

Annexure 27.A.6.2

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**UNIVERSITY SCHOOL
OF
INFORMATION AND COMMUNICATION TECHNOLOGY**

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND 4IR TECHNOLOGIES

PROGRAMME STRUCTURE

**B.TECH. ARTIFICIAL INTELLIGENCE
2021-2025**



**GAUTAM BUDDHA UNIVERSITY
GAUTAM BUDH NAGAR, GREATER NOIDA, UP, INDIA**

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B.Tech. Artificial Intelligence

Effective from 2021 (Batch 2021-2025)

SEMESTER I

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CS101	Fundamentals of Computer Programming	3	1	0	4	CC1 / FC
2	AI101	Introduction of Artificial Intelligence	2	0	0	2	CC2 / FC
3	MA101	Engineering Mathematics-I	3	1	0	4	GE1
4	PH102	Engineering Physics	3	1	0	4	GE2
5	EC101	Basic Electronics Engineering	3	1	0	4	GE3 / FC
6	EN101	English Proficiency	2	0	0	2	OE1 / AECC
7	CE103	Engineering Graphics Lab	1	0	2	2	GE-L1
8	CS181	Computer Programming Lab	0	0	2	1	CC-L1 / SEC
9	PH104	Engineering Physics Lab	0	0	2	1	GE-L2
10	EC181	Basic Electronics Engineering Lab	0	0	2	1	GE-L3
11	GP	General Proficiency	Non Credit				
Total Hours and Credits			14	3	8	25	

SEMESTER II

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SEMESTER III

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	AI201	Software Engineering	3	0	0	3	CC5
2	AI203	Intelligent Systems	3	0	0	3	CC6
3	AI205	Theory of Automata	3	0	0	3	CC7
4	AI207	Database Management Systems	3	0	0	3	CC8
5	AI209	Computer Vision	3	0	0	3	CC9
6	AI211	Introduction to R Programming	3	1	0	4	CC10 / SEC
7	AI281	Database Management Systems Lab	0	0	3	2	CC-L4
8	AI283	Computer Vision Lab	0	0	3	2	CC-L5
9	AI285	R Programming Lab	0	0	3	2	CC-L6 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER IV

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	AI202	Machine Learning	3	1	0	4	CC11
2	AI204	Operating System	3	0	0	3	CC12
3	AI206	Biometric Security	3	0	0	3	CC13
4	AI208	Introduction to MATLAB	3	0	0	3	CC14 / SEC
5	AI210	Quantum Computing	3	0	0	3	CC15
6	AI212	Computer Networks	3	0	0	3	CC16
7	AI282	Machine Learning Lab using Python	0	0	3	2	CC-L7 / SEC
8	AI284	Operating System Lab	0	0	3	2	CC-L8
9	AI286	MATLAB	0	0	3	2	CC-L9 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER V

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	AI301	Big Data Analytics	3	0	0	3	CC17
2	AI303	Compiler Design	3	0	0	3	CC18
3	AI305	Deep Learning	3	0	0	3	CC19 / SEC
4	AI307	Information Security Management	3	1	0	4	CC20
5		Elective 1	3	0	0	3	E1 / DSE
6		Elective 2	3	0	0	3	E2 / DSE
7	AI381	Big Data Analytics Lab	0	0	3	2	CC-L10 / SEC
8	AI383	Compiler Design Lab	0	0	3	2	CC-L11
9	AI385	Deep Learning Lab using Python	0	0	3	2	CC-L12
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER VI

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	AI302	IoT and Its Applications	3	0	0	3	CC21
2	AI304	Expert Systems	3	0	0	3	CC22
3	AI306	Robot Kinematics	3	0	0	3	CC23
4	AI308	Convex Optimization	3	0	0	3	CC24
5		Elective 3	3	1	0	4	CC24
6		Elective 4	3	0	0	3	E3 / DSE
7	AI382	Internet of Things Lab	3	0	0	3	E4 / DSE
8	AI384	Expert Systems Lab	0	0	3	2	CC-L13
9	AI386	Robot Kinematics Lab	0	0	3	2	CC-L14 / SEC
10	GP	General Proficiency	0	0	3	2	CC-L15
Total Hours and Credits			Non Credit				
Total Hours and Credits			18	1	9	25	

Industrial Training will be done by candidate individually after third year during the summer break and it will be of minimum 4 weeks. It will be evaluated as per University Examination in VII semester.

