



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

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 (%)	
CS2013	Computer Organization	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS2033	Data structure & Algorithms	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS2053	Digital Electronics	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS2073	Discrete Mathematics	3	1	-	4	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS2093	Operating Systems	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS2113	Advanced C Programming Lab	2	-	2	3	ISE	-	-	50	50	
						ESE	-	-	50	50	
CS2133	Data structure & Algorithms Lab	-	-	4	2	ISE	-	-	50	50	
						ESE	-	-	50	50	
CS2153	Digital Electronics Lab	-	-	2	1	ISE	-	-	100	50	
CS2173	Technical Aptitude-I	-	-	2	1	ISE	-	-	50	50	
						ESE	-	-	50	50	
	Open Elective-II Professional Skills Development and Foreign Languages - I	-	-	2	1	ISE	-	-	60	50	
						ESE	-	-	40	50	
Total		17	1	12	24						

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

Total Contact Hours/week : 30

Total Credits : 24

Note*: One extra lecture to be allotted to Environment Science in time Table.

Technical Aptitude Courses : CS2013, CS2033, CS2053, CS2073, CS2093, CS2113





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Open Elective-II

Sr. No.	Subject Name	Course Code
1.	Personal Effectiveness & Body Language	SH2593
2.	Interpersonal Skills (Work life Balance)	SH2613
3.	Professional Leadership Skills	SH2633
4.	Innovation Tools and Methods for Entrepreneurs	SH2693
5.	German Language – Basic Level	SH2733
6.	Japanese Language – Level III	SH2713

Note:

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 S.Y. B. Tech Sem-IV only.
3. The students who will select and will successfully complete 'German Language – Basic Level' and 'Japanese Language – Basic Level' in S.Y. B. Tech Sem-III will by default (mandatorily) appear for Advance Levels of said courses in Semester-IV.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Class: S. Y. B. Tech

Semester: IV

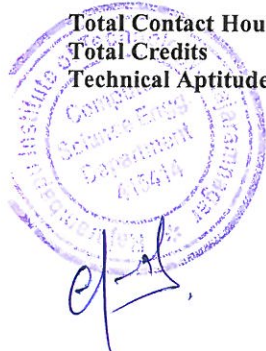
Course Code	Course	Teaching scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max	Min for Passing (%)	Max	Min for Passing (%)	
CS2003	Computer Networks	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS2023	Formal Language & Automata Theory	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CE2263	Engineering Mechanics	2	-	-	2	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
SH2023	Engineering Mathematics - III	3	1	-	4	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS2043	Computer Networks Lab	-	-	2	1	ISE	-	-	50	50	
						ESE	-	-	50	50	
CS2063	Object Oriented Programming Lab	2	-	4	4	ISE	-	-	50	50	
						ESE	-	-	50	50	
CE2283	Engineering Mechanics Lab	-	-	2	1	ISE	-	-	50	50	
	Open Elective-III Professional Skills Development and Foreign Languages - II	-	-	2	1	ISE	-	-	60	50	
						ESE	-	-	40	50	
SH2173	Environmental Science	1*	-	-	1	ISE	50	40	40	-	-
						ESE	50	40		-	-
SH2603	Environmental Science Project	-	-	2	1	ISE	-	-	100	50	
CS2083	Technical Aptitude-II	-	-	2	1	ISE	-	-	50	50	
						ESE	-	-	50	50	
Total		14	1	14	22						

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

Total Contact Hours/week : 29

Total Credits : 22

Technical Aptitude Courses : CS2003, CS2023, SH2023, CS2063





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Note: Students are required to undergo industrial / field training of minimum four weeks in the vacation of Semester-IV and its evaluation will be carried out in the Semester-V

Open Elective-III

Sr. No.	Subject Name	Course Code
1.	Personal Effectiveness & Body Language	SH2593
2.	Choice Based Professional Skills Development and Foreign Languages Programme -I & II	Interpersonal Skills (Work life Balance)
3.		Professional Leadership Skills
4.		Innovation Tools and Methods for Entrepreneurs
5.		German Language – Advanced Level
6.		Japanese Language –Level IV
6.		Japanese Language –Level IV

Note:

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 S.Y. B. Tech. Sem-IV only.
3. The students who will select and will successfully complete 'German Language – Basic Level' and 'Japanese Language – Basic Level' in S.Y. B.Tech Sem-III will by default (mandatorily) appear for Advance Levels of said courses in Semester-IV.





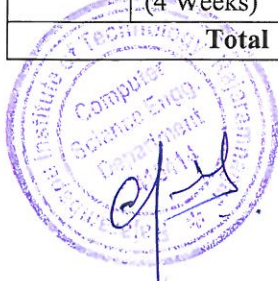
K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

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 (%)	
CS3013	Database Management Systems	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS3033	System Software	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS3053	Design & Analysis of Algorithms	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
	Program Elective-I	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS3153	JAVA Programming Lab	2	-	4	4	ISE	-	-	50	50	
						ESE	-	-	50	50	
CS3173	Database Management Systems Lab	-	-	2	1	ISE	-	-	50	50	
						ESE	-	-	50	50	
CS3193	Technical Aptitude-III	-	-	2	1	ISE	-	-	50	50	
						ESE	-	-	50	50	
SH3033	Scholastic Aptitude-I	2*	-	-	2	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
SH3011	Indian Constitution	2	Audit			ISE	100	50	(P/N)	-	-
CS3213	Summer Internship (4 Weeks)	-	-	-	2	ISE	-	-	-	100	50
Total		18	-	8	22						





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

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

Total Contact Hours/week : 26
Total Credits : 22
Technical Aptitude Courses: CS3013, CS3033, CS3053

Note*: One extra lecture to be allotted to Scholastic Aptitude-I in time Table.

Note: Advanced Application Development domain courses Evaluation Scheme: ISE – 50% and ESE – 50%
(Minimum Passing: 50% of ISE & ESE separately)

Program Elective-I

Sr. No.	Course Code	Domain	Course
1	CS3073	Database and Algorithms	Data Mining
2	CS3093	Systems and Intelligence	Soft Computing
3	CS3113	Advanced IT Technologies	Information Security
4	CS3133 ⁺	Advanced Application Development	Swift Development Lab-I





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

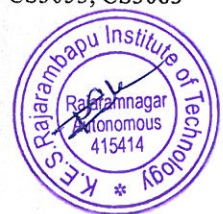
Class: T. Y. B. Tech

Semester: VI

Course Code	Course	Teaching scheme			Credits	Evaluation Scheme					
		L	T	P		Scheme	Theory (Marks)		Practical (Marks)		
							Max	Min for Passing (%)	Max	Min for Passing (%)	
	Program Elective-II	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
	Open Elective-IV	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
CS3083	Software Engineering	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
SH3021	Biology for Engineers	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15	-	-		
						ESE	50	40	-	-	
SH304	Psychology for Engineers	1*	-	-	1	ISE	50	40	40	-	-
						ESE	50			40	-
CS3103	Capstone Project phase-I	-	-	2	2	ISE	-	-	-	100	50
CS3123	.NET Programming Lab	2	-	2	3	ISE	-	-	-	50	50
						ESE	-	-	-	50	50
SH3043	Scholastic Aptitude-II	2*	-	-	2	ISE	20	40	40	-	-
						UT1	15			-	-
						UT2	15	-	-		
						ESE	50	40	-	-	
CS3143	Technical Aptitude-IV	-	-	2	1	ISE	-	-	-	50	50
						ESE	-	-	-	50	50
CS3163	Mobile Application Development Lab	2	-	2	3	ISE	-	-	-	50	50
						ESE	-	-	-	50	50
Total		19	-	8	24						

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

Total Contact Hours/week : 27
 Total Credits : 24
 Technical Aptitude Courses : CS3013, CS3033, CS3053, CS3083





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Note*: One extra lecture to be allotted to Scholastic Aptitude-II and Psychology for Engineers in time Table.

