G H Raisoni College of Engineering & Management

(An Autonomous Institute affiliated to RTM Nagpur University Nagpur)

Department of Computer Science and Engineering

B. Tech. in Computer Science and Engineering With Multidisciplinary Minor

Scheme - 2023

Institute Vision and Mission

Vision:

To achieve excellent standards of quality education by keeping pace with rapidly changing technologies and to create technical manpower of global standards with capabilities of accepting new challenges

Mission:

Our efforts are dedicated to impart quality and value based education to raise satisfaction level of all stakeholders.

Our Strength is directed to create competent professionals.

Our endeavor is to provide all possible support to promote research and development activities.

Department Vision and Mission

Our Vision

To offer high-quality undergraduate and postgraduate programs, to train the students to match global standards in different aspects of computing discipline.

Our Mission

The mission of the department is to educate students and enhancing technical skills in the areas of computer science by providing best practices of the teaching-learning process for careers in the software industry, higher education and research.

To promote research-based projects/activities in the emerging areas of technology convergence.

B. Tech. in Computer Science and Engineering

Program Educational Objectives

O-I:	**Preparation:** To prepare students to succeed in employment/profession and/or to pursue post graduate and research educations in Computer Science & Engineering discipline in particular and allied Engineering discipline in general.
PEO-II:	**Core Competence:** To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to formulate, analyse and solve engineering problems requiring knowledge of Computer Science & Engineering.
PEO-III:	**Breadth:** To prepare students with engineering breadth to innovate, design, and develop software products and to contribute in providing solutions related to multidisciplinary real life problems.
PEO-IV:	**Professionalism:** To inculcate in students professional and ethical attitude, effective communication skills and team work to become a successful professional.
PEO-V:	**Learning Environment:** To provide students with an academic environment that makes them aware of excellence and Lifelong learning in emerging technologies

Program Specific Outcomes

PSO1	Apply fundamental knowledge of Computer Science and Engineering subjects, Identify, Formulate & Solve problems of various types of integrated computer based systems as well as to interpret and synthesize the experimental data leading to valid conclusions..
PSO2	Design and code engineering problems using programming skills.
PSO3	Make use of acquired technical knowledge for qualifying in competitive examinations at various levels

Program outcomes

PO1	**Engineering knowledge:** An ability to apply knowledge of mathematics, science, and engineering fundamentals.
PO2	**Problem analysis:** An ability to identify, formulates, and solves complex engineering problems.
PO3	**Design/development of solutions:** An ability to design a system, component, or process to meet desired needs with appropriate considerations such as economic, environmental, social, political, ethical, health and safety.
PO4	**Conduct investigations of complex problems**: An ability to design and conduct experiments, as well as to analyze and interpret data.
PO5	**Modern tool usage:** An ability to use the techniques, skills, and modern engineering & computational tools necessary for engineering practice.
PO6	**The engineer and society:** The broad education necessary to understand the impact of contextual knowledge on social, health, safety, legal and cultural issues.
PO7	**Environment and sustainability:** An ability to understand contemporary issues related to social & environmental context for sustainable development of engineering solutions.
PO8	**Ethics:** An understanding of professional & ethical responsibility.
PO9	**Individual and team work:** An ability to function effectively as an individual, as a member or leader in diverse & multidisciplinary teams
PO10	**Communication:** An ability to communicate effectively.
PO11	**Project management and finance:** An understanding of engineering & management principles to manage projects.
PO12	**Life-long learning:** A recognition of the need for, and an ability to engage in lifelong learning.