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SEMESTER VII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	MA402	Modeling and Simulation	3	0	0	3	GE7
2	AI401	Computational Intelligence	3	0	0	3	CC25
3	AI403	Robotics and Drones	3	0	0	3	CC26
4	AI405	Natural Language Processing	3	0	0	3	CC27
5		Elective 5	3	0	0	3	E5 / DSE
6	AI481	Robotics and Drones Lab	0	0	3	2	CC-L16
7	AI491	Minor Project	0	0	6	3	IT1 / E
8	AI493	Industrial Training	0	0	10	5	MP1 / E
9	GP	General Proficiency	Non Credit				
Total Hours and Credits			15	0	19	25	

SEMESTER VIII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	AI490	Seminar	0	0	3	2	S / E
2	AI492	Major Project	0	0	16	8	I / E
3	AI494	Internship	0	0	30	15	MP2 / E
4	GP	General Proficiency	Non Credit				
Total Hours and Credits			0	0	49	25	

GRAND TOTAL OF CREDITS = 200

In the **Seminar**, student need to study and present individually, on latest research paper of their specialized area and It will be evaluated as per University Examination Rules.

The **Internship** in Industry will be done by candidate individually during the 8th semester and it will be for a minimum of 4 (-6) months. It will be evaluated as per University Examination Rules.

Minor and Major Project will be in a group and It will be evaluated as per University Examination Rules.

USICT will provide a mentor/supervisor for industrial training, seminar, internship, minor and major projects.

S.No.	Course Code		3	0	0	3	Types
1	AI309	Computer Graphics	3	0	0	3	E1
2	AI311	Introduction to Brain and Neuroscience	3	0	0	3	E1
3	AI313	Stochastic Processes	3	0	0	3	E1
4	AI315	Computer Based Numerical & Statistical Techniques	3	0	0	3	E1
5	AI317	Sequence Models	3	0	0	3	E1
6	AI319	Bayesian Data Theory	3	0	0	3	E2
7	AI321	Speech Analysis and Systems	3	0	0	3	E2
8	AI323	Graph Theory	3	0	0	3	E2
9	AI325	Distributed Database	3	0	0	3	E2
10	AI327	Embedded Systems	3	0	0	3	E2
11	AI310	Digital Image Processing	3	0	0	3	E3
12	AI312	Gaming	3	0	0	3	E3
13	AI314	Knowledge Engineering	3	0	0	3	E3
14	AI316	Predictive Analysis	3	0	0	3	E3
15	AI318	Digital Fabrication	3	0	0	3	E3
16	AI320	AI Enabled Cyber Security	3	0	0	3	E4
17	AI322	Computational Intelligence	3	0	0	3	E4
18	AI324	Fuzzy logic	3	0	0	3	E4
19	AI326	Distributed Operating System	3	0	0	3	E4
20	AI328	Pattern Recognition	3	0	0	3	E4
21	AI407	Automation and Robotics	3	0	0	3	E5
22	AI409	Optimization Techniques	3	0	0	3	E5
23	AI411	3D Printing	3	0	0	3	E5
24	AI413	Parallel Distributed Systems	3	0	0	3	E5
25	AI415	Time Series Analysis and Applications	3	0	0	3	E5

AI Artificial Intelligence

CC Core Course from USICT for Type of Course

GE General Elective from related discipline of other Deptt./School

GE L General Elective Lab from related discipline of other Deptt./School

OE Open Elective from other discipline of other Deptt./School

AECC Ability Enhancement Compulsary Course

DSE Discipline Specific Course

SEC Skill Enhancement Course

E Elective from USICT

CC-L Core Course Lab from USICT

IT1 Industrial Training

MP Minor / Major Project

S Seminar

I Internship

**UNIVERSITY SCHOOL
OF
INFORMATION AND COMMUNICATION TECHNOLOGY**
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND 4IR TECHNOLOGIES
PROGRAMME STRUCTURE