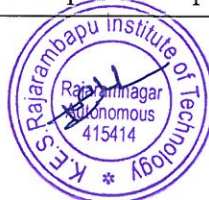
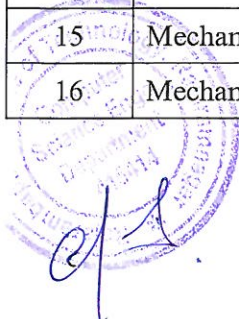
Note: Advanced Application Development domain courses Evaluation Scheme: ISE – 50% and ESE – 50% (Minimum Passing: 50% of ISE & ESE separately)

Program Elective-II

Sr. No.	Course Code	Domain	Course
1	CS3003	Database and Algorithms	Advanced Algorithms
2	CS3023	Systems and Intelligence	Optimization Techniques
3	CS3043	Advanced IT Technologies	Linux Operating System
4	CS3063+	Advanced Application Development	Swift Development Lab -II

Open Elective-IV

Sr. No.	Branch	Course Code	Open Elective-IV Courses
1	Automobile	OE3023	Reliability Engineering
2	Automobile	OE3043	Renewable Energy Sources
3	Civil	OE3063	Environmental Impact Assessment
4	Civil	OE3083	Material Management
5	Computer	OE3103	Network Administration
6	Computer	OE3123	Information Technology Foundation Program
7	E&TC	OE3143	Mechatronics
8	Electrical	OE3163	Engineering Materials
9	Electrical	OE3181	Industrial Drives
10	CS&IT	OE336	Neural Network and Deep Learning
11	CS&IT	OE3221	Cyber Forensics
12	MBA	OE3243	Marketing for Engineers
13	Mechanical	OE3263	Aircraft Systems
14	Mechanical	OE3283	Supply Chain Management
15	Mechanical	OE3301	New Product Design and Development
16	Mechanical	OE3323	Entrepreneurship Development





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Sr. No.	Branch	Course Code	Open Elective-IV Courses
17	Mechanical	OE3341	Research Methodology





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Class: Final Year B. Tech

Semester: VII

Course Code	Course	Teaching scheme			Credits	Evaluation Scheme					
		L	T	P		Scheme	Theory (Marks)		Practical (Marks)		
							Max	Min for Passing (%)	Max	Min for Passing (%)	
CS4013	Machine Learning	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
	Program Elective-III	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
	Program Elective-IV	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
	Program Elective-V	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS4253	Cloud Computing	3	-	-	3	ISE	20	40	40	-	-
						UT-1	15			-	-
						UT-2	15			-	-
						ESE	50			-	-
CS4273	Machine Learning Lab	-	-	2	1	ISE	-	-	50	50	
	ESE	-	-	-	50	50					
	Program Elective-IV Lab	-	-	2	1	ISE	-	-	50	50	
	ESE	-	-	-	50	50					
CS4353	Capstone Project Phase-II	-	-	4	4	ISE	-	-	100	50	
	ESE	-	-	-	100	50					
CS4373	Web Technology Lab	2	-	2	3	ISE	-	-	50	50	
	ESE	-	-	-	50	50					
Total		17	-	10	24						

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

Total Contact Hours/week : 27
Total Credits : 24

Note: Advanced Application Development domain courses Evaluation Scheme: ISE – 50% and ESE – 50%
 (Minimum Passing: 50% of ISE & ESE separately)





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Program Elective-III

Sr. No.	Course Code	Domain	Course
1	CS4033	Database and Algorithms	Big Data Analytics
2	CS4053	Systems and Intelligence	Natural Language Processing
3	CS4073	Advanced IT Technologies	Blockchain Technology
4	CS4093+	Advanced Application Development	IOS Development Lab-I

Program Elective-IV

Sr. No.	Course Code	Domain	Course
1	CS4113	Database and Algorithms	Parallel Programming
2	CS4133	Systems and Intelligence	Artificial Intelligence
3	CS4153	Advanced IT Technologies	Internet of Things

Program Elective-IV Lab

Sr. No.	Course Code	Domain	Course
1	CS4293	Database and Algorithms	Parallel Programming Lab
2	CS4313	Systems and Intelligence	Artificial Intelligence Lab
3	CS4333	Advanced IT Technologies	Internet of Things Lab

Program Elective-V

Sr. No.	Course Code	Domain	Course
1	CS4173	Database and Algorithms	Advanced Database System
2	CS4193	Systems and Intelligence	Computer Vision
3	CS4213	Advanced IT Technologies	Wireless Networks
4	CS4233+	Advanced Application Development	IOS Development Lab -II





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Track I: Industry Internship & Projects (IIP)

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 (%)
OE4381	Finance for Engineers (Online Course)	2	-	-	2	ISE	25	40	40	-	-
						ESE	75	40	-	-	
OE4361	Engineering Management & Economics (Online Course)	2	-	-	2	ISE	25	40	40	-	-
						ESE	75	40	-	-	
IP4023	Internship & Project	-	-	-	8	ISE	-	-	-	50	50
						ESE	-	-	-	50	50
TOTAL		4	-	-	12						

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

Total Contact Hours/week : 04
Total Credits : 12

Note:

1] Weekly Contact hours are not mentioned for IP4023 as student is expected to be in industry regularly for 20 weeks. However, student needs to report to Institute mentors as and when required.

2] For online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments within specified time.

Weightage: 25% weightage for unit wise assignments + 75% weightage for final exam. Final exam will be held at college campus.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Curriculum Structure and Evaluation Scheme
with effective from 2020-21 [2020-24 & 2021-25 Batch]
Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Track II: Undergraduate Research Experience (URE)

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 (%)	
OE4381	Finance for Engineers (Online Course)	2	-	-	2	ISE	25	40	40	-	-
						ESE	75	40			
OE4361	Engineering Management & Economics (Online Course)	2	-	-	2	ISE	25	40	40	-	-
						ESE	75	40		-	-
RE4043	Research Project	-	-	8	8	ISE	-	-	50	50	
						ESE	-	-			50
TOTAL		4	-	8	12						

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

Total Contact Hours/week : 12

Total Credits : 12

Note:

1] For online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments within specified time.

Weightage: 25% weightage for unit wise assignments + 75% weightage for final exam. Final exam will be held at college campus.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 Curriculum Structure and Evaluation Scheme
 with effective from 2020-21 [2020-24 & 2021-25 Batch]
 Department of Computer Science & Engineering

Rev: CSE/RIT/01/2020-24

Track III: Entrepreneurship Development (ED)

Class: Final Year B. Tech

Semester: VIII

Course Code	Course	Teaching Scheme			Credits	Evaluation Scheme					
		L	T	P		Scheme	Theory (Marks)		Practical (Marks)		
							Max	Min for Passing (%)	Max	Min for Passing (%)	
ED4103	Project Management	2*	-	-	2	ISE	20	40	40	-	-
						UT-1	15				
						UT-2	15				
						ESE	50	40			
ED4043	Commercial Aspects of the Project	2*	-	-	2	ISE	20	40	40	-	-
						UT-1	15				
						UT-2	15				
						ESE	50	40			
ED4063	Entrepreneurship Development Program (EDP)	-	-	-	1	ISE	-	-	-	100	50
ED4083	Entrepreneurship Development Project	-	-	7	7	ISE	-	-	-	50	50
						ESE	-	-	-	50	
Total		4	-	7	12						

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

Total Contact Hours/week : 11

Total Credits : 12

Note:

1] * One extra lecture to be allotted to Project Management and Commercial Aspects of the Project course in time table.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2013	Course Name: Computer Organization	3	-	-	3

Course Description:

The Computer Organization and Architecture is concerned with the structure and behavior of digital computers. This course provides an overview of the architecture and organization of a computer, such as the CPU, memory, I/O organization, peripherals and so on. An emphasis on hardware design methods combined with increased discussion of performance and relevant software issues. In spite of variety and pace in the computer field, certain fundamental concepts apply consistently throughout.

