Sant Gadge Baba Amravati University, Amravati

Scheme of Implementation for

Four Year Undergraduate Degree Programme in Engineering and Technology

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B.E. (Bachelor of Engineering) in

Computer Science and Information Technology

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in the faculty of Science and Technology

ACADEMIC EVALUATION SCHEME/CREDIT SYSTEM

Year: 2024-25

(Scheme of Teaching, Learning and Examination & Evaluation w.e.f. 2024-2025 and onwards)

	Scheme for Four Year Undergraduate Engineering Degree Programme B.E. in Computer Science and Information Technology -Semester - III												
S. N.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total Marks**	**ESE (Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Discrete Structure & Graph Theory	3CSI200PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Object Oriented Programming in Python	3CSI201PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Data Structures	3CSI202PC	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
4	Comm. Engag. Project/ Field Project	3CSI400EL	0	4	0	4	2			25	25	50	
5	Object Oriented Programming in Python	3CSI203PC	0	2	0	2	1			25	25	50	
6	Data Structures lab	3CSI204PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
7	* Multi-disciplinary Minor#1 (MDM#1)	3CSI205MD	2	0	0	2	2	20	30	-	-	50	2 Hrs.
	Open Elective other than a particular Program												
8	Open Elective I	3CSI206OE1/2	3	0	0	3	3	40	60	-	-	100	3 Hrs.
	HSSMC (Entrepreneurship/ Economics/ Management Course)												
9	Entrepreneurship Development	3CSI207EM	2	0	0	2	2	20	30	-	-	50	2 Hrs.
	Value Education Course (VEC)												
10	Environmental Science	3SH208VE	2	0	0	2	2	20	30			50	2 Hrs.
DGH Revised on 21.02.2026	TOTAL		18	08	0	26	**22**					**700**	

L: Lecture	**P: Practical**	**T: Tutorial**	**ESE: End Semester Exam**	**IE: Internal Evaluation**	**INT: Internal**	**EXT: External**

Open Elective I - 3CS206OE1: Basics of Computing for Engineers | 3CS206OE2: E-Commerce

* MDM#1 - Please refer the list of Multi-disciplinary Minor courses attached separately at the end (**Annexure I**).

Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

	Scheme for Four Year Undergraduate Engineering Degree Programme B.E. in Computer Science and Information Technology - Semester - IV												
S. N.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total Marks**	**ESE (Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Data Communication & Networking	4CSI209PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Operating System	4CSI210PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Theory of Computation	4CSI211PC	3	0	0	3	2	40	60			100	3 Hrs.
	Laboratory Courses												
4	Data Communication & Networking	4CSI212PC	0	2	0	2	1			25	25	50	
5	Operating System	4CSI213PC	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
6	* Multi-disciplinary Minor#2 (MDM#2)	4CSI214MD	2	0	0	2	2	20	30	-	-	50	2 Hrs.
	Vocational and Skill Enhancement Courses												
7	Computing Skill #1 (VSEC-III)	4CSI215VS	0	2	0	2	2			50	-	50	
	Open Elective other than a particular Program												
8	Open Elective II	4CSI216OE1/2	2	0	0	2	2	20	30			50	2 Hrs.
	HSSMC (Entrepreneurship/ Economics/ Management Course)												
9	Social Science & Engineering Economics	4CSI217EM	2	0	0	2	2	20	30			50	2 Hrs.
	Ability Enhancement Course (AEC)												
10	Modern Indian Language	4SH218AE	2	0	0	2	2			25	25	50	
	Value Education Course (VEC)												
11	Universal Humans Values & Ethics	4SH219VE	2	0	0	2	2	20	30			50	2 Hrs.
DGH Revised on 21.02.2026	TOTAL		19	06	0	25	**22**					**700**	

L: Lecture	P: Practical	T: Tutorial	ESE: End Semester Exam	IE: Internal Evaluation	INT: Internal	EXT: External

Open Elective II – 4CS216OE1: Intellectual Property Rights | 4CS216OE2: Information Systems for Engineers

* MDM#2 - Please refer the list of Multi-disciplinary Minor courses attached separately at the end (**Annexure I**).

Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Scheme for Multiple Entry and Multiple Exit

Exit option -1 (L 5): Award of UG Diploma in Major with 88 credits and an additional 8 credits				
EXIT Courses				
S.N.	**Course Code**	**Course Name/Type**	**Mode / Duration**	**Credits**
1	5CSI243EC	*Network Configuration and Maintenance	Online/offline certification Course	**4**
AND				
2	5CSI244EC	*Full Stack Web Development		**4**
OR				
3	5CSI405EL	Internship at IT Related Industry	Two Months (288-320 Hrs.)	**8**

Note: The above exit courses may or may not be offered /available to students during that academic session hence it is the discretion of the department/institute to evaluate the exit course by considering either certification courses or internship from IT related Registered Industry. Students will have a choice to go for (Option 1 AND Option 2) OR (Option 3) for the exit courses.

* Certificate course shall be proposed by BoS after curetting available courses offered by the technological based industries and renowned training-cum-certification providers. These Proposed courses shall meet the skill set requirements which student must acquire. The list of curetted courses may vary as per the requirements of the employment market. These Certificate courses to be evaluated at both level i.e. Internal & External (Evaluation guidelines will be given by concerned authority in the form of SOP)

Scheme for Four Year Undergraduate Engineering Degree Programme

B.E. in Computer Science and Information Technology - Semester - V

S. N.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total Marks	ESE (Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
	Core Courses												
1	Database Management Systems	5CSI220PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Compiler Design	5CSI221PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Computer Organization & Architecture	5CSI222PC	3	0	0	3	3	40	60			100	3 Hrs.
4	Programme Elective Course I	5CSI223PE	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
5	Database Management Systems Lab	5CSI224PC	0	2	0	2	1			25	25	50	
6	Compiler Design Lab	5CSI225PC	0	2	0	2	1			25	25	50	
7	Programme Elective Course I	5CS226PE	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
8	* Multi-disciplinary Minor#3 (MDM#3)	5CSI227MD	2	0	0	2	2	20	30			50	2 Hrs.
9	* Multi-disciplinary Minor#4 (MDM#4)	5CSI228MD	2	0	0	2	2	20	30			50	2 Hrs.
10	* Multi-disciplinary Minor Lab 1 (MDM#5)	5CSI229ML	0	2	0	2	1			25	25	50	
	Open Elective other than a particular Program												
11	Open Elective III	5CS230OE1/2	2	0	0	2	2	20	30			50	2 Hrs.
DGH Revised on 21.02.2026	TOTAL		18	08	0	26	**22**					**750**	

L: Lecture	P: Practical	T: Tutorial	ESE: End Semester Exam	IE: Internal Evaluation	INT: Internal	EXT: External

Programme Elective Course -I : Data Science and Statistics | Information Security | Internet of Things

Open Elective – III : 5CSI230OE1: Cyber Laws and Ethics | 5CSI230OE2: Introduction to Data Analytics

* MDM#3, MDM#4 & MDM Lab 1 - Please refer the list of Multi-disciplinary Minor courses attached separately at the end (**Annexure I**).

Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

	Scheme for Four Year Undergraduate Engineering Degree Programme B.E. in Computer Science and Information Technology - Semester - VI												
S. N.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total Marks**	**ESE (Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Artificial Intelligence	6CSI231PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Design & Analysis of Algorithm	6CSI232PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Software Engineering	6CSI233PC	3	0	0	3	3	40	60			100	3 Hrs.
4	Program Elective Course II	6CSI234PE	3	0	0	3	3	40	60			100	3 Hrs.
5	Program Elective Course III	6CSI235PE	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
6	Design & Analysis of Algorithm Lab	6CSI236PC	0	2	0	2	1			25	25	50	
7	Software Engineering Lab	6CSI237PC	0	2	0	2	1			25	25	50	
8	Programme Elective Course II	6CSI238PE	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
9	* Multi-disciplinary Minor#5 (MDM#6)	6CSI239MD	2	0	0	2	2	20	30			50	2 Hrs.
	Vocational and Skill Enhancement Courses												
10	Computing Skill # 2 (VSEC IV)	6CSI240VS	1	2	0	3	2			50	-	50	
DGH Revised on 21.02.2026	TOTAL		18	08	0	26	**22**					**750**	

L: Lecture	**P: Practical**	**T: Tutorial**	**ESE: End Semester Exam**	**IE: Internal Evaluation**	**INT: Internal**	**EXT: External**

