



Programme Specifications

B. Tech. Programme

Programme:
Mathematics & Computing

Department:
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: Mathematics and Computing

Faculty	Engineering and Technology (FET)
Department	Computer Science and Engineering
Programme	Mathematics and Computing
Dean of Faculty	Prof. H.M. Rajashekara Swamy
Head of Department	Prof. PVR Murthy

1	Title of the Award B. Tech. in Mathematics and Computing
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 June 2020
7	Date of Programme Approval by the Academic Council of MSRUAS July 2020
8	Next Review Date: March 2024
9	Programme Approving Regulating Body and Date of Approval --
14	<p>Rationale for the Programme</p> <p>The theoretical underpinnings of computer science deal with the meaning of computation, computable functions, logic and complexity of algorithms which have roots in logic and mathematics. In the same way, when it comes to applying computers to scientific problems or to problems in other domains, a deep knowledge of applied mathematics is necessary to be able to design effective algorithms for computing solutions. Furthermore, in order to develop efficient and reliable programs for scientific computations, a student needs to be trained in effective usage of programming languages, parallel computing and advanced computer architecture. The above three facts motivate the need for a unified and cohesive offering of the respective concepts, models and techniques in a B.Tech programme in Mathematics and Computing as there is a rich body of foundational knowledge available today in all the three topics mentioned above. With the undisputable emergence of Artificial Intelligence(AI) and Machine Learning as a tool for penetrating deeply into almost every scientific and commercial or business endeavour for optimal solutions, it is imperative that an undergraduate programme in Mathematics and Computing needs to train students in AI too.</p> <p>The above mentioned observations clearly indicate the need for an inter-disciplinary B.Tech programme in Mathematics and Computing offering a balanced set of courses in theoretical computer science, models of computation, applied mathematics, machine learning, programming languages, parallel computing and computer architecture.</p> <p>Data clearly indicates the need for professionals and scientists in industry and R&D establishments in the areas of theoretical computer science to apply appropriate mathematical tools to design innovative algorithms for various problems, to solve scientific, financial and management problems using _____</p>

	<p>appropriate mathematical models as the basis for computer algorithms and also in driving innovations in computational models and computer architecture based on practical experience in solving complex problems.</p> <p>In order to be ready for solving various problems in science, technology and business in the 21st century, students need a programme such as B.Tech in Mathematics and Computing to not only study and investigate into traditional models of computation such as the Turing Machine or Lambda Calculus but also to gain an edge by early initiation into Quantum Computing along with the required practical knowledge gained from experimentation and implementation.</p>
10	<p>Programme Accredited Body and Date of Accreditation</p> <p>--</p>
11	<p>Grade Awarded by the Accreditation Body</p> <p>--</p>
12	<p>Programme Accreditation Validity</p> <p>--</p>
13	<p>Programme Benchmark</p> <p>N/A</p>
15	<p>Programme Mission</p> <p>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</p>
16	<p>Graduate Attributes</p> <ol style="list-style-type: none"> 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	<p>Programme Goal</p> <p>The programme goal is to produce graduates with critical, analytical and problem solving skills, and ability to think independently, to pursue a career in Mathematics and Computing.</p>
18	<p>Programme Objectives</p> <p>The main objective of BTech Mathematics and Computing programme is to prepare a student to solve real-life problems in science, engineering and finance using computing as a tool with</p>