Course Learning Outcomes:

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

1. To conceptualize basics of organizational and architectural issue, functional unit of processor in digital computer and apply in computer organization and Architecture
2. Construct the ability to perform computer arithmetic operations such as binary, signed, decimal, hexadecimal, floating point numbers.
3. Interpreting memory organization that uses banks for different word size operations and cache mapping techniques including translation, allocation.
4. Ability to understand input/output organization, data transfer techniques for computer.
5. To analyze processor performance improvement using instruction level parallelism in digital computer.

Prerequisites:

- Basic knowledge of Microprocessor Architecture.
- Basic knowledge of Fundamentals of Computer, Digital Logic Circuits.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

SYLLABUS

Unit 1	Fundamentals of Quantitative Design and Analysis Introduction, Classes of computers, Defining computer architecture, Trends in technology, Trends in power and energy in integrated circuits, Trends in cost, Dependability, Measuring, reporting and summarizing performance, Quantitative principles of computer design, Putting it all together, Fallacies and pitfalls.	(6)
Unit 2	Instruction Set Architecture Memory Locations and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Stacks, Subroutines, Additional Instructions, Dealing with 32-Bit Immediate Values, CISC Instruction Sets, RISC and CISC Styles.	(6)
Unit 3	Computer Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Unsigned Numbers, Multiplication of Signed Numbers, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations, Decimal-to-Binary Conversion.	(6)
Unit 4	Memory Hierarchy Design: Introduction, Ten advanced optimizations of cache performance, Memory technology and optimizations, Protections – virtual memory and virtual machines, The design of memory hierarchies, Memory hierarchies in the ARM Cortex-A8 and Intel Corei7, Fallacies and pitfalls.	(6)
Unit 5	I/O Organization: Accessing I/O Devices, Interrupts, Bus Structure, Bus Operation, Arbitration, Interface Circuits, Interconnection Standards.	(6)
Unit 6	Pipelining: Basic Concept, Pipeline Organization, Pipelining Issues, Data Dependencies, Memory Delays, Branch Delays, Resource Limitations, Performance Evaluation, Superscalar Operation, Pipelining in CISC Processors.	(6)





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Text Books:

1. Computer Organization and Embedded Systems, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, McGraw-Hill.
2. Computer Architecture: A Quantitative Approach, J. L. Hennessy, and D. A. Patterson, Morgan Kaufmann, Elsevier.

Reference Books:

1. "Computer Organization and Architecture-Designing for Performance", William Stallings.
2. "Computer Architecture and Organization", B. Govindarajalu s (Tata Mc Graw Hill).
3. "Computer Organization and Architecture", V. Rajaraman, T. Radha Krishnan, (PHI).
"Computer Organization", M.V.L.N Raja Rao (Scitech).



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2033	Course Name: Data structure & Algorithms	3	-	-	3

Course Description:

This course covers some of the general-purpose data structures and algorithms, and software development. A data structure is a specific way of organizing data that supports efficient performance of the relevant operations on that data. After completion of this course students will learn data structures for organizing large numbers of records where records already present can be quickly found and /or deleted and new records can be inserted and found fast.

Course Learning Outcomes:

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

1. Compare between linear and nonlinear data structures
2. Describe the characteristics of various data structure such as stacks, queues, trees, graphs and Hash tables.
3. Analyze various searching and sorting algorithms and apply it to solve particular problem.
4. Determine a suitable data structure and algorithm to solve a real-world problem

Course Prerequisites:

- Basic knowledge of C programming.
- Knowledge of basic mathematical concepts.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

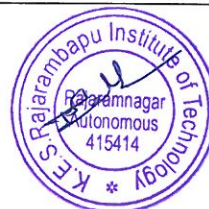
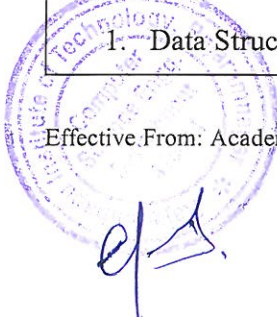
Unit 1	Introduction to Data Structures Primitive and non-primitive data structures, Operations on data structures, Algorithms, Abstract Data Types, Complexity Analysis	(5)
Unit 2	Linear Data Structures Stack: Definition, Representation and Applications of Stack. Queue: Definitions, Representation and Applications of Linear Queue, Circular Queue, and Priority Queue.	(6)
Unit 3	Linked Lists Definition, Representation, Operations and Applications of singly linked list, doubly linked list, circular linked list, Application of linked list-Stack & queue, Introduction to Sparse matrix, representation of sparse matrix using linked list.	(8)
Unit 4	Searching, Sorting and Hashing Techniques Linear search, Binary search, Bubble sort, insertion sort, Merge sort, Quick sort, Selection sort, Radix sort, Heap sort, Complexity of algorithms Hashing: Definition, Hash functions, Overflow, Collision, Open Hashing, closed hashing, Rehashing Techniques.	(8)
Unit 5	Trees Basic Technology, Binary Tree, Traversal methods, Binary search tree, AVL Tree, B tree, B+ tree, Heaps - operations and their applications.	(5)
Unit 6	Graphs Basic concepts of graph theory, Storage representation, Operations on graphs, Traversing a graph, Shortest path algorithm.	(4)

Text Books:

1. Data Structure using C -- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein (PHI)

Effective From: Academic Year 2020 - 21

Page 5 of 76





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

2. Theory and Problems of Data structures -- Lipschutz (MGH International)
3. Data Structure using C -- ISRD Group (TMH) ACE series.

Reference Books:

1. Data structures and Algorithms -- Alfred V. Aho, John E. Hopcroft, J. D. Ullman
(Addision- Wesley Series)
2. Data structures -- Seymour Lipschutz (MGH) Schaum's Outlines.
3. Introduction to Data Structures in C – Ashok N. Kamthane (Pearson Education).



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2053	Course Name: Digital Electronics	3	-	-	3

Course Description:

This course will familiarize the students with fundamental concepts of digital system, numbering system & structure, flip-flops, etc. The course will provide students with basic skills in methods of design & analysis of digital system like counters, registers etc. It will give basic knowledge about working of microprocessor & assembly language programming. This course covers the hardware & software aspects of 8085 microcomputer system, including the microprocessor structure, its operation and control, the organization & interface requirements for a microcomputer system.

Course Learning Outcomes:

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

1. Perform various arithmetic operations on different number systems.
2. Apply Boolean algebra to solve logic functions.
3. Design, implement, and analyze various logic circuits.
4. Apply the programming techniques in developing the assembly language program for microprocessor system.