UG Scheme-2023 (NEP-2020)
B. Tech. Computer Science and Engineering with Multidisciplinary Minor

Scheme Summary

Semester	Credits	Hours	Marks	No. of Theory Heads	No. of Practical Heads	Total Heads
I	20	26	550	6	5	**11**
II	20	27	600	7	6	**13**
III	20	23	550	6	2	**8**
IV	20	23	600	8	3	**11**
V	22	28	600	6	5	**11**
VI	22	28	600	6	5	**11**
VII	22	27	525	5	2	**7**
VIII	16	28	375	1	1	**2**
Total	**162**	**210**	**4400**	**45**	**29**	**74**

Course Category Credits Summary

Semester Basket		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	6	8	--	--	--	--	--	--	14
Engineering Science Course		8	4	--	--	--	--	--	--	12
Programme Core Course (PCC)	Program Courses	--	2	8	8	10	8	10	--	46
Programme Elective Course (PEC)		--	--	--	--	4	8	4	4	20
Multidisciplinary Minor (MD M)	Multidisciplinary courses	--	--	2	2	4	2	4	--	14
Open Elective (OE) Other than a particular program		--	--	4	2	2	--	--	--	8
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	2	2	--	2	--	2	--	--	8

Semester Basket		I	II	III	IV	V	VI	VII	VIII	Total Credits
Ability Enhancement Course (AEC -01, AEC-02)	Humanities	2	--	--	2	--	--	--	--	4
Entrepreneurship/Economics/ Management Courses	Social Science and Management (HSSM)	--	--	2	2	--	--	--	--	4
Indian Knowledge System (IKS)		--	2	--	--	--	--	--	--	2
Value Education Course (VEC)		--	--	2	2	--	--	--	--	4
Research Methodology	Experiential Learning Courses	--	--	--	--	2	2	--	-	4
Comm. Engg. Project (CEP)/Field Project (FP)		--	--	2	--	--	--	--	--	2
Project		--	--	--	--	--	--	4	--	4
Internship/ OJT		--	---	--	--	--	--	--	12	12
Co-curricular Courses (CC)	Liberal Learning Courses	2	2	--	--	--	--	--	--	4
Total Credits (Major)		**20**	**20**	**20**	**20**	**20**	**20**	**22**	**20**	**162**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-I													
23BTSHL102CS 23BTSHP102CS	Environmental Chemistry	BSC5	1	-	2	3	2	10	15	50	25	-	100
23BTSHL103CS	Matrices and Differential Calculus	BSC1	2	1	-	3	3	10	15	50	-	-	75
23BTSHL105CS	Linear Algebra and Statistics	BSC4	2	1	-	3	3	10	15	50	-	-	75
23BTSHP112CS	Liberal Learning Courses-I	CC1	-	-	4	4	2	-	-	-	25	25	50
23BTEEL101CS 23BTEEP101CS	Basic Electrical Engineering	ESC1	3	-	2	5	4	10	15	50	25	-	100
23BTECL101CS 23BTECP101CS	Digital Logic Design	ESC2	3	-	2	5	4	10	15	50	25	-	100
23BTCSL10X 23BTCSP10X	Elective -I : Vocational and Skill Enhancement	VSEC1	1	-	2	3	2	10	15		25	-	50
TOTAL			**12**	**2**	**12**	**26**	**20**	**60**	**90**	**250**	**125**	**25**	**550**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-II													
23BTSHL101CS 23BTSHP101CS	Engineering Physics	BSC2	1	1	2	4	3	10	15	50	25	-	100
23BTSHL104CS	Integral Calculus and Differential Equations	BSC3	2	1	-	3	3	10	15	50	-	-	75
23BTSHL108CS 23BTSHP108CS	Communication Skills	AEC1	1	-	2	3	2	10	15		25	-	50
23BTSHL10XCS	Elective : Indian Knowledge System	IKS	2	-	-	2	2	10	15	50			75
23BTSHP113CS	Liberal Learning Courses-II	CC2	-	-	4	4	2	-	-	-	25	25	50
23BTITL102CS 23BTITP102CS	Programming for Problem Solving	ESC3	3	-	2	5	4	10	15	50	25	-	100
23BTCSL101 23BTCSP101	Computer Fundamentals and Trouble Shooting	PCC1	1	-	2	3	2	10	15	50	25	-	100
23BTCSL10X 23BTCSP10X	Elective –II: Vocational and Skill Enhancement	VSEC2	1	-	2	3	2	10	15		25	-	50
TOTAL			**11**	**2**	**14**	**27**	**20**	**70**	**105**	**250**	**150**	**25**	**600**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-III													
23BTSHL201CS	Discrete Mathematics and Graph Theory	PCC2	3	1		4	4	10	15	50			75
23BTCSL201/ 23BTCSP201	Data Structure and Algorithms	PCC3	3		2	5	4	10	15	50	25	25	125
23BTCSL202	Multi-Disciplinary Minor-I(Computer Architecture)	MD M1	2			2	2	10	15	50			75
23BTCSL211	Open elective –I: Introduction To Blockchain Technology	OE1	4			4	4	10	15	50			75
23BTMBL201CS	Engineering Economics and Industrial Management	EEMC1	2			2	2	10	15	50			75
