



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation
To be implemented from (2018-19)

Rev: IT Course Structure/RIT/02/2018-19

Department: Information Technology

Class: S. Y. B. Tech

Semester: III

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for passing	Max.	Min. for passing	
IT2012	Discrete Mathematics	3	1	--	4	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2032	Computer Networks	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2052	Data Structures and Algorithms	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2072	Digital Electronics	2	--	--	2	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2092	Computer Networks Lab	--	--	2	1	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT2112	Data Structures and Algorithms Lab	--	--	4	2	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT2132	Digital Electronics Lab	--	--	2	1	ISE	---	---	100	50	
IT2152	Object Oriented Design and Programming Lab	2	--	2	3	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT2172	Comprehensive Exam-I	--	--	--	1	ESE	100	40	---	---	
	Open Elective-II Choice Based Soft Skill Program-I	--	--	2	1	ISE	---	---	100	50	
	TOTAL	13	01	12	21	---	---	---	---	---	

Total Contact Hours/week : 26

Total Credits : 21

Comprehensive Exam Subjects : Discrete Mathematics, Computer Networks, Data Structures and Algorithms, Digital Electronics

ISE = In Semester Exam, MSE (UT1+UT2) UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Note: Open Elective-II - Students should select any one course from list of choice based soft Skill Program-I





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Choice Based Soft Skill Program I

Sr. No.	Course Code	Course Name
1.	SH2592	Personal Effectiveness & Body Language
2.	SH2612	Interpersonal Skills (Work life Balance)
3.	SH2632	Leadership & Public Speaking
4.	SH2692	Innovation Tools and Methods for Entrepreneurs
5.	SH2732	German Language – Basic Level
6.	SH2712	Japanese Language – Basic Level

Note for Choice Based Soft Skill Program I & II:

1. A student has to complete any two courses out of six choices offered under Choice Based Soft Skills Programme. A course in each semester will be allocated without any repetition.
2. The students who have completed 'German Language Lab' or 'Japanese Language Lab' in F.Y.B.Tech should not give their choice for 'German Language – Basic Level' and 'Japanese Language – Basic Level'. Such students may give their choices for 'German Language – Advanced Level' and 'Japanese Language – Advanced Level' (batch sizes 40 each) in the SYB Tech Sem-IV only.
3. The students who will select and will successfully complete 'German Language – Basic Level' and 'Japanese Language – Basic Level' in SYB Tech Sem-III will by default (mandatorily) appear for Advance Levels of said courses in Semester-IV.





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Department: Information Technology

Class: S. Y. B. Tech

Semester: IV

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for passing	Max.	Min. for passing	
SH2042	Engineering Mathematics-III	3	1	--	4	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2022	Automata Theory	3	1	--	4	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2042	Software Engineering	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2062	Computer Organization	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
CE2262	Engineering Mechanics	2	--	--	2	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			40	---
IT2082	Python lab	--	--	2	1	ISE	---	---	---	50	50
						ESE	---	---	---	50	50
CE2282	Engineering Mechanics Lab	--	--	2	1	ISE	---	---	---	50	50
						ESE	---	---	---	50	50
IT2102	Comprehensive Exam-II	--	--	--	1	ESE	100	40	---	---	
	Open Elective-III Choice Based Soft Skill Program-II	--	--	2	1	ISE	---	---	100	50	
SH2172	Environmental Science	1*	--	--	1	ISE	50	40	40	---	---
						ESE	50	40		---	---
SH2602	Environmental Project	--	--	2	1	ISE	---	---	100	50	
	TOTAL	15	2	8	22	---	---	---	---	---	

Total Contact Hours/week : 25

Total Credits : 22

Comprehensive Exam Subjects: Engineering Mathematics-III, Automata Theory, Software Engineering, Computer Organization

ISE = In Semester Exam, MSE (UT1+UT2) UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Note: Open Elective-III - Students should select any one course from list of choice based soft Skill Program-II excluding the course studied under choice based soft Skill Program-I

Internship Note: Students should complete summer internship in vacations. Its evaluation will be in semester V.

Note*: Department should allot one extra lecture to Environment Science in time Table.