	<p>algorithms based on mathematical models and insights. A student should</p> <ol style="list-style-type: none"> 1. Become proficient in science, engineering and mathematics 2. Become proficient in programming to develop computing solutions 3. Be able to apply theory of computing to real-life problems 4. Be able to formulate mathematical models for problems and develop appropriate computing solutions
19	<p>Programme Intended Learning Outcomes</p> <p>The intended learning outcomes are listed under four headings:</p> <ol style="list-style-type: none"> 1. Knowledge and Understanding, 2. Cognitive skills 3. Practical skills and 4. Capability / Transferable skills. <p>Knowledge and Understanding</p> <p>After undergoing this programme, a student will be able to</p> <p>KS1: Gain knowledge of models of computation based on von Neumann style of architecture</p> <p>KS2: Gain knowledge of mathematical techniques required to perform effective computing</p> <p>KS3: Gain knowledge of programming and programming languages required to effective in Mathematics and Computing</p> <p>KS4: Gain deeper knowledge of Security and Cryptography or Artificial Intelligence or Computational Intelligence or Mathematics based on student's interest and the electives offered by CSE department.</p> <p>Cognitive Skills</p> <p>After undergoing this programme, a student will be able to</p> <p>CS1: Apply analytical skills augmented with knowledge of Mathematics and Computing</p> <p>Practical Skills</p> <p>After undergoing this programme, a student will be able to</p> <p>PS1: Develop software for algorithms based on mathematical models</p> <p>Capability Skills / Transferrable Skills</p> <p>After undergoing the programme, a student will be able to-</p> <p>TS1: Manage information, develop technical reports and make presentations</p> <p>TS2: Build, Manage and Lead a team to successfully complete a project and communicate across teams and organizations to achieve professional objectives</p> <p>TS3: Work under various constraints to meet project targets</p> <p>TS4: Adopt to the chosen profession by continuously upgrading his/her knowledge and understanding through Life-long Learning philosophy</p>
20	Programme Structure

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	19BSC101A	Engineering Mathematics-1	2	2	0	4	100
2	19BSC102A	Engineering Physics	4	0	0	4	100
3	19ESC101A	Elements of Mechanical Engineering and Work shop practise	2	0	2	3	100
4	19ESC111A ¹ / /19ESC102A ²	Basics of Electrical and Electronics Engineering ¹ / Elements of Faculty of Engineering and Technology Electronics Engineering ²	4	0	0	4	100
5	19ESC103A	Engineering Drawing	1	0	4	3	100

20. Programme Structure (given in tables for all semesters)

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	20MTB101A	Engineering Mathematics-1	2	2	0	4	100
2	20CHB105A	Engineering Chemistry	3	0	0	3	100
3	20CES105A	Elements of Mechanical Engineering and Workshop Practice	2	0	2	3	100
4	20EES106A	Elements of Electrical Engineering	3	0	0	3	100
5	20CSS107A	Elements of Computer Science and Engineering	3	0	0	3	100
6	20CHL106A	Engineering Chemistry Laboratory	0	0	2	1	50
7	20CSL108A	Computer Programming Laboratory	0	0	2	1	50
8	20EEL109A	Basic Electrical Engineering Laboratory	0	0	2	1	50
9	20TSH102A	Professional Communication	2	0	0	2	50
Total			15	2	8	21	700
Total number of contact hours per week			25 Hours				
Number of credits can be registered			Minimum	17	Maximum	21	

SEMESTER 2: Physics Cycle

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20MTB104A	Engineering Mathematics - 2	2	2	0	4	100
2	20PHB102A	Engineering Physics	3	0	0	3	100
3	20CES101A	Engineering Mechanics	3	0	0	3	100
4	20ECS102A	Elements of Electronics Engineering	3	0	0	3	100
5	20MES103A	Engineering Drawing	1	0	4	3	100
6	20PHL103A	Engineering Physics Laboratory	0	0	2	1	50
7	20ECL104A	Basic Electronics Laboratory	0	0	2	1	50
8	20TSH101A	Constitution, Human Rights and Law	2	0	0	2	50
Total			14	2	8	20	650
Total number of contact hours per week			24 Hours				
Number of credits can be registered			Minimum	16	Maximum	20	

SEMESTER 3

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20MTB201A	Complex Analysis and Vector Calculus	3	1	0	4	100
2	20CSC202A	Discrete Mathematics	3	1	0	4	100
3	20CSC203A	Data Structures using Python	3	1	0	4	100
4	20CSC301A	Probability and Statistics	3	0	0	3	100
5	20CSC205A	Microprocessors and Architecture	3	0	0	3	100
6	20CSL206A	Python & Data Structures Laboratory	0	0	2	1	50
7	20CSL208A	Microprocessors Lab	0	0	2	1	50
8	20CEM209A	Environmental Studies	2	0	0	0	Audit
Total			17	3	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	20MTB211A	Integral transforms	3	1	0	4	100
5	20MCC212A	Inferential Statistics	3	1	0	4	100
3	20CSC213A	Programming Paradigms	3	1	0	4	100
4	20CSC214A	Design and Analysis of Algorithms	3	0	0	3	100
8	20MCC215A	Linear Algebra	3	0	0	3	100
6	20MCC216A	Applications of Probability and Statistics in Finance	3	0	0	3	100
7	20MCL217A	Mathematics and Computing Laboratory	0	0	2	1	50
8	20CSL218A	Programming Paradigms Laboratory	0	0	2	1	50
Total			17	3	4	23	700
Total number of contact hours per week			24 hours				
Number of credits can be registered			Minimum		Maximum		