B.TECH. COMPUTER SCIENCE AND ENGINEERING
SPECILIZATION : CYBER SECURITY
2021-2025



GAUTAM BUDDHA UNIVERSITY
GAUTAM BUDH NAGAR, GREATER NOIDA, UP, INDIA

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SEMESTER I

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	MA101	Engineering Mathematics-I	3	1	0	4	GE1
2	PH102	Engineering Physics	3	1	0	4	GE2
3	EE102	Basic Electrical Engineering	3	1	0	4	GE3
4	ME101	Engineering Mechanics	3	1	0	4	GE4
5	ES101	Environmental Studies	3	1	0	4	OE1 / AECC
6	PH104	Engineering Physics Lab	0	0	2	1	GE-L1
7	EE104	Basic Electrical Engineering Lab	0	0	2	1	GE-L2
8	EN151	Language Lab	0	0	2	1	OE-L1 / SEC
9	ME102	Workshop Practice	1	0	2	2	GE-L3 / SEC
10	GP	General Proficiency					
Total Hours and Credits			16	5	8	25	

SEMESTER II

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CS101	Fundamentals of Computer Programming	3	1	0	4	CC1 / FC
2	CC102	Introduction to Cyber Security	2	0	0	2	CC2 / FC
3	MA102	Engineering Mathematics-II	3	1	0	4	GE5
4	EC101	Basic Electronics Engineering	3	1	0	4	GE6
5	CS102	Computer Organization and Architecture	3	1	0	4	CC3
6	EN101	English Proficiency	2	0	0	2	OE2 / AECC
7	CE103	Engineering Graphics Lab	1	0	2	2	GE-L4
8	CS181	Computer Programming Lab	0	0	2	1	CC-L1 / SEC
9	CC182	Cyber Security Lab	0	0	2	1	CC-L2 / SEC
10	EC181	Basic Electronics Engineering Lab	0	0	2	1	GE-L5
11	GP	General Proficiency					
Total Hours and Credits			14	3	8	25	

SEMESTER III

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC201	Internet Technology	3	0	0	3	CC3 / SEC
2	CC203	Operating Systems	3	0	0	3	CC4
3	CC205	Data Structure & Algorithms	3	0	0	3	CC5 / SEC
4	CC207	Introduction to Python	3	0	0	3	CC6
5	CC209	Information Retrieval Systems	3	0	0	3	CC7
6	MA201	Engineering Mathematics-III	3	1	0	4	GE8
7	CC281	Internet Technology Lab	0	0	3	2	CC-L3
8	CC283	Data Structure & Algorithms Lab	0	0	3	2	CC-L4 / SEC
9	CC285	Python Programming Lab	0	0	3	2	CC-L5 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER IV

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC202	Software Engineering	3	0	0	3	CC8
2	CC204	Database Management System	3	0	0	3	CC9 / SEC
3	CC206	Java Programming	3	0	0	3	CC10
4	CC208	Artificial Intelligence	3	0	0	3	CC11
5	CC210	Information Theory and Coding	3	0	0	3	CC12
6	CC212	Theory of Automata	3	1	0	4	CC13 / SEC
7	CC282	Database Management System Lab	0	0	3	2	CC-L6 / SEC
8	CC284	Java Programming Lab	0	0	3	2	CC-L7 / SEC
9	CC286	Information Theory and Coding Lab	0	0	3	2	CC-L8 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER V

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC301	Compiler Design	3	1	0	4	CC14 / AECC
2	CC303	Soft Computing Techniques	3	0	0	3	CC15
3	CC305	Analysis and Design of Algorithms	3	0	0	3	CC16 / SEC
4	CC307	Cryptography and Data Privacy	3	0	0	3	CC17
5	CC309	Machine Learning	3	0	0	3	CC18 / SEC
6		Elective 1	3	0	0	3	E1 / DSE
7	CC381	Analysis and Design of Algorithms Lab	0	0	3	2	CC-L9 / SEC
8	CC383	Cryptography and Data Privacy Lab	0	0	3	2	CC-L10 / SEC
9	CC385	Machine Learning using Python Lab	0	0	3	2	CC-L11 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

SEMESTER VI

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC302	Web Development using PHP	3	0	0	3	CC19
2	CC304	Network Defense for Cyber Security	3	0	0	3	CC20
3	CC306	Risk Management and Audit	3	1	0	4	CC21
4	CC308	Digital Forensic, Audit and Investigations	3	0	0	3	CC22
5	CC310	Data Privacy and Database Security	3	0	0	3	CC23 / SEC
6		Elective 2	3	0	0	3	E2 / DSE
7	CC382	Web Development using PHP Lab	0	0	3	2	CC-L12 / SEC
8	CC384	Network Defense for Cyber Security Lab	0	0	3	2	CC-L13
9	CC386	Data Privacy and Database Security Lab	0	0	3	2	CC-L14
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

Industrial Training will be done by candidate individually after third year during the summer break and it will be of minimum 4 weeks. It will be evaluated as per University Examination in VII semester.