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Choice Based Soft Skill Program II

Sr.No.	Course Code	Course Name
1.	SH2592	Personal Effectiveness & Body Language
2.	SH2612	Interpersonal Skills (Work life Balance)
3.	SH2632	Leadership & Public Speaking
4.	SH2692	Innovation Tools and Methods for Entrepreneurs
5.	SH2642	German Language – Advanced Level
6.	SH2622	Japanese Language – Advanced Level

Note for Choice Based Soft Skill Program-I & II:

1. A student has to complete any two courses out of six choices offered under Choice Based Soft Skills Programme. A course in each semester will be allocated without any repetition.
2. The students who have completed 'German Language Lab' or 'Japanese Language Lab' in F.Y.B.Tech should not give their choice for 'German Language – Basic Level' and 'Japanese Language – Basic Level'. Such students may give their choices for 'German Language – Advanced Level' and 'Japanese Language – Advanced Level' (batch sizes 40 each) in the SYBTech Sem-IV only.
3. The students who will select and will successfully complete 'German Language – Basic Level' and 'Japanese Language – Basic Level' in SYBTech Sem-III will by default (mandatorily) appear for Advance Levels of said courses in Semester-IV.





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Department: Information Technology

Class: T. Y. B. Tech

Semester: V

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)			Practical (Marks %)	
							Max	Min. for passing		Max.	Min. for passing
IT3012	Operating Systems	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT3032	Database Management Systems	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT3052	Design and analysis of algorithms	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
	Program Elective-I	2	--	--	2	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT3132	JAVA Programming Lab	3	--	2	4	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT3152	Database Management Systems Lab	--	--	2	1	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT3172	Operating Systems Lab	--	--	2	1	ISE	---	---	50	50	
						ESE	---	---	50	50	
SH3032	Aptitude Training-I	2*	--	--	2	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT3192	Summer Internship/ Professional Certification (4 Weeks)	--	--	--	2	ISE	---	---	100	50	
IT3212	Comprehensive Exam-III	--	--	--	1	ESE	100	40	---	---	
SH3012	Indian Constitution/ Essence of Indian Traditional Knowledge	2	--	--	Audit	ISE	100	50	(P/N)	---	
TOTAL		18	00	06	22	---	---	---	---	---	

Total Contact Hours/week : 24

Total Credits : 22

Comprehensive Exam Subjects : Operating Systems, Database Management Systems, Design and analysis of algorithms

ISE = In Semester Exam, MSE (UT1+UT2) UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Note*: Department should allot one extra lecture to Aptitude Training-I in time Table.





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Program Elective I

Sr.No.	Course Code	Course
1.	IT3072	Organizational Management Behavior
2.	IT3092	Cyber Laws and Security
3.	IT3112	Software Modeling and Design





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Department: Information Technology

Class: T. Y. B. Tech

Semester: VI

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for passing	Max.	Min. for passing	
IT3022	Information Security	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			---	---
	Program Elective-II	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			---	---
	Program Elective-III	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			---	---
SH3022	Biology for Engineers	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			---	---
IT3182	C#. Net Lab	3	--	2	4	ISE	---	---	---	50	50
						ESE	---	---	---	50	50
IT3202	Mobile Application Development Lab	2	--	2	3	ISE	---	---	---	50	50
						ESE	---	---	---	50	50
IT3222	Mini Project	--	--	4	2	ISE	---	---	---	100	50
SH3052	Aptitude Training-II	2*	--	--	2	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15			---	---
						ESE	50			---	---
IT3242	Comprehensive Exam-IV	--	--	--	1	ESE	100	40	---	---	
	TOTAL	19	00	08	24	---	---	---	---	---	---

Total Contact Hours/week : 27

Total Credits : 24

Comprehensive Exam Subjects : Information Security, C#. Net Lab, Mobile Application Development Lab

ISE = In Semester Exam, MSE (UT1+UT2) UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Note*: Department should allot one extra lecture to Aptitude Training-II in time Table.





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Program Elective II

Sr.No.	Course Code	Course Name
1.	IT3042	Advanced Database Systems
2.	IT3062	Sensor Network
3.	IT3082	Machine Learning Algorithms
4.	IT3102	Multimedia Techniques

Program Elective III

Sr.No.	Course Code	Course Name
1.	IT3122	Soft Computing
2.	IT3142	Human Computer Interaction
3.	IT3162	Cloud Computing





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Department: Information Technology

Class: Final Year B. Tech.