SEMESTER 5

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20CSC216A	Formal Languages and Automata Theory	3	0	0	3	100
2	20MCC301A	Quantum Computing	3	0	0	3	100
3	20MCC302A	Partial Differential Equations	3	0	0	3	100
4	20MCC303A	Optimization Techniques	3	1	0	4	100
5	20AIC204A	Principles of Artificial Intelligence	3	0	0	3	100
6	20MCC306A	Innovation Course 1	3	0	0	3	100
8	20AIL207A	Artificial Intelligence Laboratory	0	0	2	1	50
7	20MCL308A	Numerical Analysis Laboratory	0	0	2	1	50
9	20CSH309A	Economics and Cost Estimation in Computer Engineering	2	0	0	2	50
Total			20	1	4	23	750
Total number of contact hours per week			25 Hours				
Number of credits can be registered			Minimum		Maximum	23	

SEMESTER 6

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20CSC311A	Graph Theory and Optimization	3	0	0	3	100
2	20CSC303A	Computer Networks	3	0	0	3	100
3	20MCC312A	Innovation Course II	3	0	0	3	100
4	20AIC215A	Machine Learning - 1	3	0	0	3	100
5	20CSC304A	Information Security and Protection	3	1	0	4	100
6	20MCC312A	Parallel Algorithms for Scientific Computing	3	0	0	3	100
7	20AIC301A	Data Mining	3	1	0	4	100
8	20CSL308A	Computer Networks Laboratory	0	0	2	1	50
Total			21	3	2	24	750
Total number of contact hours per week			26 hours				
Number of credits can be registered			Minimum		Maximum	24	

SEMESTER 7

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	Professional Elective Core	Professional Core Elective - 1	3	1	0	4	100
2	Professional Elective	Professional Core Elective - 2	3	0	0	3	100
3	Professional Elective	Professional Core Elective - 3	3	0	0	3	100
4	Open Elective	Open Elective-1	3	0	0	3	100
6	20MCP401A	I] Project Work - I	0	0	12	4	100
	20MCP402A	II] Internship (Choose one)					
7	20MCP403A	Seminar	0	0	2	1	50
Total			12	1	14	18	550
Total number of contact hours per week			27 hours				
Number of credits can be registered			Minimum		Maximum	18	

SEMESTER 8

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	Open Elective	Open Elective - 2	3	0	0	3	100
2	20MCP411A	Project work -2	0	0	20	8	100
Total			3	0	20	11	200
Total number of contact hours per week			23 hours				
Number of credits can be registered			Minimum	0	Maximum	11	

Professional Core Elective Courses:

Sl No.	Group	VII Sem		
		PCE-1 Course Name	PCE-2 Course Name	PCE-3 Course Name
1	AI Electives-Set 1 Coding and Cryptography	20MCE401A: Information Theory and Coding	20MCE402A: Computational Number Theory and Algebra	20MCE403A: Number Theory and Elliptic Curve Cryptography
2	AI Electives Set 2 (Mathematical Methods)	20MCE404A: Introduction to Real Analysis	20MCE405A: Topology	20MCE403A: Mathematical Introduction to Elliptic Curves
3	AI Electives Set 3	I] 20MCE406A: Pattern Recognition II] 20MCE407A: Computer Vision (Choose one)	20MCE408A: AI & Healthcare	20MCE409A: Computational Intelligence

