



**NADIMPALLI SATYANARAYANA RAJU
INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)**



(Approved by AICTE, New Delhi & Affiliated to JNTU, Kakinada & AN ISO 9001:2015 & ISO 45001 Certified Institution)
Recognized under 2(F) of the UOC Act 1956 & Accredited by NAAC with 'A' Grade (3-10/4-06)
SANTYAM, Pendurthi - Anandapuram Highway, Visakhapatnam - 531173, Ph: 9885624167, 8099464546, www.nsril.edu.in

Computer Science & Engineering

Few specific feedback received reflecting the needs of stakeholders at Local, Regional, National, International level
(The feedbacks are received through centralised online system using google form with timestamp and reflected in the Feedback Form by the Program Coordinator of Computer Science Engineering for documentation attested by the HoD). The received feedback (s) are further discussed in the internal pre-BoS meeting and escalated to the BoS for necessary approval.

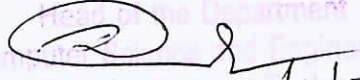
S. No	Few Feedback at	Few specific feedback received from stakeholders	Integration into the curriculum		Semester	POs/PSOs
			Course Code	Course Name		
1	Local Level	Become master the art of writing programs to solve real-world problems	20CSS01	Programming Basics	III	03
		Fundamentals of developing android applications	20CSS04	Android App Development	VI	01,02,05
		Awareness of Ethical Principles	20HSX04	Professional Ethics	VII	08
2	Regional	Make student will learn major or honor course	20CSH07	Fault Tolerant Computing		Honors
			20DSH07	Data Analysis with MAT Lab		
3	National Level	Internet of Things	20CS004	Internet of things	VI	01, 04, 05
		Master Competitive Coding Techniques	20AIS02	Competitive Programming Essentials	IV	03,04,05
		Applying AI to Information	20AI004	Cyber Security	VII	01, 04, 05, PSO2

Commented [ds1]: Few feedback received and action taken are furnished in this page as samples and rest of the evidences are attached in the trailing part of the document pertaining to CSE.

Commented [ds2]: The stakeholders suggested to include app development as it is gaining more attention and making the life more easier. In that context it is included as Skill Oriented Course.

Commented [ds3]: Since several decades the ethics at working environment place a major role enabling the institutions to nurture the character competences of the learners in this context the feedback is considered and included as one course as Professional Ethics.

Commented [ds4]: In the recent days, the problem solving skills is gaining a significant focus among higher education institutions. In this context the stakeholders had given the feedback for including the competitive programming for effective problem solving

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		Security				
		Blockchain Technology	20CS014	Blockchain Technologies	VII	01, 04, 05
		Architectures and Algorithms of IoT	20ECO01	Architectures and Algorithms of IoT	V	01, 04, 05
		Engineering Technical Report in Academics		Technical Paper Writing	V	PO1 – PO12
		Foundational Approach to Solving Practical Software Development Problems	20CS603	Modern Software Engineering	VI	01,02,03
		Networking and Internet Protocols via Programming	20CS009	Network Programming and Protocols	VI	01, 04, 05
		Summer Internship		Summer Internship 1	IV	5, 8, 9, 10, PSO 1
		Summer Internship		Summer Internship 2	VI	5, 8, 9, 10, PSO 1
4	International Level	Cyber Physical Systems	20AIO03	Intelligent Robots and Drone Technology	VII	01, 02, 04, 05, 10
		Project Based Learning	20SHO02	Design the Thinking	VI	01, 04, 05, PSO 1
		Logical reasoning		Quantitative Aptitude	III-VI	


Head of the Department 25/11/23

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SC 20CSS04 Android App Development

0 0 4 2.0

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

Code	Course Outcomes	Mapping with POs and PSOs			DoK
		PO5	PSO1	PSO2	
20CSS04.1	To illustrate the different components of Android OS in detail	3	3	3	L1, L2
20CSS04.2	To develop a mobile application using different components of Android	3	3	3	L1, L2
20CSS04.3	To choose appropriate controls to design the GUI to meet desired needs	3	3	3	L1, L2

