



Programme Specifications

B. Tech. Programme

Programme:
Information Science and Engineering

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: COMPUTER SCIENCE AND ENGINEERING

Faculty	Engineering and Technology (FET)
Department	Computer Science and Engineering
Programme	Information Science and Engineering
Dean of Faculty	Prof. Rajasekhara Swamy
Head of Department	Prof. PVR Murthy

1	Title of the Award B. Tech. in Information 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 April 2020
7	Date of Programme Approval by the Academic Council of MSRUAS May 2020
8	Next Review Date: March 2024
9	Programme Approving Regulating Body and Date of Approval --
14	<p>Rationale for the Programme</p> <p>With the advent of computerization for more than half a century, large scale information systems have been built, deployed and used in various application domains. Information systems are built using technologies available at a given point of time. Information Science deals with the analysis, collection, classification, manipulation, storage, retrieval, movement, dissemination, and protection of information. Construction of information science based systems requires understanding and analysis of systems from the perspective of stakeholders and realizing requirements using information and current technologies.</p> <p>Efficient and scalable design and architecture of software systems is crucial in the deployment of viable information systems in the field. In order to achieve this, a right blend of courses from computer science and algorithms, software engineering and security, data mining, artificial intelligence and information systems is required to offer an effective undergraduate Programme in Information Science and Engineering in the modern era of the emergence of AI and Data Sciences.</p> <p>An undergraduate B. Tech. Programme in Information Science and Engineering, in addition, needs to train students in application topics such as healthcare and information systems, data processing, information retrieval and search engines and bio-informatics. A rich set of elective courses along the lines mentioned above responds to the demand of information science professionals in various enterprises building large scale information systems in healthcare, management and education, to name a few specific application areas.</p>

	In a nutshell, a B. Tech. Programme in Information Science and Engineering, now, should train students to build effective information systems in any required domain with the latest database and Web technologies and construct and deploy large scale Information Systems that are AI and Big Data enabled.
10	Programme Accredited Body and Date of Accreditation --
11	Grade Awarded by the Accreditation Body --
12	Programme Accreditation Validity --
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 <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	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.

	<p>The objectives of the programme are:</p> <ol style="list-style-type: none"> 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	<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>KU1: Identify and describe the various algorithms, architectures, programming paradigms and systems relevant to Computer Science and Engineering</p> <p>KU2: Explain the underlying logical and engineering principles that govern the Computer Science and Engineering systems/processes</p> <p>KU3: Compare and contrast newer approaches and technologies with the existing ones</p> <p>KU4: Understand the impact of engineering solution and accept professional, ethical, social, legal and economic responsibilities</p> <p>Cognitive Skills</p> <p>After undergoing this programme, a student will be able to</p> <p>CS1: Design and synthesise algorithms, architectures and software for computing and information technology systems</p> <p>CS2: Model, simulate and analyse computing and information technology systems</p> <p>CS3: Modify existing algorithms, architectures and programs to meet newer requirements</p> <p>CS4: Apply scientific and engineering principles to evaluate computing systems and answer what if questions</p> <p>Practical Skills</p> <p>After undergoing this programme, a student will be able to</p> <p>PS1: Use the facilities of CASE tools and IDEs for software development life cycle activities</p> <p>PS2: Employ appropriate tools for development and measurement of scientific and engineering systems</p> <p>PS3: Deploy and configure standalone and distributed computing and information technology infrastructure</p> <p>PS4: Operate computing, networking and information technology systems</p>

	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

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 Electronics Engineering ²	4	0	0	4	100
5	19ESC103A	Engineering Drawing	1	0	4	3	100
6	19BSL103A	Engineering Physics Laboratory	0	0	2	1	50
6	19ESL110A ¹ / 19ESL105A ²	Basic Electrical Engineering Laboratory ¹ / Basic Electronics Laboratory ²	0	0	2	1	50
8	19HST101A	Constitution, Human Rights and Law	2	0	0	2	50
Total			14	2	10	21	650
Total number of contact hours per week			26 hours				
Number of credits can be registered			Minimum	17	Maximum	21	