23BTSHL228 23BTSHL229 23BTSHL227	Humanities Elective: 1)Content Designing and Media fundamentals 2)Cyber ethics and Moral responsibilities 3)Applied life Skills for progressive excellence	VEC1	2			2	2	10	15	50			75
23BTCSP205	Minor Project	CEP			4	4	2				25	25	50
TOTAL			**16**	**1**	**6**	**23**	**20**	**60**	**90**	**300**	**50**	**50**	**550**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-IV													
23BTCSL203	Computer Architecture and Organization	PCC8	4			4	4	10	15	50			75
23BTCSL204/ 23BTCSP204	Database Management System	PCC5	3		2	5	4	10	15	50	25	25	125
23BTCSL206	Multi-Disciplinary Minor:(Web Development)	MD M2	2			2	2	10	15	50			75
23BTCSL221	Open elective –II	OE2	2			2	2	10	15	50			75
23BTCSL207/ 23BTCSP207/	Vocational and Skill Enhancement Elective – III((POOP) PRINCIPLES OF OBJECT ORIENTED PROGRAMMING	VSEC3	1		2	3	2	10	15		25		50
23BTSHL231CS/ 23BTSHP231CS	Aptitude & Employability Skills	AEC2	1		2	3	2	10	15		25		50
23BTMBL202CS	Entrepreneurship Development Practices	EEMC2	2	-	-	2	2	10	15	50	-	-	75
23BTSHL233CS	Universal Human Values 2 : Understanding Harmony	VEC2	2			2	2	10	15	50			75
TOTAL			**17**	**-**	**6**	**23**	**20**	**80**	**120**	**300**	**75**	**25**	**600**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-V													
23BTCSL301	Formal Languages and Automata	PCC7	3			3	3	10	15	50			75
23BTCSL304/ 23BTCSP304	Operating System	PCC8	3		2	5	4	10	15	50	25	25	125
23BTITL301CS/ 23BTITP301CS	Computer Networks	PCC9	2		2	4	3	10	15	50	25		100
23BTCSL311 23BTCSL312 23BTCSL313 23BTCSL314	Programme Elective Core1 1)Cloud computing 2)UNSTRUCTURD DATABASE MANAGEMENT 3)Natural Language Processing 4)Code Repository and Version Control	PEC1	3		2	5	4	10	15	50	25		100
23BTCSL305 23BTCSL310	Multi-Disciplinary Minor:III (data structure with C programming/ Backend Programming)	MDM3	3		2	5	4	10	15	50	25		100
23BTCSL306	Open elective - III(Relational databases)	OE3	2			2	2	10	15	50			75
23BTSHP301CS	Research Methodology	RM			4	4	2				25		25
TOTAL			**16**		**12**	**28**	**22**	**60**	**90**	**300**	**125**	**25**	**600**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VI													
23BTCSL303/ 23BTCSP303	Design and Analysis of Algorithms	PCC9	3		2	5	4	10	15	50	25	25	125
23BTCSL307	Data Mining and Warehousing	PCC12	3		2	5	4	10	15	50	25	25	125
23BTCSL321 23BTCSL322 23BTCSL323 23BTCSL324	Programme Elective Core2 1)Salesforce 2)Big Data Computing 3) User InterfaceDesign 4) Blockchain Technology	PEC2	3		2	5	4	10	15	50	25		100
23BTCSL331 23BTCSL332 23BTCSL333	Programme Elective Core3 1)Agile Scrum Master 2)Mobile Computing 3)Distributed Computing	PEC3	4			4	4	10	15	50			75
23BTCSL308	Multi-Disciplinary Minor-IV(Introduction to Cloud Computing)	MDM4	2			2	2	10	15	50			75
23BTCSL309	Vocational andSkill Enhancement Elective – IV(Web Technology)	VSEC4	1		2	3	2	10	15		25	-	50
23BTSHP302	Research Methodology	RM			4	4	2				50		50
TOTAL			**16**		**12**	**28**	**22**	**60**	**90**	**250**	**150**	**50**	**600**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VII													
23BTCSL401/ 23BTCSP401	Compiler Design	PCC11	3		2	5	4	10	15	50	25	25	125
23BTCSL402	Artificial Intelligence and Machine Learning	PCC4	3			3	3	10	15	50			75
23BTCSL403	Computer System Security	PCC13	3			3	3	10	15	50			75
23BTCSL441 23BTCSL442 23BTCSL443	Programme Elective Core4 1)Parallel computing 2)Digital forensics 3)Optimization techniques	PEC4	4			4	4	10	15	50			75
23BTCSL405	Multi-Disciplinary Minor-V(Python Programmg)	MDM5	4			4	4	10	15	50		-	75
23BTCSL404	Project	P			8	8	4				50	50	100
TOTAL			**17**		**10**	**27**	**22**	**50**	**75**	**250**	**75**	**75**	**525**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VIII													
23BTCSL406	Programme Elective Core5(Mooc's Based)	PEC5	4			4	4	10	15	50			75
23BTCSP407	Internship	I			24	24	12				200	100	300
TOTAL			**4**		**24**	**28**	**16**	**10**	**15**	**50**	**200**	**100**	**375**