Semester: VII

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for passing	Max.	Min. for passing	
IT4012	Software Testing	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT4032	Artificial Intelligence	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
	Program Elective-IV	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
	Open Elective-IV	3	--	--	3	ISE	20	40	40	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40	---	---	
IT4132	Front End Web Technology Lab	2	--	4	4	ISE	---	---	50	50	
						ESE	---	---	50	50	
	Program Laboratory Elective-V	--	--	2	1	ISE	---	---	50	50	
						ESE	---	---	50	50	
IT4212/ IP4012/ RE4012/ ED4012	Phase-I	--	--	2	1	ISE	---	---	100	50	
TOTAL		14	00	08	18	---	---	---	---	---	

Total Contact Hours/week : 22

Total Credits : 18

ISE = In Semester Exam, MSE (UT1+UT2) UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Sr.No.	Choice Based Track	Phase -I Details	Course Code
1	Internship & Project (IIP)	Liberal Learning	IP4012
2	Undergraduate Research Experience (URE)	URE Synopsis	RE4012
3	Entrepreneurship Development (ED)	Prefeasibility Report	ED4012
4	Regular Capstone Project (CP)	CP Synopsis	IT4212

Note: Students will work on Phase-I of choice based track allotted to them.





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Program Elective IV

Sr.No.	Course Code	Course Name
1.	IT4052	Parallel Computing
2.	IT4072	Big Data
3.	IT4092	Recent IT Technologies
4.	IT4112	Data Mining

Program Elective V

Sr.No.	Course Code	Course Name
1.	IT4152	Advanced Java Lab
2.	IT4172	R Programming Lab
3.	IT4192	Asp. Net MVC Lab

Open Elective IV

Sr.No.	Course Code	Course
1.	OE4232	Open Source Softwares





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Track I: Industry Internship & Projects (IIP)

Department: Information Technology

Class: Final Year B. Tech

Semester: VIII

Sr.No	Course Code	Course	Teaching Scheme			Credits	Evaluation Scheme				
			L	T	P		Scheme	Theory (Marks %)		Practical (Marks %)	
								Max	Min. for passing	Max	Min. for passing
1	IPIT4002	Online Course- I/Self learning course-I	-	-	-	3	ESE*			100	50
2	OE4362	Engineering Management & Economics (Online Course)	-	-	-	2	ESE*			100	50
3	IP4022	Internship & Project	-	-	-	11	ISE			50	50
							ESE			50	50
Total			-	-	-	16					

Total Contact Hours/week : -

Total Credits : 16

ISE = In Semester Evaluation , ESE = End Semester Exam

Note:

1) Online or self-learning course may be:

A) Online Certification Course

B) Self-study course approved by Dean Academics

All courses should be related to Industry project.

2) Engineering Management is Compulsory online course.

* Indicates that, student needs to produce certificate of online or certification course at the time of ESE. If student fails to produce this certificate, he or she will not be eligible to give ESE of Online course.

3) *Weekly Contact hours are not mentioned as student is expected to be in industry regularly for 20 weeks. However, student needs to report to Institute mentors as and when required.*





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Track II: Undergraduate Research Experience (URE)

Department: Information Technology

Class: Final Year B. Tech

Semester: VIII

Sr.No	Course Code	Course	Teaching Scheme			Credits	Evaluation Scheme					
			L	T	P		Scheme	Theory (Marks %)		Practical (Marks %)		
								Max	Min. for passing	Max	Min. for passing	
1	RE4022	Research Methodology	3	-	-	3	ISE	20	40	40		
						UT-1	15					
						UT-2	15					
						ESE	50	40				
2	RE4062	Research Methodology Lab	-	-	2	1	ISE				100	50
3	OE4362	Engineering Management & Economics (Online Course)	-	-	-	2	ESE*				100	50
4	RE4042	Research Project	-	-	10	10	ISE				50	50
							ESE				50	50
Total			3	-	12	16						

Total Contact Hours/week : 15

Total Credits : 16

ISE = In Semester Evaluation, UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

Note:

1] Engineering Management is Compulsory online course.

* For Online Certification course, student needs to produce certificate of online course at the time of ESE. If student fails to produce this certificate, he or she will not be eligible to give ESE of Online course.

All courses should be related to research project.