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	19BSC105A	Engineering Chemistry	3	0	0	3	100
4	19ESC106A ¹ / 19ESC107A ²	Engineering Mechanics ¹ / Elements of Electrical Engineering ²	3	0	0	3	100
5	19ESC108A	Elements of Computer Science and Engineering	2	2	0	4	100
6	19BSL106A	Engineering Chemistry Laboratory	0	0	2	1	50
7	18ESL110A ¹ / 19ESL105A ²	Basic Electrical Engineering Laboratory ¹ / Basic Electronics Laboratory ²	0	0	2	1	50

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			17	4	6	24	700
Total number of contact hours per week			15			2	
Number of credits can be registered			25 Hours				

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	Engineering Mathematics3	3	1	0	4	100
2	20CSC202A	Discrete Mathematics	3	1	0	4	100
3	20CSC203A	Data Structures using Python	3	0	0	3	100
4	20ISC204A	Elements of Information Science	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
8	20CSL207A	Microprocessor Laboratory	0	0	2	1	50
9	20CEM210A	Environmental Studies	2	0	0	0	Audit
Total			17	4	6	19	600
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	Engineering Mathematics4	3	1	0	4	100
2	20CSC212A	Software Development Fundamentals	3	0	0	3	100
3	20CSC213A	Programming Paradigms	3	1	0	4	100
	20CSC214A	Design and Analysis of Algorithms	3	0	0	3	100
4	20CSC215A	C & Data Structures	3	0	0	3	100
5	20CSC216A	Formal Languages and Automata Theory	3	0	0	3	100
6	20CSL217A	Software Development Laboratory	0	0	2	1	50
7	20CSL218A	Programming Paradigms Laboratory	0	0	2	1	50
Total			15	4	4	22	600
Total number of contact hours per week			23 hours				
Number of credits can be registered			Minimum		Maximum	25	

SEMESTER 5

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20CSC301A	Probability and Statistics	3	0	0	3	100
2	20CSC302A	Database Systems	3	0	0	3	100
3	20ISC306A	Innovation Course 1	3	0	0	3	100
4	20ISC304A	Data Processing	3	0	0	3	100
5	20CSC303A	Computer Networks	3	0	0	3	100
6	20CSC304A	Information Security and Protection	3	1	0	4	100
7	20CSC307A	IoT 1	0	1	0	1	50
8	20CSL307A	Database Systems Laboratory	0	0	2	1	50
9	20ISL308A	Data processing Laboratory	0	0	2	1	50
10	20CSH309A	Economics and Cost Estimation in Computer Engineering	2	0	0	2	50
Total			17	2	6	24	800
Total number of contact hours per week			hours				
Number of credits can be registered			Minimum		Maximum	25	

SEMESTER 6

Sl. No.	Code	Course Title	Theory (h/W/S)	Tutorials (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	20CSC315A	Distributed and Cloud Computing	3	1	0	4	100
2	20AIC204A	Principles of Artificial Intelligence	3	0	0	3	100
3	20ISC313A	Innovation Course II	3	0	0	3	100
4	20CSC314A	Web Architecture & Development	3	0	0	3	100
5	20CSC313A	Operating Systems	3	0	0	3	100
6	20ISC315A	Bio-informatics	3	0	0	3	100
7	20CSC316A	Software Design Patterns	3	0	0	3	50
8	20AIL317A	Artificial Intelligence Laboratory	0	0	2	1	50
9	20CSL318A	Web Architecture and Application Development Laboratory	0	0	2	1	50
10	20CSL319A	Software Design Patterns Laboratory	0	0	2	1	
Total			15	2	2	25	750
Total number of contact hours per week			hours				
Number of credits can be registered			Minimum		Maximum	25	