21	Programme Delivery As per the time Table
22	Teaching and Learning Methods <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3">ILO No.</th> <th rowspan="3">Intended Learning Outcome</th> <th colspan="3">CE (Weightage: 50 %)</th> <th>SEE</th> </tr> <tr> <th>Assessment Type</th> <th>Comp-1a</th> <th>Comp-1b</th> <th>Comp-1c</th> <th>(Weightage: 50 %)</th> </tr> <tr> <th>Comp Weightage (%)</th> <th>00</th> <th>00</th> <th>00</th> <th>Sem End Exam</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ILO-1</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>ILO-2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>ILO-3</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>ILO-4</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>ILO-5</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>ILO-6</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>CE – can be from any combination of the following: Assignments, term Tests, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, others, if any.</p> <p>Component - 2 (SEE): 50% weight</p>	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				
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																																																				

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
		Assessment Type	Comp-1a	Comp-1b	Comp-1c Lab	(Weightage: 50 %)
						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.

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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 <ol style="list-style-type: none">1. Review of Course Notes2. Review of Question Papers and Assignment Questions3. Student Feedback4. Moderation of assessed work5. Opportunities for students to see their assessed work6. Review and Audit by external examiners7. Staff Student Consultative Committee meetings8. Student exit feedback
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28		Curriculum Map														
Course Code					Intended Learning Outcomes											
					Knowledge and Understanding				Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving)				Practical skills			
HST/CN	BS	ES/EC	CS	OEE	KU1	KU2	KU3	KU4	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
a	b	c	d	e												
101A	C101A	C101A	C201A			bcd		abcd		d		bd		bcd		
102A	C102A	C102A	C202A		cd	bcd	d	abcd	d	d	d	bd	d	bcd		
CEN201A	L103A	C103A	C203A		d	bcd		abcd	d	d	a	bd	d	bcd		
201A	L106A	L104A	C210A		d	bcd	d	abcd	d	d	d	bd	d	bcd	d	d
	C104A	L105A	L205A		cd	bcd	d	bcd	d	d	d	bd	d	bcd		
	C105A	C106A	L206A		d	bcd		bcd	d	d		bd	d	bcd		
	C207A	C107A	L213A		cd	bcd	d	bcd	d	d	d	bd	d	bcd	d	d
	C208A	C108A	C208A		cd	bcd	d	bcd	cd	cd	cd	bcd	d	bcd		
	C401A	L109A	C204A		cd	cd		cd	d	d		d	d	d	d	d
		L110A	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	d	d	d	d	d	d	d	d	
			E428A		d	d	d	d	d	d	d	d	d	d		
			E421A		d	d	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	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
			E441A		d	d	d	d	d	d	d	d	d	d		
			E443A		d	d	d	d	d	d	d	d	d	d		
			P141A		d	d	d	d	d	d	d	d	d	d	d	d
			P142A		d	d	d	d	d	d	d	d	d	d	d	d
			C401A		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
			P43A		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/CEN	BS	ES/EC	CS	OEE	GK	SL	WC	OC	P	B	IM	PM	L	AO	
a	b	c	d	e											
101A	C101A	C101A	C201A		a	abcd	abcd	abcd	abcd		abcd	abcd			
102A	C102A	C102A	C202A		a	abcd	abcd	abcd	abcd	a	abcd	abcd			
CEN201A	L103A	C103A	C203A		a	abcd	abcd	abcd	abcd		abcd	abcd			
201A	L106A	L104A	C210A		a	abcd	abcd	abcd	abcd	a	abcd	abcd			
	C104A	L105A	L205A			bcd	bcd	bcd	bcd		bcd	bcd			
	C105A	C106A	L206A			bcd	bcd	bcd	bcd		bcd	bcd			
	C207A	C107A	L213A			bcd	bcd	bcd	bcd		bcd	bcd			
	C208A	C108A	C208A			bcd	bcd	bcd	bcd		bcd	bcd			
	C401A	L109A	C204A			cd	c	cd	cd		c	cd			
		L110A	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			
			E421A			d	d	d	d		d	d			
			E432A			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										
			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		
			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		
			P43A		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	<p>Co-curricular Activities</p> <p>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.</p>
31	<p>Cultural and Literary Activities</p> <p>Annual cultural festivals are held to showcase the creative talents in students. They are involved in planning and organizing the activities.</p>
32	<p>Sports and Athletics</p> <p>Students are encouraged to take part in sports and athletic events regularly. Annual sports meet will be held to demonstrate sportsmanship and competitive spirit.</p>

