepts related to patents, trademark and copyright

Course Code:	3CS5202
Course Title:	Minor Project

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
0	0	10	-	-	-	5

Course Learning Outcomes (CLO):

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

1. identify the issues related with the recent trends in the field of computer science and its applications
2. formulate the problem definition, analyze and do functional simulation of the same
3. design, implement, test and verify the proposed solution related to problem definition
4. compile, comprehend and present the work carried out

Semester - III

Course Code:	3CS1302
Course Title:	Major Project Part-I

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
-	-	-	-	-	-	14

Course Learning Outcomes (CLO):

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

1. understand the issues related with the recent trends in the field of engineering and its applications
2. formulate the problem definition, analyze and do functional simulation of the same
3. design, Implement, test and verify the engineering solution related to problem definition
4. compile, Comprehend and Present the work carried out
5. manage Project

Semester - IV

Course Code:	3CS1402
Course Title:	Major Project Part-II

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
-	-	-	-	-	-	14

Course Learning Outcomes (CLO):

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

1. understand the issues related with the recent trends in the field of engineering and its applications
2. formulate the problem definition, analyze and do functional simulation of the same
3. design, Implement, test and verify the engineering solution related to problem definition
4. compile, Comprehend and Present the work carried out
5. manage Project