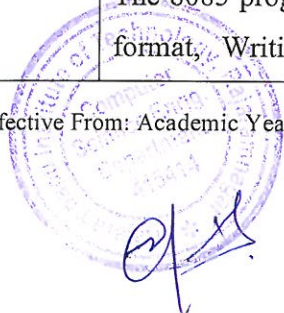




K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

Unit 1	Number Systems and Codes Introduction to Number Systems-Types-Decimal, Binary, Octal, Hexadecimal; Conversion from one number system to other; Binary arithmetic operations; Representation of Negative Numbers;1's complement and 2's complement, Complement arithmetic, BCD code, Digital Codes -Excess-3 code, Gray code, Binary to Excess -3 code conversion and vice versa, ASCII code, EBCDIC code, Error Detection Codes.	(5)
Unit 2	Logic Gates and Boolean algebra Analog and digital systems, Digital and logic circuits, Basic logic operations and gates- OR, AND, NOT. Describing logic circuits algebraically, implementing circuit from Boolean expression. NOR and NAND gates. Boolean theorems, K-Map, Standard representation of Boolean Expressions, De Morgan's theorems, Universality of NAND & NOR gate.	(6)
Unit 3	Flip-flops, Registers and counters Half and Full adder, Half and Full Subtractor, Flip-flop using NOR and NAND gates, clocked flip-flops, Clocked S-R, J-K, D Flip-flops, Data storage and transfer, Shift register, Asynchronous counter using Flip-flop, Multiplexer and De-multiplexer.	(7)
Unit 4	Microprocessor Architecture Microprocessor Architecture and its operation- Microprocessor initiated operations, internal operation, and Peripheral operation. Memory map and addresses, The 8085 MPU, Microprocessor communication and bus timing, De- multiplexing address and Data bus, Generating control signals, The 8085 Architecture, 8085 based microcomputer-machine cycles and bus timing, op- code fetch machine cycle, memory read and write machine cycle. Memory interfacing -memory structure, basic concepts in memory interfacing.	(6)
Unit 5	8085 assembly language programming The 8085 programming model, instruction classification, instruction and data format, Writing and execution assembly language program. The 8085	(6)



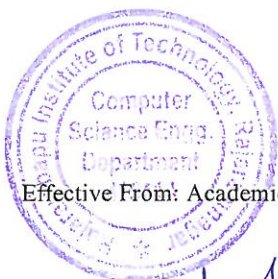


K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	instruction-data transfer operations, addressing modes, Arithmetic operation, Flag concept and cautions, Logic operations, Branch operations, Stack, Instruction related to stack, Important concept in stack, execution of CALL and RET.	
Unit 6	Interfacing I/O devices: The 8085 interrupts, RST instructions, vectored interrupts, RIM and SIM instructions. Basic interfacing concepts, peripherals i/o instructions - IN, OUT, I/O execution, device selection and data transfer, Input interfacing, Interfacing i/o using decoder, interfacing displays, memory mapped i/o. Interfacing of 8155 I/O and Timers.	(6)

Text Books:

1. Digital systems, principles and applications – Ronald Tocci, Neal Widmer, Gregory Moss, Pearson Education.
2. Modern digital Electronics (3/e) by R. P. Jain (TMH)
3. Microprocessor Architecture – programming and applications with 8085 – Ramesh Gaonkar, Penram International.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2073	Course Name: Discrete Mathematics	3	1	-	4

Course Description:

Discrete mathematics is the study of mathematical structures that are fundamentally discrete rather than continuous. Concepts and notations from discrete mathematics are useful in studying and describing objects and problems in branches of computer science, such as computer algorithms, programming languages, cryptography, automated theorem proving, and software development.

Course Learning Outcomes:

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

1. Define mathematical logic, truth table, and their applications to programming and hardware design.
2. Introduce mathematical logic applied to circuits, automata and algorithm analysis.
3. Apply direct and indirect methods of proof and to prove elementary mathematical results
4. Apply counting principles to determine the number of various combinatorial configurations
5. Be able to solve problems on graphs and networks
6. Solve problems on Permutations, Combinations and Discrete Probability

Prerequisites:

- Mathematics



Effective From: Academic Year 2020 - 21

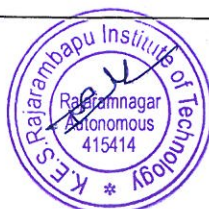
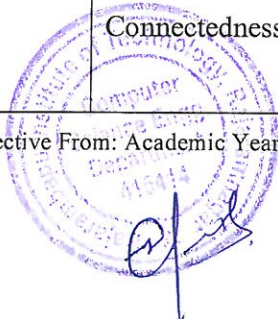




K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

Unit 1	Mathematical logic Introduction, statements and notations, connectives – negation, conjunction, disjunction, conditional, bi-conditional, Statement formulas and truth tables, well-formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal and principal normal forms, completely parenthesized infix and polish notations, Theory of inference for statement calculus – validity using truth table, rules of inference.	(7)
Unit 2	Set theory Basic concepts of set theory, types of operations on sets, some basic set Identities, ordered pairs, Cartesian product, representation of Discrete structures-Data structures, Storage structures, Sequential allocation, pointer and link allocation. Relation and Functions: Relation, properties of binary relations, matrix and graph representation, partition and covering of set, equivalence relation, composition, POSET and Hasse diagram, Function – types, composition of functions, Inverse function Examples and general properties.	(5)
Unit 3	Algebraic Systems and Groups Algebraic Systems- Examples and General Properties, Semi groups and monoids, Groups- Definition and examples, subgroups and homomorphism, Group codes –communication model, Generation of codes using checksum, error recovery in group codes.	(6)
Unit 4	Lattices and Boolean algebra Lattice as POSETs, definition, examples and properties, Lattice as algebraic systems, Special lattices, Boolean algebra definition and examples, Boolean functions, representation and minimization of Boolean functions.	(6)
Unit 5	Graph theory Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler Graphs – Hamiltonian Paths and	(6)





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

	Circuits- Matrix representation of graphs – Trees – Properties of trees – Distance and Centers in Tree – Rooted and Binary Trees, PERT.	
Unit 6	Permutations, Combinations and Discrete Probability Permutations and Combinations: rule of sum and product, Permutations, Combinations, Algorithms for generation of Permutations and Combinations. Discrete Probability, Conditional Probability	(6)

Text Books

1. Discrete mathematical structures with application to computer science - J. P. Tremblay & R. Manohar (MGH International)
2. Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, Pearson Education.
3. Discrete mathematics and its applications - Kenneth H. Rosen (AT&T Bell Labs)

Note: Scope of the articles mentioned in the syllabus is as per the text book.

Reference books

1. Discrete mathematics - Semyour Lipschutz, Marc Lipson (MGH), Schaum's outlines.
2. Schaums solved problem series - Lipschutz
3. Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S.C. Ross and Nadeemur-Rehman (Pearson Education).
4. Graph Theory With Applications To Engineering And Computer Science, Narsingh Deo, PHI Publication

Term Work

It should consist of minimum 8 to 10 tutorials on the above topics.

Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2093	Course Name: Operating Systems	3	-	-	3

Course Description:

Operating System is essential part of computer system. This field is undergoing rapid change, as computers are now prevalent in virtually every application, from game for children through the most sophisticated planning tools for government and multinational firms.

This course begins with an introduction to basic concept of Operating System and the fundamental principles of operating system design and kernel implementation. It includes a detailed discussion of the various process management concepts including scheduling, synchronization and deadlocks.

Prerequisites for course:

In this course students are going to study the fundamental concepts of operating system.