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective Pos
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create DoK: Depth of Knowledge

Android SDK Features, The Dalvik Virtual Machine, Downloading and Installing the Android SDK, Developing with Eclipse, Application Manifest File, Creating resources, Drawables, Layouts, Animations, Menus, Building user Interfaces-Assigning user interfaces to Activities, Layouts-Linear, Relative and Grid Layout, Working with fragments, Android widget Toolbox-Creating New Views, Introducing adapters, Intents and Broadcast receivers, Databases and content providers-SQLite Databases and content Providers, Introducing services, Using background threads, using alarms, Customizing toasts, Introducing Notifications, Maps

References

1. Reto Meier, "Professional Android 4 Application Development", Wrox, 2018
2. Dave MacLean, Satya Komatineni, Grant Allen, "Pro Android 5", Apress 2015
3. John Horton, "Android Programming for Beginners", PACKT 2015
4. Wallace Jackson, "Android Apps for Absolute Beginners", Apress, 2013


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ICC 20ICC01 Competitive Programming

2 0 8 6

Version: 01.00

Duration 240 hours (2 hours theory and 14 hours practical per week) as specified above
 Industry Collaborator M/s. Demy Software Solutions, Visakhapatnam

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

Code	Course Outcomes	Mapping with POs		DoK
		POs / PSOs	Weight	
20ICC01.1	Understand the basics of Programming	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC01.2	Explain various types of Operators, operations, relations, and techniques in programming	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC01.3	Demonstrate gaming basics	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC01.4	Execute various Operations on Linked lists	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC01.5	Explore various applications of the techniques.	1, 2, 3, PSO #1	3	L1, L2, L3
20ICC01.6	Solving various problems of Binary Trees, insertion, deletion and updation.	1, 2, 3, PSO #1	3	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective POs
 L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create, DoK: Depth of Knowledge

Deliverables

WEEK 1 - Introduction- Execution of a program, Decimal - Binary conversion, Ranges of Data Types and constraints, Complexity Analysis of Algorithms, Big-O Notation, Time & Space Analysis and Constraints, Importance of constraints

WEEK 2 - Bit-Manipulation, Bitwise operators, Bit-masking, Modular Arithmetic, Recursion, Thinking Recursively, Recurrence Relations, Sorting Techniques, Two Pointer Technique

WEEK 3 - Binary Search, Applications of Binary Search, Lower Bound & Upper Bound, Finding Frequency, Optimization problems, Hashing, Hashing Techniques, Collision Resolutions, Inbuilt Libraries

WEEK 4 - Maps and Sets, Subarrays and Sub sequences, String matching, Sieve of Eratosthenes, Segmented Sieve, Game Theory, Nims Game, Counting Game

WEEK 5 - Prefix and Suffix concepts, Collecting water, Stacks, Balanced Parentheses, Largest Histogram Area, Queues, Sliding Window Maximum

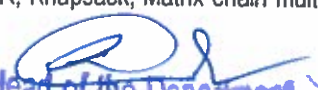
WEEK 6 - Linked Lists, Various Operations on linked lists, LRU Cache, Cloning Linked list with random pointer, Doubly-linked list

WEEK 7 - Binary Trees, BT and FBT, Traversals, Various operations on Binary Trees, Binary Search Trees, Insertion, Updating and Deletion

WEEK 8 - More Problems on Binary Trees, Iterative Traversals, Least Common Ancestor, Heaps, Quick Select, Running Median, Trie, Introduction and Implementation

WEEK 9 - Problems on Tries, Maximum XOR pair, Partitioning of string, 1D Dynamic Programming, Approaching DP problem, Problems on Overlapping subproblems, Problems on Optimal Substructure, Longest Increasing Subsequence

WEEK 10 - 2D Dynamic Programming, Compute NCR, Knapsack, Matrix chain multiplication, Graphs, Introduction and


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Implementation, Dijkstra, Topological sort.

