RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Programme Specifications

B. Tech. Programme

Programme:	Department:
Computer science and Engineering	Computer science and Engineering

Faculty of Engineering & Technology

M.S. Ramaiah University of Applied Sciences

University House, New BEL Road, MSR Nagar, Bangalore – 560 054

www.msruas.ac.in

PROGRAMME SPECIFICATIONS: COMPUTER SCIENCE AND ENGINEERING

Faculty	Engineering and Technology (FET)
Department	Computer Science and Engineering
Programme	Computer Science and Engineering
Dean of Faculty	Prof. M. Arulanantham
Head of Department	Prof. PVR Murthy

1	**Title of the Award** B. Tech. in Computer Science and Engineering
2	**Modes of Study** Full Time
3	**Awarding Institution /Body** M. S. Ramaiah University of Applied Sciences
4	**Joint Award** Not Applicable
5	**Teaching Institution** Faculty of Engineering and Technology, M.S. Ramaiah University of Applied Sciences
6	**Date of Programme Specifications** July 2019
7	**Date of Programme Approval by the Academic Council of MSRUAS** June 2018
8	**Next Review Date:** March 2023
9	**Programme Approving Regulating Body and Date of Approval** --
14	**Rationale for the Programme** Computing and information technologies have not only touched all aspects of human existence but are also helping drive all modern human endeavours, most notably science and engineering practice. Advances in Computer Science and Engineering (CSE) field are enabling several disciplines such as intelligent systems, data science, bioinformatics, nanotechnology and interactive virtual worlds. It is also contributing to methodological advances in most fields of study: from computational proofs of mathematical theorems through simulation based studies of physical, biological and engineering systems to virtual reality based psychology experiments. Algorithms and computing systems are responsible for the Artificial Intelligence (AI) and data driven revolution and processing voluminous data in all spheres of engineering, simulation of earth climatic models and social networking sites, among many others. As a consequence, the field of CSE is dynamic and constantly evolving. These diverse and demanding applications generate a constant demand for CSE professionals able to analyse and develop appropriate abstractions of the problems to be addressed, design appropriate architectures and components, implement as well as deploy solutions. While it has commonalities with other Engineering disciplines, CSE is unique due to the fact that every final product (software) is largely handcrafted. Thus, an undergraduate programme in CSE should lay a strong and balanced foundation as well as the ability to synthesise working systems. Students have to be thorough in the underlying principles as well as the practical aspects of modern computing systems and information infrastructure preparing them for a career in the challenging and dynamic field. The Computer Science and Engineering programme at Faculty of Engineering and Technology at MSRUAS has been developed by the members of the faculty based on their teaching experience and long standing interactions with various universities and industries in India and abroad.

The curriculum is outcome based and helps students to develop critical thinking abilities and imbibe relevant practical skills for a smooth transition from academics to real-life work environment. Opportunities are provided for the students to do their internship in India or abroad depending on their preferences.

While most engineering colleges and universities across the world offer a CSE degree (or its equivalent), there is a shortage in quality graduates. The CSE programme is designed to produce creative and knowledgeable engineers with capabilities to innovate, design and develop computing and information technology solutions for diverse requirements of society, environment and human endeavours.

10	**Programme Accredited Body and Date of Accreditation**
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11	**Grade Awarded by the Accreditation Body**
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12	**Programme Accreditation Validity**
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13	**Programme Benchmark**
	N/A
15	**Programme Mission**
	The purpose of the programme is creation of innovative problem solvers in multi-disciplinary settings, entrepreneurs and leaders applying the knowledge, understanding, cognitive abilities, practical skills and transferrable skills gained through systematic, flexible and rigorous learning in the chosen academic domain
16	**Graduate Attributes**