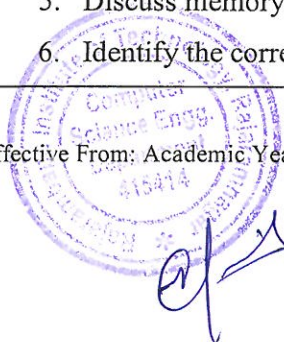
They must have prerequisite knowledge about:

- Basic data structure like stack, linked list, queue etc.
- Computer organization as well as computer algorithms
- High level language like C/C++
- Basic function or working principle of hardware
- Fundamentals of hardware components

Course Learning Outcomes:

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

1. Differentiate various operating systems
2. Discuss concept of process and threads
3. Explain synchronization techniques
4. Explain concept of deadlock and avoidance of it
5. Discuss memory management in operating system
6. Identify the correct page replacement algorithm for a given problem statement





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

Unit 1	Introduction Idea of an operating system, Different types of Operating Systems, System Calls.	(3)
Unit 2	Process Process Concept, Process Scheduling, Operation on process, Cooperating Process, Threads, Inter-process Communication (Algorithm's evaluation), Process Scheduling: Basic concept, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling, Real time scheduling.	(9)
Unit 3	Inter-process Synchronization Background, Classical problems of synchronization, Critical Region, The critical section problem, Synchronization Hardware Monitors, Semaphores.	(5)
Unit 4	Deadlocks System modes, Deadlock characterization, Methods for handling deadlocks Deadlock prevention, Deadlock avoidance, Deadlock detection Recovery from deadlock, Combined approach to dead lock.	(6)
Unit 5	Memory management and I/O system Background, Logical Versus Physical Address space, Swapping Contiguous Allocation, Paging, Segmentation	(6)
Unit 6	Virtual Memory: Background, Demand paging, Page Replacement, Page replacement algorithms, Allocation of frames, Thrashing, I/O Systems Overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O request to hardware operation.	(7)





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Text Books:

1. Operating System concepts - Silberschatz Galvin (John Wiley).

Reference Books:

1. Operating system with case studies in Unix, Netware and Windows NT – Achyut S. Godbole (TMGH).
2. Operating systems: concepts and design - Milan Milenkovic (TMGH).





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2113	Course Name: Advanced C Programming Lab	2	-	2	3

Course Description:

C language is one of the most fundamental programming techniques and has a huge importance in software and electronic industries. The proficiency in C Language is also important to crack the GATE Computer Science examination. Almost all software companies conduct Technical Aptitude Tests based on C language in their recruitment process. C Language questions are frequently asked in technical Interviews as well. This Course aims to discuss advanced concepts of C programming to satisfy above goals.

Course Learning Outcomes:

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

1. Learn advanced C topics like command line arguments, file handling, pointers, dynamic memory allocation, and Macros.
2. Implement, Compile and Debug complex C programs.
3. Solve tricky questions on C programming.
4. Analyze given C program carefully and guess the output of same.
5. Develop problem solving skills among students using C programming.

Prerequisites:

- C Programming Basic Concepts.
- Basic skills to design algorithm for given problem.

SYLLABUS

Unit 1	C Basic Concepts	(6)
Data Types, Operators, Control Statements, Type casting, Functions, Storage Classes, Methods of parameter passing, Command line arguments.		





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

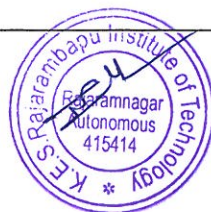
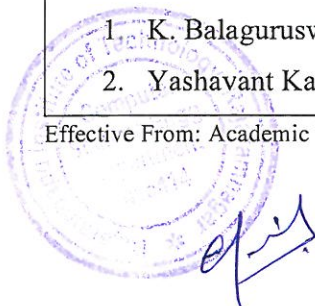
Unit 2	Arrays and Pointers Passing Array to function, Returning Array from function, Array of Pointers, Pointer to Array, Pointer to Function, Types of Pointers – Null, Dangling, Void, Double and Triple Pointers.	(6)
Unit 3	User Defined Data Types Struct, Union, Enum, Arrays of Structures, Structures within Structures, Methods of Passing Structure to Function, Structure member alignment, Nested Structures, Structure and Pointers.	(6)
Unit 4	Dynamic Memory Allocation and Macros Dynamic Memory Allocation, Allocating Block of Memory: Malloc, Allocating Multiple Blocks of Memory: Calloc, Releasing the Used Space: Free, Altering the Size of a Block: Realloc. Macro Substitution, Conditional Macros.	(6)
Unit 5	File Management Introduction, Advantages of Files, Types of Files, Standard Streams, Defining and Opening a File, Closing a File, Input / Output Operations on Files, Error Handling During I/O Operations.	(6)
Unit 6	Problem Solving using C Algorithm and program implementation for various problems like square root of number, smallest divisor, GCD of two number, prime number, prime factors of integer, pseudo random number generation, raising the number to a large power, Matrix operations (addition, multiplication, transpose etc.), String operations and manipulation (finding length, reverse, change case etc.),	(6)

Text Books:

1. B.W. Kernighan And D. M. Ritchie, "The 'C' Programming Language", Pearson Education
2. Sandeep A. Thorat, "C Language Interview Q&A", Shroff Publishers.
3. R G Dromey, "How to Solve it by Computer", Pearson Publisher

Reference Books:

1. K. Balaguruswamy, "Programming in ANSI C", TMH Publication
2. Yashavant Kanetkar. "Let Us C".





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2133	Course Name: Data structure & Algorithms Lab	-	-	4	2

Course Description:

This course covers some of the general-purpose data structures and algorithms, and software development. A data structure is a specific way of organizing data that supports efficient performance of the relevant operations on that data. After completion of this course students will learn data structures for organizing large numbers of records where records already present can be quickly found and /or deleted and new records can be inserted and found fast.

Course Learning Outcomes:

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

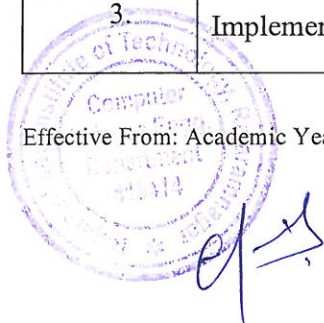
1. Implement various data structures in C Language.
2. Write and execute basic algorithms in C language.
3. Choose appropriate data structure to develop a real time application.
4. Analyze and compare the static and dynamic implementations of various data structures.

Course Prerequisites:

- Basic knowledge of C programming.
- Knowledge of basic mathematical concepts.

SYLLABUS

Expt. No.	Description
It should consist of minimum 10-12 experiments based on the following concepts:	
1.	Implement the concept of Stack using array.
2.	Implement the concept of Queue using array.
3.	Implement the concept of Linear Linked List.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

4.	Implement the concept of Stack using Linked List.
5.	Implement the concept of Queue using Linked List.
6.	Implement the concept of Circular Linked List.
7.	Implement the concept of Doubly Linked List.
8.	Implement the concept of Searching Techniques (Linear and Binary).
9.	Implement the concept of Sorting (Different Sorting Algorithms).
10.	Implement the concept of Hashing Techniques
11.	Implement the concept of Tree- Binary tree, BST, AVL tree (Tree operations and traversing).
12.	Implement the concept of Graph (Graph operations, traversing and shortest path algorithms).

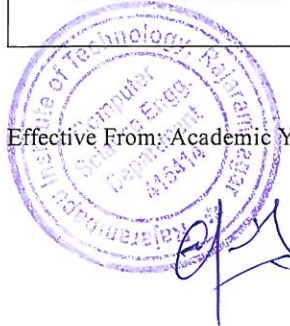
The above experiments are given and evaluated by the respective subject faculty. A journal is to be prepared by individual student and duly signed by the respective faculty to be submitted to the department at the end of the semester.

Text Books:

1. Data Structure using C -- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein (PHI)
2. Theory and Problems of Data structures -- Lipschutz (MGH International)
3. Data Structure using C -- ISRD Group (TMH) ACE series.

Reference Books:

1. Data structures and Algorithms -- Alfred V. Aho, John E. Hopcroft, J. D. Ullman (Addision- Wesley Series)
2. Data structures -- Seymour Lipschutz (MGH) Schaum's Outlines.
3. Introduction to Data Structures in C – Ashok N. Kamthane (Pearson Education).





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2153	Course Name: Digital Electronics Lab	-	-	2	1

Course Description:

This course will familiarize the students with fundamental concepts of digital system, numbering system & structure, truth table of flip-flops. The course will provide students with basic skills in methods of design & analysis of digital system like counters, registers etc. It will give basic knowledge about working of microprocessor & assembly language programming.