Assessment

Mode of Delivery	Offline / Online
No. of transferable credits for redemption	9 (Nine)
Credits validity	7 years from the date of registration of the program and remains NIL after redemption for the award of the degree.
Dedicated certificate by the collaborating industries	Yes

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Board of Studies**

**Head of the Department
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HS 20HSX04 Professional Ethics

3 0 0 3

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

Code	Course Outcomes	Mapping with POs		DoK
		PO8	PO12	
20HSX04.1	Understand the ethics and apply ethics in society	3	1	L1, L2, L3
20HSX04.2	Discuss the ethical issues related to engineering and realize the responsibilities and rights in the society	3	1	L1, L2, L3
20HSX04.3	Know the code of ethics and industrial standards	3	1	L1, L2, L3
20HSX04.4	Understand the rights and responsibilities of an employee at workplace	3	1	L1, L2, L3
20HSX04.5	Understand environmental ethics and CSR of companies	3	1	L1, L2, L3

1. Weakly Contributing | 2. Moderately Contributing | 3. Strongly Contributing, for the attainment of respective Pos
L1: Remember | L2: Understand | L3: Apply | L4: Analyze | L5: Evaluate | L6: Create. DoK: Depth of Knowledge

Unit I: Introduction to Ethics

9 Hours

Need and importance of ethics, objectives, morals, values and ethics – integrity – work ethic – service learning – civic virtue – respect for others – living peacefully – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence.

Unit II: Engineering Ethics

9 Hours

Senses of 'engineering ethics' – variety of moral issues – types of inquiry – moral dilemmas – moral autonomy – consensus and controversy – models of professional roles – self-interest – self respect - customs and religion.

Unit III: Engineering as Social Experimentation

9 Hours

Engineering as experimentation – engineers as responsible experimenters – codes of ethics – industrial standards - a balanced outlook on law.

Unit IV: Safety, Responsibilities and Rights

9 Hours

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis - Safety lessons from Challenge - Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights.

Unit V: Global Issues

9 Hours

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers–Moral Leadership– Code of Conduct– Corporate Social Responsibility.

Text Books

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003
2. Govindarajan M., Natarajan S., Senthil Kumar V. S., "Engineering Ethics", Prentice Hall of India, New Delhi, 2004

Reference Books

1. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" McGraw Hill Education, India Pvt. Ltd., New Delhi, 2013, Web References
2. World Community Service Centre, ' Value Education', Vethathiri Publications, Erode, 2011
3. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009

Web References

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org



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Computer Science and Engineering

Credit requirement for the award of the degree under academic Regulation 2020–2021 for the candidates admitted from the academic year 2021 onwards

		Four Years	Three Years					
B. Tech.(Regular Degree)		160	121					
B. Tech.(Honors Degree)		180	141					
B. Tech.(With Minor specialization other than Chosen Branch of Engg. & Tech.)		180	141					
Semester I								
No.	Code	Course	POs	Contact Hours				
				L	T ¹	P	C	
01	20HSX01	Communicative English	10	3	0	0	3.0	HS
02	20BSX11	Linear Algebra and Differential Equations	1, 12 ²	3	1	0	3.0	BS
03	20BSX33	Applied Physics	1	3	1	0	3.0	BS
04	20ESX02	Programming for Problem Solving using 'C'	1	3	0	0	3.0	ES
05	20CS101	Fundamentals of Computer Science	1	3	0	0	3.0	ES
06	20HSX02	Communicative English Lab	1, 10	0	0	3	1.5	HS
07	20BSX34	Applied Physics Lab	1, 4	0	0	3	1.5	BS
08	20ESX07	Programming for Problem Solving using 'C' Lab	1, 4	0	0	3	1.5	ES
Sub-total				15	02	09	19.5	
Semester II								
01	20BSX12	Partial Differential Equations and Vector Calculus	1	3	1	0	3.0	BS
02	20BSX23	Applied Chemistry	1	3	1	0	3.0	BS
03	20ESX05	Basic Electrical and Electronics Engineering	1	3	1	0	3.0	ES
04	20CS201	Data Structures using 'C'	1	3	1	0	3.0	ES
05	20EC203	Digital Logic Design	1	3	1	0	3.0	ES
06	20BSX24	Applied Chemistry Lab	1, 4	0	0	3	1.5	BS
07	20CS202	Data Structures using 'C' Lab	1, 4	0	0	3	1.5	ES
08	20ESX08	Basic Electrical & Electronics Engineering Lab	1, 4	0	0	3	1.5	ES
09	20MCX01	Environmental Science	-	2	0	0	-	MC
Sub-total				17	05	09	19.5	
Semester III								
01	20BSX16	Mathematical Foundations for Computer Science	1	3	1	0	3.0	BS
02	20CS302	Design and Analysis of Algorithms	1, 2, 3	3	1	0	3.0	PC
03	20CS303	Database Management Systems	1, PSO1	3	1	0	3.0	PC
04	20CS304	Object Oriented Programming through C++	1	3	1	0	3.0	PC
05	20CS305	Computer Organization	1	3	0	0	3.0	PC
06	20CS306	Design and Analysis of Algorithms Lab	4	0	0	3	1.5	PC
07	20CS307	Database Management Systems Lab	1, 4, PSO1	0	0	3	1.5	PC
08	20CS308	Object Oriented Programming through C++Lab	1, 4	0	0	3	1.5	PC
09	20CSS01	Short-term Skill Oriented Elective	3, 4, 5	0	0	4	2.0	SC
10	20MCX02	Constitution of India ³	-	2	0	0	-	MC
Sub-total				17	05	09	21.5	