2021-2025)

B.Tech. Computer Science and Engineering - Specialization : Cyber Security

Effective from 2021 (Batch 2021-2025)

SEMESTER VII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	MA401	Modeling & Simulation	3	1	0	4	GE9
2	CC401	Blockchain Technology	3	0	0	3	CC24
3	CC403	AI Enabled Cyber Security	2	0	0	2	CC25 / SEC
4		Elective 3	3	0	0	3	E3 / DSE
5		Elective 4	3	0	0	3	E4 / DSE
6	CC481	AI Enabled Cyber Security Lab	0	0	3	2	CC-L15
7	CC491	Minor Project	0	0	10	5	MP1 / E
8	CC493	Industrial Training	0	0	6	3	IT1 / E
9	GP	General Proficiency	Non Credit				
Total Hours and Credits			14	1	19	25	

SEMESTER VIII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC490	Seminar	0	0	3	2	S / E
2	CC492	Major Project	0	0	16	8	MP2 / E
3	CC494	Internship	0	0	30	15	I / E
4	GP	General Proficiency	Non Credit				
Total Hours and Credits			0	0	49	25	

GRAND TOTAL OF CREDITS = 200

In the Seminar, student need to study and present individually, on latest research paper of their specialized area and It will be evaluated as per University Examination Rules.

The Internship in Industry will be done by candidate individually during the 8th semester and it will be for a minimum of 4 (-6) months. It will be evaluated as per University Examination Rules.

Minor and Major Project will be in a group and It will be evaluated as per University Examination Rules.

USICT will provide a mentor/supervisor for industrial training, seminar, internship, minor and major projects.

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Effective from 2021 (Batch 2021-2025)

B.Tech. Computer Science and Engineering - Specialization : Cyber Security

ELECTIVES FROM AI4IRT

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CC311	Security Information & Event Management	3	0	0	3	E1
2	CC313	Intrusion Detection and Prevention System	3	0	0	3	E1
3	CC315	Cryptography	3	0	0	3	E1
4	CC317	Biometric System and Security	3	0	0	3	E1
5	CC319	Ethical Hacking	3	0	0	3	E2
6	CC312	Mobile Security	3	0	0	3	E2
7	CC314	Cloud Architecture and Security	3	0	0	3	E2
8	CC316	Principle of Secure Coding	3	0	0	3	E2
9	CC318	Information Warfare	3	0	0	3	E2
10	CC320	Social Network Security	3	0	0	3	E3
11	CC405	Physical Security of IT Infrastructure	3	0	0	3	E3
12	CC407	NISTA 800-53 (Security Control)	3	0	0	3	E3
13	CC409	Operating Systems Security	3	0	0	3	E3
14	CC411	Mobile and Wireless Network Security	3	0	0	3	E3
15	CC413	Enterprise Security and Management	3	0	0	3	E4
16	CC415	Malware Analysis	3	0	0	3	E4
17	CC417	Android Security Design and Internals	3	0	0	3	E4
18	CC419	Data and Database Management Security	3	0	0	3	E4
19	CC421	Web Application and Penetration Testing	3	0	0	3	E4
20	CC423	Access Control and Identity Management Systems	3	0	0	3	E4

CC Computer Science & Engineering / Cyber Security for Course Code

CC Core Course from USICT for Type of Course

GE General Elective from related discipline of other Deptt./School

GE L General Elective Lab from related discipline of other Deptt./School

OE Open Elective from other discipline of other Deptt./School

AECC Ability Enhancement Compulsary Course

DSE Discipline Specific Course

SEC Skill Enhancement Course

E Elective from USICT

CC-L Core Course Lab from USICT

IT1 Industrial Training

MP Minor / Major Project

S Seminar

I Internship