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	Professional Core Elective - 1	3	2	0	4	100
2	Professional Elective	Professional Core Elective - 2	3	2	0	3	100
3	Professional Elective	Professional Core Elective - 3	3	2	0	3	100
4	Open Elective	Open Elective	3	0	0	3	100
6	20ISP401A	I] Project Work - I	0	0	12	4	100
	20ISP402A	II] Internship (Choose one)					
7	20ISP403A	Seminar	0	0	2	1	50
Total			12	6	14	18	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	Professional Elective	Open Elective - 2	3	0	0	3	100
2	20ISP411A	Project work -2	0	0	20	8	100
TOTAL			3		20	11	200
Total number of contact hours per week			31 hours				
Number of credits can be registered			Minimum	0	Maximum	20	

Professional Core Elective Courses:

SL.no	Group	ISE:VII Sem		
		PCE-1 Course Titles	PCE-2 Course Title	PCE-3 Course Titles
1	Applications to Healthcare Information Systems	Computer Vision 20ISE402A	Text Mining 20ISE401A	Computational Intelligence 20ISE411A
2	Semantic Web	Natural Language Processing 20ISE404A	Semantic Web Technologies 20ISE405A	Computational Intelligence 20ISE411A
3	Software Development	Software Oriented Architecture 20ISE407A	Text Mining 20ISE401A	Software Testing 20ISE412A

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

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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		CE (Weightage: 50 %)				SEE (Weightage: 50 %):
		Assessment Type	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.

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	<p>Quality Control Measures</p> <ol style="list-style-type: none"> 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
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29	Capability / Transferable Skills Map													
Course Code					Skills									
HST/CEN a	BS b	ES/EC c	CS d	OEE e	GK	SL	WC	OC	P	B	IM	PM	L	AO
H101A	B101A	C101A	C108A		a	abcd	abcd	abcd	abcd		abcd	abcd		
H102A	B102A	C102A	L109A		a	abcd	abcd	abcd	abcd	a	abcd	abcd		
	B201A	L104A	C205A		a	abcd	abcd	abcd	abcd		abcd	abcd		
	B202A	L105A	L206A		a	abcd	abcd	abcd	abcd	a	abcd	abcd		
	L103A	C106A	L207A			bcd	bcd	bcd	bcd		bcd	bcd		
	L106A	C107A	L208A			bcd	bcd	bcd	bcd		bcd	bcd		
	B211A	C108A	C213A			bcd	bcd	bcd	bcd		bcd	bcd		
	B212A	L109A	C214A			bcd	bcd	bcd	bcd		bcd	bcd		
		L110A	C215A			cd	c	cd	cd		c	cd		
			L216A			d	d	d	d		d	d		
			L217A			d	d	d	d		d	d		
			C302A			d	d	d	d		d	d		
			C303A			d	d	d	d		d	d		
			C304A			d	d	d	d		d	d		
			C305A			d	d	d	d		d	d		
			C306A			d	d	d	d		d	d		
			L307A			d	d	d	d		d	d		
			L308A			d	d	d	d		d	d		
			L309A			d	d	d	d		d	d		
			C311A			d	d	d	d		d	d		
			C312A			d	d	d	d		d	d		
			C313A			d	d	d	d		d	d		
			C314A			d	d	d	d		d	d		
			C315A			d	d	d	d		d	d		
			C316A			d	d	d	d		d	d		
			C317A			d	d	d	d		d	d		
			L318A			d	d	d	d		d	d		
			L319A			d	d	d	d		d	d		
			P401A			d	d	d	d		d	d		
			P402A			d	d	d	d		d	d		
			P403A			d	d	d	d		d	d		
			P410A			d	d	d	d		d	d		
			E401A			d	d	d	d		d	d		
			E402A			d	d	d	d		d	d		
			E403A			d	d	d	d		d	d		
			E404A			d	d	d	d		d	d		
			E405A			d	d	d	d		d	d		
			E406A			d	d	d	d		d	d		
			E407A			d	d	d	d		d	d		
			E408A			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.