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Track III: Entrepreneurship Development (ED)

Department: Information Technology

Class: Final Year B. Tech

Semester: VIII

Sr.No	Course Code	Course	Teaching Scheme			Credits	Evaluation Scheme					
			L	T	P		Scheme	Theory (Marks %)		Practical (Marks %)		
								Max	Min. for passing	Max	Min. for passing	
1	ED4102	Project Management	3	-	-	3	ISE	20	40	40		
							UT-1	15				
							UT-2	15				
							ESE	50				
2	ED4042	Commercial Aspects of the Project	3	-	-	3	ISE	20	40	40		
							UT-1	15				
							UT-2	15				
							ESE	50				
3	ED4062	Entrepreneurship Development Program (EDP)	-	-	-	1	ISE				100	50
4	ED4082	Entrepreneurship Development Project	-	-	9	9	ISE				50	50
							ESE				50	
Total			6	-	9	16						

Total Contact Hours/week : 15

Total Credits : 16

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Track IV: Regular Capstone Project (CP)

Department: Information Technology

Class: Final Year B. Tech

Semester: VIII

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for passing	Max.	Min. for passing	
	Program Elective-VI	3	-	-	3	ISE	20	40	40		
					UT1	15					
					UT2	15					
					ESE	50	40				
	Open Elective-V	3	-	-	3	ISE	20	40	40		
					UT1	15					
					UT2	15					
					ESE	50	40				
OE4362	Engineering Management & Economics (Online Course)	-	-	-	2	ESE*				100	50
IT4082	Capstone Project			8	8	ISE				50	50
						ESE				50	50
	TOTAL	6	-	08	16						

Total Contact Hours/week : 14

Total Credits : 16

ISE = In Semester Evaluation, UT-I = Unit Test-I, UT-II = Unit Test-II ESE = End Semester Exam

1] Engineering Management is Compulsory online course.

* For Online Certification course, student needs to produce certificate of online course at the time of ESE. If student fails to produce this certificate, he or she will not be eligible to give ESE of Online course





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Program Elective VI

Sr.No.	Course Code	Course
1.	IT4022	Data Analytics
2.	IT4042	Internet of Things
3.	IT4062	Computer Graphics and Virtual Reality

Open Elective V

Sr.No.	Course Code	Course
1.	OE4222	Information Technology and Business Management





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Program Electives (All)

Sr. No.	Course Code	Domain	Course
II	IT3042	Database	Advanced Database Systems
IV	IT4072		Big Data
IV	IT4112		Data Mining
II	IT3062	Networking	Sensor Network
IV	IT4092		Recent IT Technologies
VI	IT4042		Internet of Things
I	IT3092	IT Technologies	Cyber Laws and Security
II	IT3102		Multimedia Techniques
III	IT3162		Cloud Computing
IV	IT4052		Parallel Computing
VI	IT4062		Computer Graphics and Virtual Reality
II	IT3082		Algorithms
III	IT3122	Soft Computing	
VI	IT4022	Data Analytics	
I	IT3112	Software Engineering	Software Modeling and Design
III	IT3142		Human Computer Interaction
I	IT3072	Management	Organizational Management Behavior
V	IT4152	Programming	Advanced Java
V	IT4172		R Programming
V	IT4192		Asp.Net MVC

Open Electives (All)

Sr.No.	Course Code	Department	Course
IV	OE4232	Information Technology	Open Source Softwares
V	OE4222		Information Technology and Business Management





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Credit Distribution:

Sr.No.	Category	Suggested Breakup of Credits (Total 160)	Break up of Credits
1	Humanities and Social Sciences including Management Courses	12*	10
2	Basic Science courses	25*	23
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	24*	21
4	Professional core courses	48*	66
5	Professional Elective courses relevant to chosen specialization/branch	18*	15
6	Open subjects – Electives from other technical and /or emerging subjects	18*	11
7	Project work, seminar and internship in industry	15*	14
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	1
	Total	160*	161

Name & Sign of HOD : Dr. A. C. Adamuthe

Department: Information Technology





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Class:- S.Y. B. Tech	Semester-IV
Course Code : SH2172	Course Name: Environmental Science

L	T	P	Credits
1*	--	--	1

Course Description:

The syllabus of Environmental Science provides an integrated, quantitative and interdisciplinary approach to the study of environmental systems. The students of Engineering undergoing this course would develop a better understanding of human relationships, perceptions and policies towards the environment and focus on design and technology for improving environmental quality. Their exposure to subjects like understanding of earth processes, evaluating alternative energy systems, pollution control and mitigation, natural resource management and the effects of global climate change, will help the students to bring a systems approach to the analysis of environmental problems.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Relate the interdependency of environmental components.
2. Identify the environmental problems and prevent environmental pollution
3. Interpret impacts of waste on environmental components.
4. Analyze environmental change and its social impacts

Prerequisite: Understanding of Environment Education course.