16. **Graduate Attributes**
   1. Ability to apply knowledge of mathematics, science, and Engineering fundamentals to solve complex problems in engineering
   2. Ability to analyse engineering problems, interpret data and arrive at meaningful conclusions involving mathematical inferences
   3. Ability to design an engineering system, component, or process to meet desired needs considering public health and safety, and the cultural, societal, and environmental considerations
   4. Ability to understand and solve complex engineering problems by conducting experimental investigations
   5. Ability to apply appropriate tools and techniques and understand utilization of resources appropriately to complex engineering activities
   6. Ability to understand the effect of engineering solutions on legal, cultural, social and public health and safety aspects
   7. Ability to develop sustainable solutions and understand their effect on society and environment
   8. Ability to apply ethical principles to engineering practices and professional responsibilities
   9. Ability to work as a member of a team, to plan and to integrate knowledge of various engineering disciplines and to lead teams in multidisciplinary settings
   10. Ability to make effective oral presentations and communicate technical ideas to a broad audience using written and oral means
   11. Ability to lead and manage multidisciplinary teams by applying engineering and management principles
   12. Ability to adapt to the changes and advancements in technology and engage in independent and life-long learning

17	**Programme Goal**
	The programme goal is to produce graduates with critical, analytical and problem solving skills, and ability to think independently, to pursue a career in Computer Science and Engineering.
18	**Programme Objectives**
	The programme will impart knowledge of computing and information technology systems and their sub systems; develop understanding of underlying logical, algorithmic, architectural and programming principles of computer science and engineering; teach modelling, simulation and analysis to study the performance of computing systems and develop the ability to design, build and test modern computing

systems. It also trains students on personal development and interactive skills with professionals and feel for society.

The objectives of the programme are:

1. To facilitate the acquisition of knowledge in computing and information technology systems and their subsystems
2. To develop understanding of the underlying logical, algorithmic, architectural and programming principles of computing systems
3. To build the ability to design and implement computing and information systems to meet the specific application needs
4. To model, simulate and analyse the behaviour of computing and information systems to predict and improve their performance
5. To train students on development of software products to meet specific requirements and customer needs
6. To impart training on the processes and practice of engineering, deployment and operation of information technology infrastructure
7. To impart training on professional ethics, history, economics, social sciences and interactive skills relevant to professional practice
8. To provide a general perspective on lifelong learning and opportunities for a career in industry, business and commerce

19	**Programme Intended Learning Outcomes**

The intended learning outcomes are listed under four headings:
1. Knowledge and Understanding, 2. Cognitive skills 3. Practical skills and
4. Capability / Transferable skills.

Knowledge and Understanding

After undergoing this programme, a student will be able to

KU1:	Identify and describe the various algorithms, architectures, programming paradigms and systems relevant to Computer Science and Engineering
KU2:	Explain the underlying logical and engineering principles that govern the Computer Science and Engineering systems/processes
KU3:	Compare and contrast newer approaches and technologies with the existing ones
KU4:	Understand the impact of engineering solution and accept professional, ethical, social, legal and economic responsibilities

Cognitive Skills

After undergoing this programme, a student will be able to

CS1:	Design and synthesise algorithms, architectures and software for computing and information technology systems
CS2:	Model, simulate and analyse the computing and information technology systems
CS3:	Modify the existing algorithms, architectures and programs to meet newer requirements
CS4:	Apply scientific and engineering principles to evaluate computing systems and answer what if questions

Practical Skills

After undergoing this programme, a student will be able to

PS1:	Use the facilities of CASE tools and IDEs for software development life cycle activities
PS2:	Employ appropriate tools for development and measurement of scientific and engineering systems
PS3:	Deploy and configure standalone and distributed computing and information technology infrastructure
PS4:	Operate computing, networking and information technology systems

Capability Skills / Transferrable Skills

After undergoing the programme, a student will be able to-

TS1:	Manage information, develop technical reports and make presentations
TS2:	Build, Manage and Lead a team to successfully complete a project and communicate across teams and organizations to achieve professional objectives
TS3:	Work under various constraints to meet project targets
TS4:	Adopt to the chosen profession by continuously upgrading his/her knowledge and understanding through Life-long Learning philosophy