¹Suggested tutorial hours will not carry any credits

²By default, all courses are mapped to PO 12 as they are weakly contributing

³It is mandate for all students to pursue an online certification course for minimum duration of 30 hours



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Semester IV

No.	Code	Course	POs	Contact Hours				
				L	T	P	C	
01	20HSX03	Managerial Economics & Financial Analysis	11	3	0	0	3.0	HS
02	20CS402	Data Warehousing and Mining	1, 2	3	0	0	3.0	PC
03	20CS403	Python Programming	1	3	1	0	3.0	PC
04	20CS404	Operating Systems	1	3	1	0	3.0	PC
05	20CS405	Theory of Computation	1, 2	3	1	0	3.0	PC
06	20CS406	Data Mining Lab	4	0	0	3	1.5	PC
07	20CS407	Python Programming Lab	4	0	0	3	1.5	PC
08	20CS408	Operating Systems Lab	1, 4	0	0	3	1.5	PC
09	20CSS02	Short-term Skill Oriented Elective	3, 4, 5	0	0	4	2.0	SC
Sub-total				16	03	11	21.5	

Semester V

01	20CS501	Java Programming	1	3	1	0	3.0	PC
02	20CS502	Computer Networks	1, 2	3	1	0	3.0	PC
03	20AI405	Artificial Intelligence	1, 2	3	1	0	3.0	PC
04	-	Professional Elective I	-	3	0	0	3.0	PE
05	-	Open Elective I	-	3	0	0	3.0	OE
06	20CS506	Java Programming Lab	4	0	0	3	1.5	PC
07	20CS507	Computer Networks Lab	1, 4	0	0	3	1.5	PC
08	-	Technical Paper Writing ⁴	1, 10	0	0	4	2.0	SC
09	20MCX03	Intellectual Property Rights and Patents ⁵	-	2	0	0	-	MC
10	-	Summer Internship#1 ⁶ / CSP	5, 8, 9, 10, PSO1	0	0	0	1.5	IN
Sub-total				17	03	08	21.5	

⁴The students are expected to identify one research area in the recent trends, collect recent research articles, prepare a technical research review paper and publish in renowned annual conferences/ journals, preferably indexed in Scopus or UGC care

⁵It is mandate for all students to pursue an online certification course for minimum duration of 30 hours

⁶The work pertaining to summer Internship #1 and #2 shall be completed at the end of the semesters IV & VI respectively. The assessment shall be carried out during the semesters V and VII

It is mandate for all the students to undergo 4-6 weeks of industrial training and appear for assessment during Semester V with report. With regard to Community Service Project (CSP), based on the availability the students can opt CSP as an alternate option for summer internship #1 for a duration of 08 weeks