Multidisciplinary Minor from Other Department

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-III													
23BTECL206CS	Fundamentals of Electronic Devices	MDM1	2	-	-	2	**2**	10	15	50	-	-	75
SEMESTER-IV													
23BTITL204CS	Software Engineering and Project Management	MDM2	2	-	-	2	**2**	10	15	50	-	-	75
SEMESTER-V													
		MDM3	3	-	2	5	**4**	10	15	50	25	-	100
SEMESTER-VI													
		MDM4	2	-	-	2	**2**	10	15	50	-	-	75
SEMESTER-VII													
		MDM5	4	-	-	4	**4**	10	15	50	-	-	75
TOTAL			**13**	**-**	**2**	**15**	**14**	**50**	**75**	**250**	**25**	**-**	**400**

UG Scheme-2023 (NEP-2020)
B. Tech. in Computer Science & Engineering
Vocational & Skill Enhancement Courses (VSEC)

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-I													
23BTCSL102/ 23BTCSP102	Computer Programming	VSEC1	1	-	2	3	2	10	15	-	25	-	50
SEMESTER-II													
23BTCSL105/ 23BTCSP105	Foundation of Data Analytics	VSEC2	1	-	2	3	2	10	15	-	25	-	50
SEMESTER-IV													
23BTCSL207/ 23BTCSP207	Principles of Object Oriented Programming	VSEC3	1	-	2	3	2	10	15	-	25	-	50
SEMESTER-VI													
23BTCSL309/ 23BTCSL309	Web Technology	VSEC4	1	-	2	3	2	10	15	-	25	-	50
TOTAL			**4**	**-**	**8**	**12**	**8**	**40**	**60**	**-**	**100**	**-**	**200**

Minor Track: Computer Science & Engineering

Semester	Credits [TH + PR]	Code-Course	Course Name
III	4	23BTCSL201/ 23BTCSP201	Data Structure and Algorithms
IV	4	23BTCSL204/ 23BTCSP204	Database Management Systems
	4	23BTCSL203	Computer Architecture and Organization
V	4	23BTCSL304/ 23BTCSP304	Operating System
	3	23BTCSL301	Formal Languages and Automata
VI	4	23BTCSL303/ 23BTCSP303	Design and Analysis of Algorithms
	4	23BTCSL307	Data Mining and Warehousing
VII	4	23BTCSL401/ 23BTCSP401	Compiler Design
VIII	-	-	-