Programme Elective Course -II : Natural Language Processing | Network Security | Cryptography
Programme Elective Course -III : Data Warehousing & Mining | Cognitive Technology | Digital Forensics

* MDM#5 - Please refer the list of Multi-disciplinary Minor courses attached separately at the end (**Annexure I**).
Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Scheme for Multiple Entry and Multiple Exit

Exit option -3 (L5.5): Award of bachelor's degree in Vocation (B.Voc.) in Major with 132 credits and an additional 8 credits				
EXIT Courses				
S.N.	**Course Code**	**Course Name/Type**	**Mode / Duration**	**Credits**
1	7CSI310EC	*Database Engineer/Database Administrator	Online/offline certification Course	**4**
AND				
2	7CSI311EC	*Cloud Engineer/Cloud Administrator		**4**
OR				
3	7CSI406EL	Internship at IT Related Industry	Two Months (288-320 Hrs.)	**8**

Note: The above exit courses may or may not be offered /available to students during that academic session hence it is the discretion of the department/institute to evaluate the exit course by considering either certification courses or internship from IT related Registered Industry. Students will have a choice to go for (Option 1 AND Option 2) OR (Option 3) for the exit courses.

* Certificate course shall be proposed by BoS after curetting available courses offered by the technological based industries and renowned training-cum-certification providers. These Proposed courses shall meet the skill set requirements which student must acquire. The list of curetted courses may vary as per the requirements of the employment market. These Certificate courses to be evaluated at both level i.e. Internal & External (Evaluation guidelines will be given by concerned authority in the form of SOP)

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	Scheme for Four Year Undergraduate Engineering Degree Programme B.E. in Computer Science and Information Technology - Semester - VII												
S. N.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total Marks**	**ESE (Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Object Oriented Analysis & Design	7CSI300PC	3	0	0	3	3	40	60			100	3 Hrs.
2	Professional Ethics & Management	7CSI301PC	3	0	0	3	3	40	60			100	3 Hrs.
3	Program Elective Course IV	7CSI302PE	3	0	0	3	3	40	60			100	3 Hrs.
4	Program Elective Course V	7CSI303PE	3	0	0	3	3	40	60			100	3 Hrs.
5	Program Elective Course VI	7CSI304PE	3	0	0	3	3	40	60			100	3 Hrs.
	Laboratory Courses												
6	Programme Elective Course IV	7CSI305PE	0	2	0	2	1			25	25	50	
7	Programme Elective Course V	7CSI306PE	0	2	0	2	1			25	25	50	
	Multidisciplinary Minor												
8	* Multi-disciplinary Minor#6 (MDM#7)	7CSI307MD	2	0	0	2	2	20	30			50	2 Hrs.
9	* Multi-disciplinary Minor Lab-II (MDM#8)	7CSI308ML	0	2	0	2	1			25	25	50	
	Project												
10	Project	7CSI401PR	0	4	0	4	2			50	50	100	
DGH Revised on 21.02.2026	TOTAL		17	10	0	27	**22**					**800**	

L: Lecture	P: Practical	T: Tutorial	ESE: End Semester Exam	IE: Internal Evaluation	INT: Internal	EXT: External

Programme Elective Course -IV : Blockchain Fundamentals | Machine Learning | Wireless Sensor Networks
Programme Elective Course -V : Business Intelligence | Cloud Computing | Distributed Ledger Technology
Programme Elective Course -VI : Embedded System | Virtual & Augmented Reality | Modelling & Simulation

* MDM#6 & MDM Lab 2 - Please refer the list of Multi-disciplinary Minor courses attached separately at the end (**Annexure I**).

Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

	Scheme for Four Year Undergraduate Engineering Degree Programme B.E. in Computer Science and Information Technology - Semester - VIII												
S. N.	**Course Name**	**Code**	**Course Plan per Week (Hrs.)**				**Credits**	**Theory Evaluation**		**Practical Evaluation**		**Total Marks**	**ESE (Time Hrs.)**
			L	**P**	**T**	**Hrs.**		**IE**	**ESE**	**INT**	**EXT**		
	Core Courses												
1	Research Methodology	8CSI309RM	4*	0	0	4	4	40	60			100	3 Hrs.
2	Industry Internship	8CSI402EL	0	24	0	24	12			100	200	300	--
3	Project	8CSI403PR	0	4	0	4	2			50	50	100	3 Hrs.
DGH Revised on 21.02.2026	TOTAL		4	28	0	32	18					**500**	