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Semester VI

01	20CS601	Cryptography and Network Security	1, 2, 3	3	0	0	3.0	PC
02	20CS602	Web Technologies	1, 2, 3	3	0	0	3.0	PC
03	20CS603	Modern Software Engineering	1, 2, 3	3	0	0	3.0	PC
04	-	Professional Elective II	-	3	0	0	3.0	PE
05	-	Open Elective II	-	3	0	0	3.0	OE
06	20CS606	Cryptography and Network Security Lab	4	0	0	3	1.5	PC
07	20CS607	Web Technologies Lab	4	0	0	3	1.5	PC
08	20CS608	Modern Software Engineering Lab	4	0	0	3	1.5	PC
09	20CSS04	Short-term Skill Oriented Elective	5, PSO1, PSO2	0	0	4	2.0	SC
10	20MCX04	Indian Traditional Knowledge ⁷	-	0	0	0	-	MC
Sub-total				17	03	13	21.5	

Semester VII

01	-	Professional Elective III		3	0	0	3.0	PE
02	-	Professional Elective IV		3	0	0	3.0	PE
03	-	Professional Elective V		3	0	0	3.0	PE
04	-	Open Elective III		2	0	2	3.0	OE
05	-	Open Elective IV		2	0	2	3.0	OE
06	20HSX04	Professional Ethics	8	3	0	0	3.0	HS
07	20CSS05	Finishing School for CSE	PO1 – PO12	0	0	4	2.0	SC
08	-	Summer Internship#2 ⁸	All POs, PSOs	0	0	0	3.0	IN
Sub-total				16	0	04	23.0	

Semester VIII

01	-	Full Semester Internship ⁹	5 – 10, PSOs	0	0	0	06	IN
02	-	Capstone Project	5 – 10, PSOs	0	0	0	06	IN
Sub-total				0	0	0	12.0	
Total Credits				-	-	-	160	

⁷It is mandate for all the students to pursue an online certification course for minimum duration of 30 hours

⁸It is mandate for all the students to undergo 6-8 weeks of industrial training and appear for assessment during Semester VII write report and those opted FSI during Semester VII shall appear through online for reviews

⁹Students opting for FSI in VII semester have to take up courses of VII semester in VIII semester. The students are expected to do a capstone project parallely demonstrating their POs & PSOs and submit a separate report