Honor Track: Computer Science & Engineering

Semester	Credits [TH + PR]	Code-Course	Course Name
III	4	PNCSEL546	Distributed Operating System
IV	4	PNCSEL563	HIGH PERFORMANCE COMPUTER ARCHITECTURE
	3	PNCSEL588	Elective-III: DATA SCIENCE
V	3	PNCSEL551	Elective-I: Soft computing
	4+1	PNCSEL547/ PNCSEP547	Advances in Algorithm
VI	4	PNCSEL556	Big Data Computing
	3	PNCSEL576	Elective-IV: OPTIMIZATION TECHNIQUES
VII	3	PNCSEL558	Elective-II: HUMAN COMPUTER INTERACTION
VIII	-	-	-

Computer Science and Engineering courses offered in Multidisciplinary Track

Semester	Credits [TH + PR]	Code-Course	Course Name
III	2	23BTCSL202	Computer Architecture
IV	2	UNCSL206	Software Testing
V	4 [3 TH + 1 PR]	UNCSL307/ UNCSP307	Data Structure using C
	4 [3 TH + 1 PR]	UNCSL308/ UNCSP308	Introduction to Database
VI	2	UNCSL309	Basics of Scripting Language
	2	UNCSL320	Introduction to Cloud Computing
VII	4	UNCSL319	Distributed Computing
	4	UNCSL317	Agile Scrum Master
VIII	-	-	-

Scheme-2023 (NEP-2020)

B. Tech. in Computer Science & Engineering

Tracks for Programme Elective Courses (PEC)

Electives	Course Code	Software Development	Course Code	Data Processing	Course Code	AI & Machine Learning	Course Code	System Architecture & Security	Course Code	Advanced Computing
Track		**Track-I**		**Track-II**		**Track-III**		**Track-IV**		**Track -V**
Professional Electives with Practical										
Professional Elective-I (Credits :4) (Semester-V)	[23BTCSL311/ 23BTCSP311]	Cloud Computing	[23BTCSL312 /23BTCSP312]	Unstructured Database Management System	[23BTCSL313 /23BTCSP313]	Natural Language Processing	[23BTCSL314 /23BTCSP314]	Code Repository & Version Control System	[UNCSL313/ UNCSP313]	Advanced Programming
Professional Elective-II (Credits :4) (Semester-VI)	[23BTCSL321 /23BTCSP321]	Salesforce	[23BTCSL322 23BTCSP322]	Big Data Computing	[23BTCSL325/ 23BTCSL325]	Deep Learning	[23BTCSL323/ 23BTCSP322]	User Interface Design	[23BTCSL324/ 23BTCSP322]	Blockchain Technology
Professional Electives without Practical										
Professional Elective-III (Credits :4) (Semester-VI)	[23BTCSL331]	Agile Scrum Master	[23BTCSL332]	Mobile Computing	[23BTCSL334]	Application ofAI in Healthcare	[23BTCSL335]	Advanced Computer Architecture	[23BTCSL333]	Distributed Computing
Professional Elective-IV (Credits :4) (Semester-VII)	[23BTCSL444]	DevOps: Software Development & IT Operations	[23BTCSL445]	Business Intelligence	[23BTCSL441]	Parallel computing	[23BTCSL442]	Digital Forensic	[23BTCSL443]	Optimization Techniques
Professional Elective-V (NPTEL Based) (Credits :4) (Semester-VIII)	[23BTCSL406.1]	Digital Marketing	[23BTCSL40 6.2]	Data Science for Engineers	[23BTCSL40 6.3]	Reinforcement Learning	[23BTCSL40 6.4]	Augmented Reality and Virtual Reality	[23BTCSL40 6.5]	Soft Computing