20	**Programme Structure**

Programme Structure

Semester: 1, Physics Cycle

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	18BSC101A	Engineering Mathematics-1	3	2	0	4	100
2	18BSC102A	Engineering Physics	3	2	0	4	100
3	18ESC101A	Elements of Mechanical Engineering	3	0	0	3	100
4	18ESC102A	Elements of Electronics Engineering	3	2	0	4	100
5	18ESC103A	Engineering Drawing	1	0	4	3	100
6	18BSL103A	Engineering Physics Laboratory	0	0	2	1	50
7	18ESL104A	Basic Workshop Practice	0	0	2	1	50
8	18ESL105A	Basic Electronics Laboratory	0	0	2	1	50
9	18HST101A	Elements of Social Sciences and Ethics	2	0	0	2	50
		Total	**15**	**6**	**10**	**23**	**700**
	Total number of contact hours per week		**31 hours**				
	Number of credits can be registered		**Minimum**	**18**	**Maximum**		**23**

Semester: 2, Chemistry Cycle

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	18BSC104A	Engineering Mathematics - 2	3	2	0	4	100
2	18BSC105A	Engineering Chemistry	3	0	0	3	100
3	18ESC106A	Engineering Mechanics and Construction Materials	3	2	0	4	100
4	18ESC107A	Elements of Electrical Engineering	3	2	0	4	100
5	18ESC108A	Elements of Computer Science and Engineering	3	2	0	4	100
6	18ESL109A	Computer Programming Laboratory	0	0	2	1	50
7	18BSL106A	Engineering Chemistry Laboratory	0	0	2	1	50
8	18ESL110A	Basic Electrical Engineering Laboratory	0	0	2	1	50
9	18HST102A	Professional Communication	2	0	0	2	50
		Total	**17**	**8**	**6**	**24**	**700**
	Total number of contact hours per week		**31 hours**				
	Number of credits can be registered		**Minimum**	**20**	**Maximum**		**24**

Semester: 1 Chemistry Cycle

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	18BSC101A	Engineering Mathematics-1	3	2	0	4	100
2	18BSC105A	Engineering Chemistry	3	0	0	3	100
3	18ESC106A	Engineering Mechanics and Construction Materials	3	2	0	4	100
4	18ESC107A	Elements of Electrical Engineering	3	2	0	4	100
5	18ESC108A	Elements of Computer Science and Engineering	3	2	0	4	100
6	18BSL109A	Engineering Chemistry Laboratory	0	0	2	1	50
7	18ESL106A	Basic Electrical Laboratory	0	0	2	1	50
8	18ESL110A	Computer Programming Laboratory	0	0	2	1	50
9	18HST102A	Professional Communication	2	0	0	2	50
		Total	**17**	**8**	**6**	**24**	**700**
	Total number of contact hours per week		**31 hours**				
	Number of credits can be registered		**Minimum**	**20**		**Maximum**	**24**

Semester : 2, Physics Cycle

S. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	18BSC104A	Engineering Mathematics-2	3	2	0	4	100
2	18BSC102A	Engineering Physics	3	2	0	4	100
3	18ESC101A	Elements of Mechanical Engineering	3	0	0	3	100
4	18ESC102A	Elements of Electronics Engineering	3	2	0	4	100
5	18ESC103A	Engineering Drawing	1	0	4	3	100
6	18BSL103A	Engineering Physics Laboratory	0	0	2	1	50
7	18ESL104A	Basic Workshop Practice	0	0	2	1	50
8	18ESL105A	Basic Electronics Laboratory	0	0	2	1	50
9	18HST101A	Elements of Social Science	2	0	0	2	50
		Total	**15**	**6**	**10**	**23**	**700**
	Total number of contact hours per week		**31 hours**				
	Number of credits can be registered		**Minimum**	**18**		**Maximum**	**23**

SEMESTER 3

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19MHB201A	Engineering Mathematics - 3	3	2	0	4	100
2	19CSC202A	Discrete Mathematics	3	2	0	4	100
3	19CSC203A	Data Structures and Algorithms	3	0	0	3	100
4	19CSC204A	Logic Design	3	0	0	3	100
5	19CSC205A	Microprocessors and Assembly Programming	3	0	0	3	100
6	19CSL206A	Data Structures and Algorithms Laboratory	0	0	2	1	50
7	19CSL207A	Logic Design Laboratory	0	0	2	1	50
8	19CSL208A	Microprocessor and Assembly Programming Laboratory	0	0	2	1	50
9	19CEM210A	Environmental Studies	2	0	0	0	Audit
Total			**17**	**4**	**6**	**20**	**650**
Total number of contact hours per week			**27 hours**				
Number of credits can be registered			**Minimum**			**Maximum**	**20**