L: Lecture	**P: Practical**	**T: Tutorial**	**ESE: End Semester Exam**	**IE: Internal Evaluation**	**INT: Internal**	**EXT: External**

***The course on Research Methodology may be completed by the student in Online mode (Swayam, MOOC's, any other platform approved by AICTE or on the LMS platform offered by the Institute).**

Note: Appropriate nos. of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

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Note:

1. The Multi-Disciplinary Minors (MDMs) offered by the Computer Science and Information technology discipline are open to students from all engineering disciplines **except** the: i. Computer Science and Engineering, ii. Computer Engineering, iii. Artificial Intelligence and Data Science iv. Artificial Intelligence (AI) and Data Science, v. Computer Science and Engineering (IoT), vi. Computer Science and Engineering (Artificial Intelligence and Machine Learning), vii. Computer Science and Information Technology, viii. Computer Science and Engineering (Data Science), ix. Information Technology and allied disciplines. (**Annexure I**: MDM Basket offered by CSE)
2. Students enrolled in : i. Computer Science and Engineering, ii. Computer Engineering, iii. Artificial Intelligence and Data Science iv. Artificial Intelligence (AI) and Data Science, v. Computer Science and Engineering (IoT), vi. Computer Science and Engineering (Artificial Intelligence and Machine Learning), vii. Computer Science and Information Technology, viii. Computer Science and Engineering (Data Science), ix. Information Technology and allied disciplines. are eligible to opt for MDMs offered by all other engineering disciplines. (**Refer the scheme of respective disciplines**)
3. The Baskets of Multi-Disciplinary Double Minors offered by Computer Science and Engineering discipline are listed under **Annexure II.**
4. Detailed guidelines for **Honors with Research** option is listed under **Annexure III.**
5. To promote the adoption and use of Open-Source Software (OSS), a subject-wise suggestive list of OSS tools is provided as part of this scheme. These tools can be effectively utilized for conducting practical sessions and demonstrations. Please note that this list is dynamic and may evolve with advancements in technology and the introduction of new tools or versions. **(Annexure IV:** List of suggested OSS**)**

Annexure I

Multidisciplinary Minors Subjects offered by Computer Science and Information technology

Reference	Sem	Subject Code	Subject Title	Type	Credits
MDM#1	III	3CSI205MD	Foundations of Computing & Programming	Theory	2
MDM#2	IV	4CSI214MD	Data Structures and Problem Solving	Theory	2
MDM#3	V	5CSI227MD	Introduction to Operating Systems	Theory	2
MDM#4	V	5CSI228MD	Web Technologies & Development	Theory	2
MDM Lab-I	V	5CSI229ML	Web Technologies Lab	Practical	1
MDM#5	VI	6CSI239MD	Cloud Computing & Virtualization	Theory	2
MDM#6	VII	7CSI307MD	Database Management System	Theory	2
MDM Lab-II	VII	7CSI308ML	Database Management System Lab	Practical	1

Note: Above is the list of Multi-Disciplinary Minors (MDMs) offered by Computer Science and Information technology discipline. These minors are open to students from all engineering disciplines except the following: i. Computer Science and Engineering, ii. Computer Engineering, iii. Artificial Intelligence and Data Science, iv. Artificial Intelligence (AI) and Data Science, v. Computer Science and Engineering (IoT), vi. Computer Science and Engineering (Artificial Intelligence and Machine Learning), vii. Computer Science and Information Technology, viii. Computer Science and Engineering (Data Science), ix. Information Technology and allied disciplines.