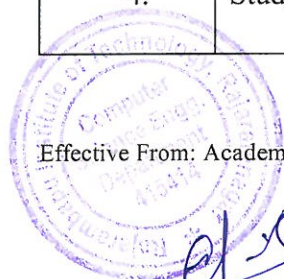
Course Learning Outcomes:

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

1. Demonstrate different types of gates.
2. Design various logic circuits.
3. Draw flowchart and apply assembly language programming techniques to develop the assembly language program for microprocessor system.

SYLLABUS

Expt. No.	Description
It should consist of minimum 10-12 experiments based on the following concepts. The experiment list given below is only guidelines. The course coordinator can set some additional experiment based on topics mentioned in the syllabus.	
1.	Study of Basic and Universal logic gates
2.	Study and implementation of Boolean algebra & De Morgan's theorem using logic gates.
3.	Study and implementation of Half and Full adder, Half and Full Subtractor
4.	Study and implementation of different types of flip-flops





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

5.	Assembly language programming for 8085 to demonstrate Arithmetic, Logical, Data transfer, Branch operations
6.	Assembly language program to perform Block Transfer
7.	Assembly language program to arrange given string in ascending & descending order
8.	Assembly language program to perform delay operation
9.	Assembly language programs to demonstrate various interrupts
10.	Assembly language program to perform Interfacing of 8155 I/O and Timers

The above experiments are to be given and evaluated by the respective course coordinator. A journal is to be prepared by individual student and duly signed by the respective faculty to be submitted to the department at the end of the semester.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Class: - SY B. Tech	Semester - III	L	T	P	Credits
Course Code: CS2173	Course Name: Technical Aptitude-I	-	-	2	1

Course Description:

Comprehensive examination comprises of the courses namely Computer Organization., Data structure & Algorithms, Digital Electronics, Discrete Mathematics, Operating Systems and Advanced C Programming Lab. The 100 marks examination will be conducted at the end of the semester as per the GATE examination pattern and this is evaluated for one credit in Second Year Semester - I. This will be helpful for students to prepare for GATE and other competitive examinations.

Course Learning Outcomes:

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

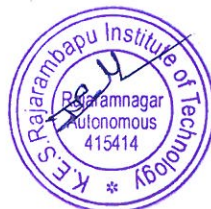
1. Choose proper techniques to find solution for engineering problems
2. Solve various types of problems
3. Develop ability to face competitive examinations
4. Inspect the problem & conclude with proper solution

Pre-requisite:

Knowledge of Computer Organization., Data structure & Algorithms, Digital Electronics, Discrete Mathematics, Operating Systems and Advanced C Programming Lab.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class:- S.Y. B. Tech .	Semester-III/IV
Course Code : SH2633	Course Name : Professional Leadership Skills

L	T	P	Credits
-	-	2	1

Course Description: This course is one of various courses offered under Choice Based Professional Skills Development programme. This course guides those special students who want to be entrepreneurs and professional leaders. This course covers various aspects of Leadership which includes Team formation, conflict management, motivation and presentation skills.

Course Outcomes:

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

1. Explain the traits of a leadership through real life examples.
2. Exhibit the ability to work effectively in team.
3. Prepare a presentation as per the audience and context requirements.

Prerequisite: A Student, who is going to enroll for this course should have -

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Ability to communicate moderately in English.

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	SMART Goal Setting, SWOT/C Analysis and Action Plan: Discussion on Dos and Don'ts, Advantages, and Generation of the Document by Students and its Assessment	02
2.	Assertiveness and Positive Thinking: Types of Behaviour, Benefits of Being Assertive and Positive Thinking, Developing Positive Attitude, Case Studies and Presentations	02
3.	Self Management: Need of Self Management, Developing Self Acceptance, Steps of Self Management, Individual Classroom Activity and its Assessment	02
4.	Leadership Styles and Change Management: Introduction to Different Types of Leaderships, Effective Organizational Change Management, Individual Classroom Activity and its Assessment	02
5.	Team Formation and Leading a Team-I: Why Teams? Roles and Responsibilities in Teams, Strategies for Team Development, Barriers to Teams, Steps of Team Development	02
6.	Team Formation and Leading a Team – II: Case Studies of Teams and Student Presentations	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

7.	Business Meetings and Decision Making – I: Preparing for the Meeting, Role of Chairperson and Participants in Meetings	02
8.	Business Meetings and Decision Making – II: Mock Meetings, Decision Making Case Studies and Feedback	02
9.	Conflict Management: Types of Personalities, Possible Reasons of Conflicts at Work Place, Conflict Resolution Strategies, Conflict Management Case Studies and Feedback	02
10.	Time Management: Time Management Techniques, Introduction to Time Management Tools, Benefits of Time Management, Case Studies and Presentations	02
11.	Presentation Skills – I: Preparation, Types of Presentations - Informative, Instructional, Arousing, Persuasive, Decision-making, Presentation Tools	02
12.	Presentation Skills – II: Body Language, Managing Questions and Student Presentations Student Presentations and Feedback, Student Presentations and Feedback	02
13.	Creative and Critical Thinking: Approaches to Creative Thinking, Strategies for Creative Thinking, Characteristics and Strategies of Critical Thinking	02
14.	Motivating People: Types of Motivation, Components of Motivation, Steps in Keeping Motivation Level High	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. Krishna Mohan and Meera Banerji; *Developing Communication Skills*, Macmillan India Ltd., New Delhi
2. Masters, L. Ann et al. *Personal Development for Life and Work*, New Delhi: Cengage Learning.
3. Jeff Butterfield, *Soft Skills for Everyone*, Cengage Learning India Private Limited.
4. John Seely, *Oxford Guide to Effective Writing and Speaking*; Oxford University Press.
5. UNLESH the power within... Soft Skills – Infosys Training Manual *Module 1 to 5* (Infosys Campus Connect Programme)

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2613	Course Name : Interpersonal Skills ('Jeevanvidya' for Work Life Balance)	-	-	2	1

Course Description: Jeevan means life and Vidya means knowledge. Jeevanvidya (JV) means science of life and art of successful and happy living. Achieving work-life balance is an art. The science behind work-life balance is based on the universal laws of nature. The aspects of it are applied on the art forms. At a high level, JV consists of management of health, wealth, mind and life. This course offers the tips and techniques to lead a life full of success, prosperity and happiness by changing the current mindset to that of positive and harmonious thinking. It further touches upon important aspects such as priorities in life, how to manage stress, teamwork, laws of nature, human body as a divine computer, power of mind, etc.

Course Outcomes:

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

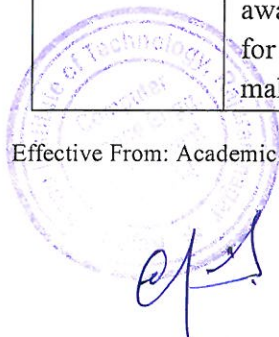
1. Exhibit interpersonal communication skills.
2. Demonstrate decision-making skills.
3. Apply conflict resolution styles appropriate in different situations.
4. Demonstrate skills to manage balance in work and life.
5. Apply Jeevanvidya wisdom in day to day life.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Minimum 12 sessions will be conducted from the following list.