SEMESTER 4

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19MHB211A	Engineering Mathematics - 4	3	2	0	4	100
2	19ECC212A	Software Development Fundamentals	3	0	0	3	100
3	19CSC213A	Programming Paradigms	3	2	0	4	100
4	19CSC214A	Design and Analysis of Algorithms	3	0	0	3	100
5	19CSC215A	Formal Languages and Automata Theory	3	0	0	3	100
6	19CSC216A	Software Development Laboratory	0	0	2	1	50
7	19CSL217A	Programming Paradigms Laboratory	0	0	2	1	50
Total			**15**	**4**	**4**	**20**	**600**
Total number of contact hours per week			**23 hours**				
Number of credits can be registered			**Minimum**			**Maximum**	**20**

SEMESTER 5

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CSC301A	Probability and Statistics	3	0	0	3	100
2	19CSC302A	Database Systems	3	0	0	3	100
3	19CSC303A	Computer Networks	3	0	0	3	100
4	19CSC304A	Operating Systems	3	0	0	3	100
5	19CSC305A	Compilers	3	2	0	4	100
6	19CSL306A	Database Systems Laboratory	0	0	2	1	50
7	19CSL307A	Computer Networks Laboratory	0	0	2	1	50
8	19CSL308A	Operating Systems Laboratory	0	0	2	1	50
9	19CSC309A	Economics and Cost Estimation in Computer Engineering	2	0	0	2	50
Total			**17**	**2**	**6**	**21**	**700**
Total number of contact hours per week			**25 hours**				
Number of credits can be registered			**Minimum**		**Maximum**		**21**

SEMESTER 6

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CSC311A	Graph Theory and Optimization	3	0	0	3	100
2	19CSC312A	Artificial Intelligence	3	2	0	4	100
3	19CSC313A	Distributed and Cloud Computing	3	0	0	3	100
4	19CSC314A	Web Architecture and Application Development	3	0	0	3	100
5	19CSC315A	Information Security and Protection	3	2	0	4	100
6	19CSL316A	Distributed and Cloud Computing Laboratory	0	0	2	1	50
7	19CSL317A	Web Architecture and Application Development Laboratory	0	0	2	1	50
Total			**15**	**2**	**2**	**19**	**600**
Total number of contact hours per week			**19 hours**				
Number of credits can be registered			**Minimum**		**Maximum**		**19**

SEMESTER 7

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CSE41XA	Professional Core Elective - 1	3	2	0	4	100
2	19CSE42XA	Professional Core Elective - 2	3	0	0	3	100
3	19CSE43XA	Professional Core Elective - 3	3	0	0	3	100
4	19CSO41XA	Open Elective - 1	3	0	0	3	100
6	I]19CSP401A	I] Project Work - I	0	0	12	6	100
	II]19CSP402A	II]Internship (Choose one)					
7	19CSP403A	Seminar	0	0	2	1	50
		Total	**12**	**2**	**14**	**20**	**550**
	Total number of contact hours per week		**28 hours**				
	Number of credits can be registered		**Minimum**			**Maximum**	**20**

SEMESTER 8

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19CSE44XA	Professional Core Elective - 4	3	2	0	4	100
2	19CSE45XA	Professional Core Elective - 5	3	0	0	3	100
3	19CSO41XA	Open Elective - 2	3	0	0	3	100
4	19CSP404A	Project Work - II	0	0	20	10	100
		Total	**9**	**2**	**20**	**20**	**400**
	Total number of contact hours per week		**31 hours**				
	Number of credits can be registered		**Minimum**	**0**	**Maximum**		**20**

Professional Core Elective Courses:

Group	VII Sem			VIII Sem	
	PCE-1 Course Name	PCE-2 Course Name	PCE-3 Course Name	PCE-4 Course Name	PCE-5 Course Name
Machine Learning	19CSE412A: Artificial Neural Networks	I] 19CSE422A: Computational Intelligence II] 19CSE425A: Computer Graphics (Choose one)	19CSE432A: Pattern Recognition and Machine Learning	I] 19CSE441A: Data Analytics II] 19CSE443A: Data Visualization (Choose one)	19CSE451A: Deep Learning
Data Engineering	19CSE413A: Data Modelling and Representation	I] 19CSE423A: Python for Data Science II] 19CSE424A: R for Data Science III] 19CSE425A: Computer Graphics (Choose one)	I] 19CSE433A: Data Processing II] 19CSE432A: Pattern Recognition and Machine Learning (Choose one)	19CSE441A: Data Analytics	19CSE452A: Text Mining
Enterprise Computing	19CSE414A: Software Engineering	19CSE426A: Grid and Cloud Computing	19CSE434A: Principles and Practices of Software Testing	19CSE444A: Enterprise Computing	19CSE453A: Service Oriented Architecture
Theoretical Computer Science	19CSE415A: Applied Formal Methods	19CSE427A: Principles and Practices of Cryptography	19CSE435A: Quantum Computing	19CSE445A: Theory of Computation	19CSE454A: Theory of Machine Learning
Embedded Systems and IoT	19CSE416A: Real-Time Embedded Systems	19CSE428A: Embedded Computer Architecture and Programming	I] 19CSE436A: Connected Devices II] 19CSE437A:Signals and Systems (Choose one)	19CSE446A: Advanced Computer Architecture	19CSE455A: Introduction to IoT
Computer Networks	19CSE417A: Network Programming & Simulation	19CSE427A: Principles and Practices of Cryptography II] 19CSE429A: Statistical Detection and Estimation (Choose one)	I] 19CSE438A: Wireless Networks II] 19CSE439A: Signal and Image Processing Algorithms (Choose one)	I] 19CSE447A: Multimedia Systems II] 19CSE448A: Mobile Computing (Choose one)	19CSE456A: Software-defined networking
Common Group	19CSE423A: Python for Data Science	I] 19CSE422A: Computational Intelligence II] 19CSE425A: Computer Graphics (Choose one)	I]19CSE431A: Data Science Algorithms and Applications II] 19CSE432A: Pattern Recognition and Machine Learning	19CSE441A: Data Analytics	19CSE412A: Artificial Neural Networks and Deep Learning

21	**Programme Delivery** As per the time Table

22	**Teaching and Learning Methods**
	1. Face to Face Lectures using Audio-Visuals
	2. Workshops-Group Discussions, Debates, Presentations
	3. Demonstrations
	4. Guest Lectures
	5. Laboratory-work/Field work/workshop
	6. Industry Visit
	7. Seminars
	8. Group Exercises
	9. Project work
	10. Project Exhibitions
	11. Technical Festivals

23	**Assessment and Grading**
	1. Every course will be assessed for a weight of 100%
	2. For the courses having 100% theory
	There are two components-Component-1 and Component-2
	Component-1 (CE) carries a weight of 50% and Component -2 (SEE) carries a weight of 50%
	Component-1 (CE): 50% weight
	The course leader will indicate the mode of assessment in consultation and approval of the respective HoD and the faculty Dean, before commencement of the semester.
	The template for weightage of CE and SEE in percentages for each theory course is indicated in Table below.

ILO No.	Intended Learning Outcome	CE (Weightage: 50 %)				SEE
		Assessment Type	Comp-1a	Comp-1b	Comp-1c	(Weightage: 50 %)
		Comp Weightage (%)	00	00	00	Sem End Exam
1	ILO-1					
2	ILO-2					
3	ILO-3					
4	ILO-4					
5	ILO-5					
6	ILO-6					

CE – can be from any combination of the following:

Assignments, term Tests, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, others, if any.

Component - 2 (SEE): 50% weight

A 3 hour duration Semester End Examination will be conducted for a maximum of 100 marks

and will be reduced to 50% weight.

A student is required to score a minimum of 40% marks in Semester end examination and 40% marks overall in each theory course.

3.   For Laboratory/ Practical courses

Total Marks : 50

Component 1(CE) : Laboratory Report: 50% Weight

Component 2(SEE) Semester End Examination: 50% Weight

A 3 hour duration Semester End Examination will be conducted for a maximum of 50 marks.

The course leader will indicate the mode of assessment in consultation and approval of the respective HoD and the faculty Dean, before commencement of the semester.