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List of Electives

Professional Elective#1								
1	20CS001	Object Oriented Analysis and Design	-	3	0	0	3.0	PE
2	20BSX15	Probability and Statistics	-	3	0	0	3.0	PE
3	20AI603	Artificial Neural Networks	-	3	0	0	3.0	PE
4	20CS004	Internet of Things	-	3	0	0	3.0	PE
5	20CS005	Mobile Computing	-	3	0	0	3.0	PE
Professional Elective#2								
6	20CS006	Software Quality Management	-	3	0	0	3.0	PE
7	20DS405	Foundations of Data Science	-	3	0	0	3.0	PE
8	20AI502	Machine Learning	-	3	0	0	3.0	PE
9	20CS009	Network Programming and Protocols	-	3	0	0	3.0	PE
10	20CS010	Cloud Computing	-	3	0	0	3.0	PE
Professional Elective#3								
11	20CS011	Software Testing Methodologies	-	3	0	0	3.0	PE
12	20DS502	Big Data	-	3	0	0	3.0	PE
13	20AI602	Deep Learning Principles and Practices	-	3	0	0	3.0	PE
14	20CS014	Block Chain Technologies	-	3	0	0	3.0	PE
15	20CS015	XML and Web Services	-	3	0	0	3.0	PE
Professional Elective#4								
16	20CS016	Software Project Management	-	3	0	0	3.0	PE
17	20DS603	Data Visualization	-	3	0	0	3.0	PE
18	20AI005	Cyber Security	-	3	0	0	3.0	PE
19	20CS019	Ethical Hacking	-	3	0	0	3.0	PE
20	20DS020	Digital Image Processing and Applications	-	3	0	0	3.0	PE
Professional Elective#5								
The curriculum provides academic flexibility to choose any of the domain specific courses from MOOCs as approved by the respective Board of Studies and Academic Council. The students can take up this course on self study mode. The course shall be of 45–60 hours duration (4 credits) and the assessment shall be as per the academic regulation 2020.								
PE								
Open Elective #1								
21	20CEO01	Urban Environmental Services	-	3	0	0	3.0	OE
22	20CS001	Data Structures and Algorithms	-	3	0	0	3.0	OE
23	20AIO01	Machine Learning for Engineers	-	3	0	0	3.0	OE
24	20DSO01	Introduction to Database Management Systems	-	3	0	0	3.0	OE
25	20ECO01	Architecture and Algorithms of IoT	-	3	0	0	3.0	OE
26	20EEO01	Introduction to Renewable Energy Sources	-	3	0	0	3.0	OE
27	20MEO01	Nano Technology	-	3	0	0	3.0	OE
28	20SHO01	Women and Society	-	3	0	0	3.0	OE
Open Elective #2								
29	20CEO02	Ecology, Environment and Resource Management	-	3	0	0	3.0	OE
30	20CS002	Designing the Internet of Things	-	3	0	0	3.0	OE
31	20AIO02	Fundamentals of Deep Learning	-	3	0	0	3.0	OE
32	20DSO02	Introduction to Data Science	-	3	0	0	3.0	OE
33	20ECO02	IoT for Smart Grids	-	3	0	0	3.0	OE
34	20EEO02	Electrical Safety and Management	-	3	0	0	3.0	OE
35	20MEO02	Fundamentals of Automobile Engineering	-	3	0	0	3.0	OE
Open Elective #3								
36	20CEO03	Disaster, Risk Mitigation and Management	-	3	0	0	3.0	OE
37	20CS404	Operating Systems	-	3	0	0	3.0	OE
38	20AIO03	Fundamentals of AI	-	3	0	0	3.0	OE
39	20DSO03	Introduction to Big Data	-	3	0	0	3.0	OE
40	20ECO03	Privacy and Security in IoT	-	3	0	0	3.0	OE
41	20EEO03	Low-cost Automation	-	3	0	0	3.0	OE
42	20MEO03	Industrial Automation	-	3	0	0	3.0	OE
43	20SHO02	Design Thinking	-	3	0	0	3.0	OE
Open Elective #4								
The curriculum provides academic flexibility to choose any of the inter-disciplinary courses from MOOCs as approved by the respective Board of Studies and Academic Council. The students can take up this course on self-study mode. The course shall be of 45 – 60 hours duration and the assessment shall be as per the academic								
OE								


Head of the Department

regulation 2020.

B. Tech. (Honors)

Category I

1	20CSH01	Advanced Computer Architecture	-	4	0	0	4.0	HO
2	20DSH01	Text Analytics	-	4	0	0	4.0	HO
3	20AIH03	Game Theory	-	4	0	0	4.0	HO

Category II

4	20CSH04	GPU Architecture and Programming	-	4	0	0	4.0	HO
5	20DSH04	Recommender Systems	-	4	0	0	4.0	HO
6	20AIH06	Game Programming	-	4	0	0	4.0	HO

Category III

7	20CSH07	Fault Tolerant Computing	-	4	0	0	4.0	HO
8	20DSH07	Data Analysis with Matlab	-	4	0	0	4.0	HO
9	20AIH09	3D Graphics and Animation	-	4	0	0	4.0	HO

Category IV

10	20CSH10	Distributed and Parallel Computing	-	4	0	0	4.0	HO
11	20DSH10	Data Preparation and Cleaning	-	4	0	0	4.0	HO
12	20AIH12	Augmented Reality and Virtual Reality	-	4	0	0	4.0	HO

B. Tech. (Minor with Specialization)

Category I

1	20CEM01	Air Pollution	-	3	0	0	3.0	MI
2	20CSM01	E-Commerce	-	3	0	0	3.0	MI
3	20MEM01	Biomaterials	-	3	0	0	3.0	MI
4	20EEM01	Basic Control Systems	-	3	0	0	3.0	MI
5	20ECM01	Semiconductor Devices & Circuits	-	3	0	0	3.0	MI
6	20AIM01	Fundamentals of Neural Networks	-	3	0	0	3.0	MI
7	20DSO03	Introduction to R Programming	-	3	0	0	3.0	MI
8	20SHM01	Psychology	-	3	0	0	3.0	MI
9	20SHM02	Statistical Methods	-	3	0	0	3.0	MI
10	20MBM01	General Management	-	3	0	0	3.0	MI
11	20MBM02	Human Resource Planning	-	3	0	0	3.0	MI