Annexure II

Multidisciplinary Double Minors Subjects offered by Computer Science and Information technology

Track: Cyber Security (Honours / Double Minor)				
Semester	**Subject Code**	**Subject Title**	**Credits**	**T/P**
III	3CSI245DH1	Fundamentals of Cyber Security	4	Theory
IV	4CSI246DH1	Network & Web Application Security	4	Theory
V	5CSI247DH1	Digital Forensics & Incident Response	4	Theory
VI	6CSI248DH1	Advanced Topics in Cryptography	4	Theory
VII	7CSI407DH1	Cyber Security Practice Lab	2	Lab

Track: Data Science (Honours / Double Minor)				
Semester	**Subject Code**	Subject Title	Credits	T/P
III	3CSI245DH2	Introduction to Data Science	4	Theory
IV	4CSI246DH2	Statistical Methods for Data Analysis	4	Theory
V	5CSI247DH2	Machine Learning Techniques	4	Theory
VI	6CSI248DH2	Big Data Systems & Tools	4	Theory
VII	7CSI407DH2	Data Science Lab with Python & R	2	Lab

Note: The subjects offered by Computer Science and Information Technology discipline as Double Minor for students of other major disciplines, shall also be applicable and treated as Honours subjects for students pursuing a major in Computer Science and Information Technology.

Annexure III
Honors with Research

Semester	**Subject Code**	Subject Title	Credits	T/P
VII	7CSI408HR	Research Project (Part#1) Problem Identification & Definition Literature Review Experimental Work	9	P
VIII	8CSI409HR	Research Project (Part#2) Prototype Development Data Analysis Publication(s)	9	P

Note: Students intending to pursue a degree with Honours with Research must undertake and successfully complete a dedicated research project during Semesters VII and VIII, as outlined in the curriculum and in accordance with the guidelines issued by the respective department from time to time. This research project shall be distinct and independent from the regular final year project (7CS401PR & 8CS403PR).

Annexure IV

Suggestive Subject-Wise list Open-Source Tools

Name of Subject	Open-Source Tools	Name of Subject	Open-Source Tools
Object-Oriented Programming	Eclipse, NetBeans, IntelliJ IDEA (Community Edition), BlueJ	**Sensors & Actuators**	Arduino IDE, Raspberry Pi OS
Data Structure	Code::Blocks, Visual Studio Code, GDB Debugger	**Cryptography**	OpenSSL, GPG
Data Communication & Networking	Wireshark, Mininet, Cisco Packet Tracer (free educational license), NS-3	**Computer Architecture & Organization**	Gem5, Logisim
Operating System	QEMU, VirtualBox, Unix/Linux Shell, FreeDOS	**Information Retrieval**	Apache Solr, Elasticsearch
Artificial Intelligence	TensorFlow, PyTorch, OpenCV, Scikit-learn	**Supervised Machine Learning**	TensorFlow, Scikit-learn
Programming Methodology using Python	Jupyter Notebook, Anaconda, PyCharm (Community Edition), VS Code	**Digital Forensics**	Autopsy, Sleuth Kit, Volatility
Probability & Statistics for Data Science	R, RStudio, NumPy, SciPy, Matplotlib	**Internet of Everything**	Node-RED, ThingsBoard, Kaa IoT
Cognitive Technologies	IBM Watson (free tier), TensorFlow, spaCy	**Image & Video Processing**	OpenCV, GIMP, FFmpeg
Data Science and Statistics	R, Jupyter Notebook, KNIME	**Augmented & Virtual Reality**	Blender, Godot Engine
Internet of Things	Arduino IDE, Node-RED, ThingsBoard	**Usability Engineering**	Axure RP (free for students), Figma
Introduction to Cyber Security	Kali Linux, Metasploit Framework, OpenVAS	**Cryptography & Security**	Wireshark, OpenSSL, VeraCrypt
Database Management Systems	MySQL, PostgreSQL, SQLite, MongoDB	**Wireless Sensor Networks**	Cooja, NS-3
Compiler Design	LLVM, GCC, Flex, Bison	**System & Software Security**	Metasploit, Snort
Numerical Methods	Octave, SciPy, NumPy	**Blockchain Fundamentals**	Ethereum, Hyperledger, Ganache
Microprocessor & Assembly Language Programming	Keil uVision, GNUSim8085, Logisim	**Data Storage & Network**	FreeNAS, OpenFiler
Design & Analysis of Algorithm	Gephi, NetworkX	**Distributed Ledger Technology**	Hyperledger Fabric, Corda
Cloud Computing	OpenStack, CloudStack, Apache Hadoop	**Deep Learning**	Keras, TensorFlow, PyTorch
Natural Language Processing	NLTK, spaCy, Hugging Face Transformers	**Data Visualization**	Tableau Public, Matplotlib, D3.js
Big Data Analytics	Apache Hadoop, Apache Spark, Dask	**Data Warehousing**	Apache Hive, Pentaho