The template for weightage of CE and SEE in percentages for each course is indicated in Table below.

ILO No.	Intended Learning Outcome	Assessment Type	CE (Weightage: 50 %)				SEE (Weightage: 50 %):
			Conduction of Lab Exercises)	(Viva)	(Lab Record Submission)	(Lab Test)	SEE
		Comp Weightage (%)					50
1	ILO-1						
2	ILO-2						

A student is required to score a minimum of 40% marks in Semester end examination and 40% marks overall in each laboratory course.

4.   **For courses with a combination of theory and laboratory**

There are two components-Component-1 and Component-2

Component-1 (CE) carries a weight of 50% and Component -2 (SEE) carries a weight of 50%.

Component-1 (CE): 50% weight

The course leader will indicate the mode of assessment in consultation and approval of the respective HoD and the faculty Dean, before commencement of the semester.

The template for weightage of CE and SEE in percentages for each course is indicated in Table below.

ILO No.	Intended Learning Outcome	CE (Weightage: 50 %)				SEE (Weightage: 50 %)
		Assessment Type	Comp-1a	Comp-1b	Comp-1c Lab	SEE
		Comp Weightage (%)	00	00	00	50
1	ILO-1					
2	ILO-2					
3	ILO-3					
4	ILO-4					
5	ILO-5					
6	ILO-6					

CE – can be from any combination of the following:

Assignments, term Tests, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, others,

A 3 hour duration Semester End Examination will be conducted for a maximum of 100 marks and will be reduced to 50 marks.

A student is required to score a minimum of 40% marks in Semester end examination and 40% marks overall in each theory course.

5. Other flexibilities (exceptions) as per the programme regulations.

24	**Attendance**
	A minimum of 80% attendance is compulsory to appear for semester end examinations. Condoning of attendance shortage is as per the Academic Regulations of B.Tech. Programme.
25	**Award of Class**
	As per the Academic Regulations of B.Tech. Programme
26	**Student support for Learning** 1. Course Notes 2. Reference Books in the Library 3. Magazines and Journals 4. Internet Facility 5. Computing Facility 6. Laboratory Facility 7. Workshop facility 8. Staff support 9. Lounges for Discussions 10. Any other support that enhances their learning

27	**Quality Control Measures**
	1. Review of Course Notes
	2. Review of Question Papers and Assignment Questions
	3. Student Feedback
	4. Moderation of assessed work
	5. Opportunities for students to see their assessed work
	6. Review and Audit by external examiners
	7. Staff Student Consultative Committee meetings
	8. Student exit feedback