Course Content

Unit No	Description	Hrs
1.	Ecology: Ecosystem, Ecological Pyramids, Food chain, food web, Biodiversity, Biodiversity at global and national level, types, uses threats to biodiversity, Hotspots of Biodiversity, Habitat and ecological niche. Ecological succession, Natural resources and associated problems.	04
2.	Pollution:: Water pollution: causes, effects, control, drinking water quality standards, Arsenic, lead, cadmium, chromium, fluoride contamination & its effects, water treatment, wastewater treatment. Air pollution: Causes, effects, control, Air pollution controlling equipments, Air quality standards, National air quality index, vehicular emission, alternative fuels, indoor air pollution, Thermal inversions (Los	08





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	Angeles), Photochemical Smog (Mexico City) and Acid Precipitation (Mumbai) - how acid precipitation affects ecosystems, Bharat Stage Emission standards in India Noise pollution: Causes, effects, control, noise standards recommended by CPCB Pollution Case studies: Bhopal Gas Tragedy, Chernobyl Accident: A nuclear Disaster, Ganga Water Pollution	
3.	Waste management: Solid waste management, biomedical waste management, E waste, plastic waste management, Hazardous waste management, carbon footprint, Recycling of waste, Role of Central Pollution Control Board (CPCB), State Pollution Control Board, Role of NGO's, Disaster management: Flood, Earthquakes, Cyclones, Landslides, Draught, Tsunami etc., Swachh Bharat mission, Role of Information technology in Environment and human health	06
4.	Social Issues and Environment: Global Warming, Ozone layer depletion, urban problems related to energy, Alternative energy sources, Evolution of Sustainable development: timeline, Evolution of green movements in India, International and National efforts for Environmental Protection, Paris agreement, Global organizations and National organizations.	06

References -

Text Books:

1. D.K.Asthana, Meera Asthana, A Textbook of Environmental Studies, S. Chand Publication Revised edition, 2006.
2. S. Deswal & A. Deswal, Basic course in environmental Studies, Dhanpat Rai & Co Ltd., Delhi, Second revised edition, 2009.

Reference Books:

1. Eldon D Enger, Bradley F. Smith, Environmental science – a study of inter-relationships Wm C Brown Publishers 1989
2. Francois Ramade Ecology of Natural resources, John wiley & Sons
3. Robert Leo Smith, Ecology and field biology, Harper Collins Publishers
4. Gilbert M. Masters, Introduction to Environmental Engineering & Science, Prentice Hall International Inc. Second Edition





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Class:- S.Y. B. Tech	Semester-IV		L	T	P	Credits
Course Code : SH2602	Course Name: Environmental Project		-	-	2	1

Course Description:

Mini Project has been incorporated to enhance high potential in the student and built research and positive attitude towards environment related issues, which will help them in their social and technical life ahead. The mini project is designed to make them apply practical knowledge with relevant tools and techniques to solve real life problems related to the environment and industry. It will help students in developing eco-friendly approach to achieve sustainable development

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Use scientific methods to solve environmental problems.
2. Evaluate technologies for restoration of degraded environment.
3. Develop presentation and report writing skills.
4. Develop as an individual and in group leadership quality.

Guidelines For Mini Project:

1. Course Teacher will work as project coordinator.
2. The distribution of project group will be done by project coordinator and respective head of the department to the faculty.
3. Mini project will be the team work consisting min 3 to max 5 students.
4. Project topic should be application oriented and with consideration to Environmental science problems in their respective stream. Selection and finalization will be through project guide.
5. Prepare project report as per guidelines provided for first year mini project.
6. Project group must provide complete solution to the selected problem with conceptual clarity.
7. The project will be evaluated by respective branch HOD and project guide and senior faculty.
8. The mini project should be presented before the committee, which shall evaluate for 100 marks.





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Class:- S.Y. B. Tech	Semester-III
Course Code : IT2012	Course Name : Discrete Mathematics

L	T	P	Credits
3	1	-	4

Course Description:

Discrete Mathematics is a branch of mathematics involving discrete elements that uses algebra and arithmetic. It is increasingly being applied in the practical fields of mathematics and computer science. This course explains the fundamental concepts of Mathematical Logic Sets, Relations and Functions, Counting Theory, Algebraic structures and Graph Theory.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Simplify and evaluate basic logic statements including all logical connectives using the properties of logic.
2. Apply the concepts in discrete data structures such as sets, relations and functions to solve the problems.
3. Solve examples using algebraic structures.
4. Prove the properties, which are based on lattices.
5. Apply elementary combinatory to counting problems.
6. Apply graph theory concepts to solve problems of connectivity.