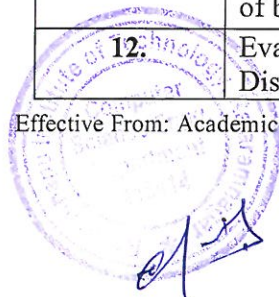
Course Content		
Experiment No	Description	Hrs
1.	Importance of Universal Laws of Nature in Human Life.- Overview of Jeevanvidya's Philosophy, scientific, universal, secular, usefulness in every walk and phase of life, overview of Universal Laws of Nature, determining factor in human life, important laws of nature and its influence on life of individual, family, society and world at large. Jeevanvidya's wisdom, living life in tune with laws of nature	02
2.	'You are the Architect of your Destiny' - This unit will make you aware that none else but you alone are responsible and accountable for what you achieve in your life, freedom of decisions, choices to make up your future, guiding powers to make the choices in your life,	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	achieving life full of health, wealth, success, peace and happiness for yourself and all	
3.	Setting and Achieving Goals – Defining your own goals in life , Concept of power of mind , concepts of interaction of conscious and subconscious levels of mind, tips and techniques to harness the amazing power of subconscious mind to achieve goals, Visualization and auto-suggestion techniques, real life examples	02
4.	Work-life Balance – What ‘Jeevanvidya’ means by work-life balance, priorities in life, time management, its importance, practical tips that enable to achieve work-life balance	02
5.	Art of Harmonious Thinking. – Importance , concept of harmonious thinking, Wishful Thinking, Positive Thinking, difference between Harmonious Thinking and Positive Thinking, powerful techniques to inculcate the habit of Harmonious Thinking, concept of Spiritual Thinking , Divine Universal Prayer – the life changer, Bless All technique, benefits of chanting the prayer	02
6.	Spirituality in Day-to-day Life – Concept of Love Work, 7 dimensions of Love Work, benefits us as individual, family, society and entire human race, important to be a good human being, usefulness to become successful, tools to apply the different ‘Jeevanvidya’ principles in day-to-day life, simple but powerful and useful techniques such as attitude of gratitude , attitude of win-all	02
7.	Human Values – Ethics and Human values, difference in ethics and values, Qualities of human values	02
8.	Communication Skills – Ability to commendably read, write, speak and listen by conforming knowledge and presenting in a structured, cohesive fashion, Understanding and demonstrating workplace communication in the context of organization’s business, understanding one’s core skills for job	02
9.	Interpersonal Skills – Presenting interpersonal skills by amiable and respecting individuals, effective listening to stakeholders, bonding and developing rapport, Team success	02
10.	Decision Making – Importance of correct decision making, Analytical thinking / mind, Information processing ability, Making sound judgment and confident decision	02
11.	Cross cultured sensitizations & Adaptability – Adapting multinational & multicultural environment, embracing diversity, culturally sensitive and bonding to colleagues and stakeholders, sense of belongings and promotion of unity at work place	02
12.	Evaluation of Students for their Understanding of Various Concepts Discussed.	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

References -

1. Mr. P. W. Pai. JV's Spiritual Wisdom in Day-to-day life, Blog.
2. Satguru Shri W. G. Pai. Towards the goal of beautiful life, Nam Sampradaya Mandal Publication
2. Mr. P. W. Pai. JV's Spiritual Wisdom in Day-to-day life, Blog.
3. Satguru Shri W. G. Pai. Towards the goal of beautiful life, Nam Sampradaya Mandal Publication
4. Satguru Shri W. G. Pai. Master Key to Happy Life, Jeevanvidya Foundation
5. Satguru Shri W. G. Pai. Your Destiny In Your Thoughts: You Are The Architect Of your Destiny, Jeevanvidya Foundation
6. Satguru Shri W. G. Pai. Gift of Wisdom, Jeevanvidya Foundation
7. Satguru Shri W. G. Pai. Search For Happiness, Jeevanvidya Foundation
8. Satguru Shri W. G. Pai. Ideal Parents Ideal Students, Jeevanvidya Foundation
9. Satguru Shri W. G. Pai. Human Body - God Incarnate!, Jeevanvidya Foundation
10. Satguru Shri W. G. Pai. Shape Your Destiny, Jeevanvidya Foundation
11. Satguru Shri W. G. Pai. True Concept of Satguru, Jeevanvidya Foundation
12. Dr. J. Murphy. Power of your subconscious mind, Amazing Reads Publication
13. S. Covey. Seven people of highly effective people, Winx Club Publication
14. D. Carnegie. How to win friends and influence people, Fingerprint! Publishing

Evaluation Scheme: ISE- 60% ESE – 40% (Minimum Passing Marks: 50% (Separate ISE and ESE)

Evaluation Method: In each session student will be assessed. Each assessment will be of minimum 10 marks. In the end of semester ESE for 40 marks shall be conducted. There should be separate passing of 50% in ISE and ESE



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2693	Course Name : Innovation Tools and Methods for Entrepreneurs	-	-	2	1

Course Description: This course helps students to identify different tools for developing the solution that student has already learned to ideate in the previous course "Creativity and Design Thinking". Further, students get information about various tools to carry out competitor analysis and user journey map. It would help him to come up with detailed specifications and USP of the product based on the competitor survey.

Course Outcomes:

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

1. Explain structured approach to define the problem with every possible detail, identify conflicts and solve them
2. Apply User Journey Map to the selected problem to show user interaction at various stages
3. Analyze the solutions provided by competitors for effectiveness and gaps if any.

Prerequisite: A Student who is going to enroll for this course should have following abilities:

1. Creativity and Innovativeness
2. Problem identification
3. Apply design thinking approach to develop working prototype
4. Structured approach to problem solving

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	Systematic Innovation: Define the problem in depth with all details, Trend prediction, Modeling the problem to identify tradeoffs and contradictions	02
2.	TRIZ: Theory of Inventive problem solving (TRIZ), HIT Matrix, Scamper, Algorithms of brain storming and innovation, Functional analysis	02
3.	Frugal and Disruptive Innovation: Biomimicry and frugal innovation for prototyping, Disruptive innovation.	02
4.	User Journey Map: Map showing user interaction at every stage of product/service. Step-by step process of UJM creation	02
5.	Competitor analysis: Analysis of competitor and users for similar products, effectiveness of existing solutions and identifications of gaps	02
6.	Product/Software Design Specifications: Detailed specifications for better product design, detailed UI for software for clarity on user	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 S.Y. B. Tech Computer Engineering Syllabus
 With effective from 2021 - 2022

	interaction, specify USPs of the product in comparison to the competitors	
7.	Business Canvas: A. Definition of a Business Model B. The 9 Building Blocks: 1. Customer 2. Value Propositions 3. Channels, distribution, 4. Customer relationships 5. Revenue 6. Key Resources 7. Key Activities 8. Key Partnerships 9. Cost Structure	02
8.	Design Thinking (Part I): Customer Insights, Ideation, Visual Thinking.	02
9.	Design Thinking (Part II): A. Prototyping. B. Storytelling. C. Scenarios	02
10.	Institutional arrangement for Entrepreneurship Development: Institutional arrangement for Entrepreneurship Development – DIC, ITCOT, SIDCO, NSIC, SISI, TIIC, SIDBI, Commercial Banks	02
11.	Project Report: a) Economic Aspects b) Technical Aspects c) Financial Aspects d) Production Aspects e) Managerial Aspects	02
12.	Investor Pitch Tool: a) Introduction b) Helpful Tips about preparation, pitching and content sharing c) Does and Don'ts d) Introduction e) Problem f) Solution/Product/Service g) Traction h) Market Opportunities/ Size i) Competition j) Go To Market Strategies k) Financials l) Team	02
13.	Revision -I	02
14.	Revision-II	02



Effective From: Academic Year 2020 - 21





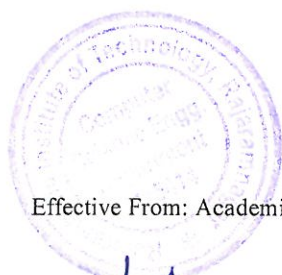
K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

References -

1. J. Knapp. Design Sprint, Simon & Schuster Publisher.
2. D. Silverstein. The Innovator's Toolkit, Wiley Publishing House.
3. M. A. Orloff. ABC-TRIZ: Introduction to creative design thinking with modern TRIZ modeling, Springer Publication.
4. M. Laverty. Entrepreneurship, OpenStax Publication.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2593	Course Name : Personal Effectiveness and Body Language	-	-	2	1

Course Description: This course is one of various courses offered under Choice Based Professional Skills Development programme. The course with its interactive and need based sessions helps students in knowing and managing self, set and pursue meaningful goals, and develop positive personal qualities for sustainability in today's global world.