28 Curriculum Map

Course Code					Intended Learning Outcomes											
					Knowledge and Understanding				Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving)				Practical skills			
TSH/CEM	BS	ES/EC	CS	OEE	KU1	KU2	KU3	KU4	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
a	b	c	d	e												
110A	MHB101A	MES103A	C201A	403		bcd		abcd		d		bd		bcd		
120A	MHB110A	EES104A	C202A		cd	bcd	d	abcd	d	d	d	bd	d	bcd		
210A	MHB201A	EES113A	C203A		d	bcd		abcd	d	d	a	bd	d	bcd		
	MHB211A	MES106A	C210A		d	bcd	d	abcd	d	d	d	bd	d	bcd	d	d
	PHB102A	ECL109A	L205A		cd	bcd	d	bcd	d	d	d	bd	d	bcd		
	PHL107A	EEL108A	L206A		d	bcd		bcd	d	d		bd	d	bcd		
	CHB111A	CES112A	L213A		cd	bcd	d	bcd	d	d	d	bd	d	bcd	d	d
	CHL116A	CSS114A	C208A		cd	bcd	d	bcd	cd	cd	cd	bcd	d	bcd		
		CSL115A	C204A		cd	cd		cd	d	d		d	d	d	d	d
			C209A		d	d	d	d	d	d	d	d	d	d	d	d
			L214A		d	d		d	d	d		d	d	d		
			L207A		d	d		d	d	d		d	d	d	d	d
			L212A		d	d		d	d	d		d	d	d	d	d
			C302A													
			C311A		d	d	d	d	d	d	d	d	d	d	d	d
			C303A		d	d		d	d	d		d	d	d	d	d
			C306A		cd	bcd	d	bcd	cd	cd	cd	bcd	d	b		
			L313A		d	d	d	d	d	d	d	d	d	d	d	d
			L307A		d	d		d	d	d		d	d	d	d	d
			C301A		d	d		d	d	d				d		
			C308A		d	d	d	d	d	d	d	d	d	d		
			C314A		d	d	d	d	d	d	d	d	d	d	d	d
			C313A		d	d	d	d	d	d	d	d	d	d	d	d
			C315A		d	d	d	d	d	d	d	d	d	d	d	d
			L312A		d	d		d	d	d		d	d	d		
			L317A		d	d	d	d	d	d	d	d	d	d	d	d
			E412A		d	d	d	d	d	d	d	d	d	d		
			E413A		d	d	d	d	d	d	d	d	d	d		
			E414A		d	d	d	d	d	d	d	d	d	d	d	d
			E415A		d	d	d	d	d	d	d	d	d	d		
			E416A		d	d		d	d	d		d	d	d		
			E417A		d	d	d	d	d	d	d	d	d	d		
			E422A		d	d	d	d	d	d	d	d	d	d		
			E423A		d	d	d	d	d	d	d	d	d	d	d	
			E424A		d	d	d	d	d	d	d	d	d	d	d	
			E425A		d	d	d	d	d	d	d	d	d	d	d	d
			E426A		d	d	d	d	d	d	d	d	d	d		
			E427A		d	d	d	abcd	d	d	d	d	d	bcd	d	
			E428A		d	d	d	d	d	d	d	d	d	d		
			E429A		d	d	d	d	d	d	d	d	d	d		
			E431A		d	d	d	d	d	d	d	d				
			E432A		d	d	d	d	d	d	d	d	d	d		
			E433A		d	d	d	d	d	d	d	d	d	d		
			E434A		d	d	d	d	d	d	d	d	d	d		
			E435A		d	d	d	d	d	d	d	d				
			E436A		d	d	d	d	d	d	d	d	d	d	d	
			E437A		d	d	d	d	d	d	d	d	d	d	d	d
			E438A		d	d	d	d	d	d	d	d	d	d	d	
			E439A		d	d	d	d	d	d	d	d	d	d		
			P401A		d	d	d	d	d	d	d	d	d	d	d	d
			P402A		d	d	d	d	d	d	d	d	d	d	d	d
			P403A		d	d	d	d		d				d	d	d
			E441A		d	d	d	d	d	d	d	d	d	d		
			E443A		d	d	d	d	d	d	d	d	d	d		

HST/CN	BS	ES/EC	CS	OEE	KU1	KU2	KU3	KU4	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
a	b	c	d	e												
			E444A		d	d	d	d	d	d	d	d	d	d	d	d
			E445A		d	d		d	d	d		d	d	d	d	d
			E446A		d	d	d	d	d	d	d	d	d	d		
			E447A		d	d		d	d	d		d	d	d	d	d
			E448A		d	d		d	d	d		d	d	d	d	d
			E451A		d	d	d	d	d	d	d	d	d	d	d	d
			E452A		d	d		d	d	d		d	d	d	d	d
			E453A		d	d	d	d	d	d	d	d	d	d		
			E454A		d	d		d	d	d		d	d	d	d	d
			E455A		d	d		d	d	d		d	d	d	d	d
			E456A		d	d		d	d	d		d	d	d	d	d
			P404A		d	d	d	d	d	d	d	d	d	d	d	d
					Total 160 credits											