Category II

12	20CEM02	Climate Change Mitigation and Adaptation	-	3	0	0	3.0	MI
13	20CSM02	Knowledge Discovery and Databases	-	3	0	0	3.0	MI
14	20MEM02	Micro Electromechanical Systems	-	3	0	0	3.0	MI
15	20EEM02	Basics of Electrical Machines and Drives	-	3	0	0	3.0	MI
16	20ECM02	Digital Electronics	-	3	0	0	3.0	MI
17	20AIM02	Machine Learning with Python	-	3	0	0	3.0	MI
18	20DSM02	Data Management and Analysis	-	3	0	0	3.0	MI
19	20SHM03	English for Media	-	3	0	0	3.0	MI
20	20SHM04	Statistical Inference	-	3	0	0	3.0	MI
21	20MBM03	Organizational Behavior	-	3	0	0	3.0	MI
22	20MBM04	Compensation Management & Employee Welfare Laws	-	3	0	0	3.0	MI

Category III

23	20CEM03	Sustainability and Pollution Prevention Practices	-	3	0	0	3.0	MI
24	20CSM03	Database Security	-	3	0	0	3.0	MI
25	20MEM03	Surface Engineering	-	3	0	0	3.0	MI
26	20EEM03	Electrical Engineering Material Science	-	3	0	0	3.0	MI
27	20ECM03	Analog Electronic Circuits	-	3	0	0	3.0	MI
28	20AIM03	Interpretable Machine Learning	-	3	0	0	3.0	MI
29	20DSM03	Data Governance	-	3	0	0	3.0	MI
30	20SHM05	Journalism	-	3	0	0	3.0	MI
31	20SHM06	Statistical Quality Control	-	3	0	0	3.0	MI
32	20MBM05	Entrepreneurship and Business Venture Planning	-	3	0	0	3.0	MI
33	20MBM06	Performance Management and Talent Management	-	3	0	0	3.0	MI



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Short Term Skill Oriented Electives

34	23CSS01	Programming Basics	3, 4, 5	0	0	4	2.0	SC
35	23CSS02	Competitive Programming Essentials	3, 4, 5	0	0	4	2.0	SC
36	23CSS04	Android App Development	5, PSO1, PSO2	0	0	4	2.0	SC
Industry Connect Courses (Skill Oriented Courses)¹⁰								
37	20ICC01	Competitive Programming	-	2	0	8	6.0	ICC
38	20ICC02	Web Technologies – Transferring to Practice	-	2	0	8	6.0	ICC
39	20ICC03	Java and Spring boot	-	2	0	8	6.0	ICC
40	20ICC04	Robotics Process Automation	-	2	0	8	6.0	ICC
41	20ICC05	Information Security and Forensics	-	2	0	8	6.0	ICC
42	20ICC06	Battery System – Design Engineering	-	2	0	8	6.0	ICC
43	20ICC07	Blockchain Technology	-	2	0	8	6.0	ICC
44	20ICC08	Network Administration	-	2	0	8	6.0	ICC
45	20ICC09	Product Engineering	-	2	0	14	9.0	ICC
46	20ICC10	Machine Learning Engineer	-	2	0	8	6.0	ICC
47	20ICC11	Data Scientist	-	2	0	8	6.0	ICC
48	20ICC12	Industrial IoT	-	2	0	8	6.0	ICC

List of Honors offered by Computer Science & Engineering Program

1. High Performance Computing
2. Data Analytics
3. Game Programming

List of Minor with Specialization offered by Computer Science & Engineering Program

1. Database Engineering

¹⁰The credits earned through Industry Connect Courses (Skill Oriented Course) can be tradeoff with any other 3-Credit course other than Professional Core