Prerequisite: Basics of Mathematics

Course Content

Unit No	Description	Hrs
1.	Mathematical Logic Propositional logic, Applications of propositional logic, propositional equivalences, Normal & Principal Normal forms, Predicate and quantifiers.	06
2.	Relations and Functions Basics of Set Theory, Relations and their properties, Partition and Covering of set, Representing Relations, Equivalence Relations, Composition of Binary Relations, Function, Composition of Function, Inverse Function.	07





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3.	Lattices Partially Ordering (Poset), Hasse Diagrams, Lattice as partially ordered sets, Boolean algebra as lattices.	05
4.	Elementary Combinatorics Basic of counting, Permutations and Combinations, The pigeonhole principle, inclusion and exclusion principle, Recurrence Relation.	06
5.	Algebraic structures Binary and n-ary Operations, Semigroups and Monoids, Groups, Subgroups, Homomorphism, Isomorphism.	06
6.	Graph Theory Introduction, Basic terminology, Special types of graphs, Representing of graphs and graph isomorphism, Connectivity, Eulerian and Hamiltonian paths, Planar graphs, Graph Coloring, Chromatic numbers.	06

References -

Text Books:

1. J. P. Tremblay & R. Manohar, "Discrete Mathematical Structures with Application to Computer Science", MGH International, 2001.
2. Kenneth Rosen, "Discrete Mathematics and its Application", Tata McGraw-Hill Publishing Company, 7th edition, 2011.

Reference Books:

1. G.S.S. Bhisma Rao, "Mathematical Foundation of Computer Science", Scitech Publication, 2nd edition, 2009.
2. S. Chakraborty & B.K. Sarkar, "Discrete Mathematics and Its Applications", Oxford University Press India, First edition, 2011.





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Class:- S.Y. B. Tech	Semester-III
Course Code : IT2132	Course Name : Digital Electronics Lab

L	T	P	Credits
-	-	2	1

Course Description:

This course provides a hands-on experience in digital circuits, which can be constructed by Using standard integrated circuits (ICs) using IC trainer kits and investigate the operation of several digital circuits combinational and sequential. Experiments are designed in such a way that the students become well aware of the concepts they learn in the theory sessions. It starts with a combinational logic: logic gates, Boolean algebra and its minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, counters, registers, and random access memories. It also considers the fundamental part of 8085 Microprocessor with assembly language programming.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Verify the basics of all logic gates using IC Trainer Kit.
2. Demonstrate the working of Combinational circuits on IC Trainer Kit.
3. Demonstrate the working of Sequential circuits on IC Trainer Kit.
4. Implement the 8085 assembly language program using TASM or simulator.

Prerequisite: Statistics, Fundamentals of C language.

Course Content

Experiment No	Description	Hrs
1.	Logic Gates Verification of all logic gates on IC Trainer Kit.	02
2.	Universal Gates Demonstrate the NAND & NOR as universal gates on IC Trainer Kit	02
3.	Half adder & Full adder Demonstration of half adder & full adder on IC Trainer Kit	02
4.	Half subtractor & Full subtractor Demonstration of Half subtractor & Full subtractor on IC Trainer Kit	02





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5.	Multiplexer and De-multiplexer Demonstration of MUX and DEMUX on IC Trainer Kit	02
6.	Flip Flops Demonstration of SR & JK Flip flop on IC Trainer Kit	04
7.	Counters Demonstration of mod n counter using J-K flipflop on IC Trainer Kit	04
8.	8085 ALP Program on Arithmetic Instructions Implement a program for addition and subtraction of n numbers on TASM or Simulator.	02
9.	8085 ALP Program on Flag status To Check the content in the flag register after execution of program on TASM or Simulator	02
10.	8085 ALP Program on Smallest & Largest number To find the largest and smallest number in an array of data on TASM or Simulator	02

References -

Text Books:

1. R. P. Jain, "Modern Digital Electronics", TMH ISBN-13:978-0-07-066911-6
2. Ramesh Gaonkar, "Microprocessor Architecture Programming & Application", WilleyEstern. ISBN 81-87972-09-2

Reference Books:

1. Kumar Anand, "Fundamentals of digital circuits" Phi Learning ISBN-13: 9788120336797
2. Douglas Hall, "Digital Systems & Microprocessor", McGraw-Hill ISBN-13: 978-070255715
3. Morris Mano, "Digital design", Prentice Hall ISBN: 9780131217881