*Depends on elective course chosen

29   Capability / Transferable Skills Map

	Course Code								Skills					
HST/CEM	BS	ES/EC	CS	OEE	GK	SL	WC	OC	P	B	IM	PM	L	AO
a	b	c	d	e										
110A	MHB10	MES103	C201A	403	a	abcd	abcd	abcd	abcd		abcd	abcd		
120A	MHB11	EES104A	C202A		a	abcd	abcd	abcd	abcd	a	abcd	abcd		
210A	MHB20	EES113A	C203A		a	abcd	abcd	abcd	abcd		abcd	abcd		
	MHB21	MES106	C210A		a	abcd	abcd	abcd	abcd	a	abcd	abcd		
	PHB102	ECL109A	L205A			bcd	bcd	bcd	bcd		bcd	bcd		
	PHL107	EEL108A	L206A			bcd	bcd	bcd	bcd		bcd	bcd		
	CHB111	CES112A	L213A			bcd	bcd	bcd	bcd		bcd	bcd		
	CHL116A	CSS114A	C208A			bcd	bcd	bcd	bcd		bcd	bcd		
		CSL115A	C204A			cd	c	cd	cd		c	cd		
			C209A			d	d	d	d		d	d		
			C211A			d	d	d	d		d	d		
			L214A			d	d	d	d		d	d		
			L207A			d	d	d	d		d	d		
			L212A			d	d	d	d		d	d		
			C302A			d	d	d	d		d	d		
			C311A			d	d	d	d		d	d		
			C303A			d	d	d	d		d	d		
			C306A			d	d	d	d		d	d		
			L313A			d	d	d	d		d	d		
			L307A			d	d	d	d		d	d		
			C301A			d	d	d	d		d	d		
			C308A			d	d	d	d		d	d		
			C314A			d	d	d	d		d	d		
			C313A			d	d	d	d		d	d		
			C315A			d	d	d	d		d	d		
			L312A			d	d	d	d		d	d		
			L317A			d	d	d	d		d	d		
			L316A			d	d	d	d		d	d		
			E412A			d	d	d	d		d	d		
			E413A			d	d	d	d		d	d		
			E414A			d	d	d	d		d	d		
			E415A			d	d	d	d		d	d		
			E416A			d	d	d	d		d	d		
			E417A			d	d	d	d		d	d		
			E422A			d	d	d	d		d	d		
			E425A			d	d	d	d		d	d		
			E426A			d	d	d	d		d	d		
			E427A			d	d	d	d		d	d		
			E428A			d	d	d	d		d	d		

HST/CEN	BS	ES/EC	CS	OEE	GK	SL	WC	OC	P	B	IM	PM	L	AO
a	b	c	d	e										
			E429A			d	d	d	d		d	d		
			E432A			d	d	d	d		d	d		
			E433A			d	d	d	d		d	d		
			E434A			d	d	d	d		d	d		
			E435A			d	d	d	d		d	d		
			E436A			d	d	d	d		d	d		
			E437A			d	d	d	d		d	d		
			E438A			d	d	d	d		d	d		
			E439A			d	d	d	d		d	d		
			E431A			d	d	d	d		d	d		
			P401A		d	d	d	d	d	d	d	d	d	
			P402A		d	d	d	d	d	d	d	d	d	
			P403A		d	d	d	d	d	d	d	d	d	
			E431A			d	d	d	d		d	d		
			P141A		d	d	d	d	d	d	d	d	d	
			P142A		d	d	d	d	d	d	d	d	d	
			C401A			d		d	d		d	d		
			E441A			d	d	d	d		d	d		
			E443A			d	d	d	d		d	d		
			E444A			d	d	d	d		d	d		
			E445A			d		d	d		d	d		
			E446A			d	d	d	d		d	d		
			E447A			d		d	d		d	d		
			E448A			d		d	d		d	d		
			E451A			d		d	d		d	d		
			E452A			d		d	d		d	d		
			E453A			d		d	d		d	d		
			E454A			d		d	d		d	d		
			E455A			d		d	d		d	d		
			E456A			d		d	d		d	d		
			P404A		d	d	d	d	d	d	d	d	d	

GK: Group Work; SL: Self Learning; WC: Written Communication; OC: Oral Communication P: Presentation; B: Behavioural; IM: Information Management; PM: Personal Management L: Leadership; AO: Any other

30	**Co-curricular Activities** Students are encouraged to take part in co-curricular activities like seminars, conferences, symposia, paper writing, attending industry exhibitions, project competitions and related activities for enhancing their knowledge and networking.
31	**Cultural and Literary Activities** Annual cultural festivals are held to showcase the creative talents in students. They are involved in planning and organizing the activities.
32	**Sports and Athletics** Students are encouraged to take part in sports and athletic events regularly. Annual sports meet will be held to demonstrate sportsmanship and competitive spirit.

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