Course Outcomes:

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

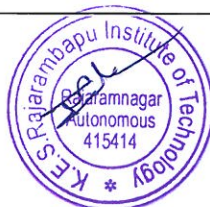
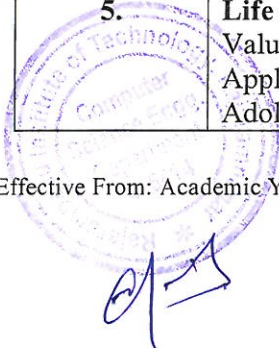
1. Develop skills to build self-esteem and positive attitude.
2. Develop interpersonal skills characterized by effective communication and conflict resolution.
3. Discover ways to overcome procrastination.
4. Demonstrate responsiveness towards stress and health issues.
5. Interpret the non-verbal behaviour of a person.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	Self-awareness and Self Esteem Meaning, Factors influencing self-esteem- environmental and social factors Developing self-esteem- strategies for building self-esteem	02
2.	Goal Setting Long term and short-term goals, Steps in goal setting (SMART)- - identify strategies - consider possible blocks and ways to deal with them - outline the steps - set deadlines	02
3.	Self-Analysis SWOT Analysis, who am I, Attributes, Importance of Self Confidence	02
4.	Personality Typing Extraversion, Introversion, Sensing, Intuition, Thinking, Feeling, Judging Perceiving	02
5.	Life Skills for Personal Effectiveness Values: Punctuality, Honesty, Loyalty, Dependability, Reliability- Application of Life Skills in day - to- day life - Life Skills for Adolescents and Youth	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

6.	Time Management Strategies for effective time management (Principles, Planning, Identify & Control time stealers, Prioritize, Problems and Solutions, learn to say NO	02
7.	Stress Management Sources of stress, types, signs and symptoms of stress - positive aspects of stress - negative aspects of stress	02
8.	Stress Management Techniques Coping mechanisms, Deep Breathing Exercise, Meditation and Visual Imagery techniques, Muscle Relaxation, Peer Sharing	02
9.	Emotional Intelligence Meaning –Components of Emotional Intelligence-Significance of managing Emotional intelligence –How to develop Emotional Quotient	02
10.	Decision-making Definition, Informed Decision Making, Consequences of Decision Making and Models of Decision Making	02
11.	Creative Thinking Out-of-the box thinking, Stages of Creative Thinking, Factors hindering creative thinking, Characteristics of Creative thinkers	02
12.	Interpersonal skills Meaning, need to develop interpersonal skills, components of interpersonal skills, techniques to improve skills, benefits with real life examples/case studies	02
13.	Art of Communication Verbal & Non-Verbal Communication, 7'Cs of Effective Communication Importance of Effective Communication	02
14.	Body Language – I Non-verbal codes: Kinesics, Proxemics	02
15.	Body Language – II Vocalics, Haptics, Appearance	02



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. S. Hariharan, et al; *Soft Skills*, MJP Publishers, Chennai.
2. Gopaldaswamy Ramesh et al. *The ACE of Soft Skills: Attitude, Communication and Etiquette for Success*, New Delhi: Pearson Education.
3. Jeff Butterfield, *Soft Skills for Everyone*, cengage Learning India Private Limited.
4. UNLESH the power within... Soft Skills – Infosys Training Manual *Module 1 to 5* (Infosys Campus Connect Programme)
5. Masters, L. Ann et al. *Personal Development for Life and Work*, New Delhi: Cengage Learning.
6. Covey, Stephen R., *Seven Habits of Highly Effective People: Powerful Lessons in Personal Change*
7. Barun K. Mitra, *Personality Development & Soft Skills*, Oxford Publishers, Third impression.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session student will be assessed. Each assessment will be of minimum 10 marks. The best 10 performances of the student will be considered for ISE of 100 marks.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III	L	T	P	Credits
Course Code : SH 2733	Course Name : : German Language - Basic Level	-	-	2	1

Course Description: This course meets the requirements of student's overall personality development. The course helps the student in learning German as a foreign language. Vocabulary building activities, grammar, reading skills and basic conversational skills are addressed in this course.

Course Outcomes:

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

1. Interpret the language if the next person is speaking slowly and clearly.
2. Make use of the language in routine life with the routing topics like family, shopping, work etc.
3. Demonstrate the language by self-introduction in German with simple sentences.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Course Content

Experi ment No	Description	Hrs
1.	Professions and their workplace Getting acquainted with different professions, usual tasks in particular profession , likes, dislikes etc.	02
2.	Job advertisements reading and understanding. To express oneself about his preferences for part time jobs. his likes and dislikes	02
3.	Short texts about finding jobs(for understanding the short paragraphs) & telephonic conversation Grammar- conjunctions and ,or, but (und ,oder ,aber)	02
4.	Grammar-Present Perfect Tense Exercises based on present perfect tense	02
5.	Present perfect tense with helping verb haben and sein. Difference between these two verbs and related exercises	02
6.	Vocabulary of clothes and conversation while buying the clothes	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

7.	Grammar- 'W' questions related to clothes(welche und diese) Exercises related to welche und diese in nominative and accusativ	02
8.	Grammar- present perfect tense of separable and non-separable verbs	02
9.	Dativ verbs Exercises related to dativ verbs	02
10.	Dialog between shopkeeper and customer Personal Pronomen in Dativ	02
11.	Orientation in the shopping mall. Understanding the floors and information on notice boards.	02
12.	Revision of the grammar and doubts clearing	02
13.	Test and presentations assigned to students during semester	02

References -

1. Studio D – A 1, Cornelsen Verlag, Goyal Publishing House, New Delhi.
2. Tangram Aktuell – A 1, Goyal Publishing House, New Delhi.
3. Language A 1, Goyal Publishing House, New Delhi.
4. Network A 1, Goyal Publishing House, New Delhi.

The extra notes will be provided to the students to complete the required syllabus.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester- III	L	T	P	Credits
Course Code : SH2713	Course Name : Japanese Language - Level III	-	-	2	1

Course Description: This course is designed to introduce students to the everyday language of Japan. Lessons are organized around natural conversational topics, leading students from fundamental aspects of grammar to readings in simple texts.

Course Outcomes:

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

- 1) Make use of basic conversations in various situations.
- 2) Identify the sentence patterns.
- 3) Explain insights about the communication required for living in Japan.
- 4) Interpret Japanese work ethics required in their professional career.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

- 1) Knowledge of basic grammar of Japanese Language.
- 2) Communicate moderately using Japanese Language.

All the 15 lab sessions will be conducted to meet the needs of following content delivery.

Course Content

Experiment No	Description	Hrs
1	Polite way of request for something, using ㇿ forms of the verbs.	02
2	Expressions used for offering to do something.	02
3	To ask for permission to do something.	02
4	Pattern used to express prohibition.	02
5	Use of ㇿ forms of the verbs to express sequence in action.	02
6	How to join two or more than two sentences together.	02
7	How to express something done after something.	02
8	Introduction of interrogative pronouns used to specify one item out of list of 2 or more than 2 things.	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S. Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

9	Rules for adjective – adjective combinations in one sentence.	02
10	How to make ない forms of the verbs.	02
11	Use of ない forms of the verbs to ask or to tell someone not to do something.	02
12	Must do pattern using なければなりません。	02
13	How to make dictionary forms of the verbs.	02
14	Uses Potential form できる	02
15	How to express the hobby.	02

***Note:** Words written phonetically using the Latin alphabet (*romaji*) will be only used in the very initial stage to aid learning pronunciations.

References -

1. Minna No Nihongo I (3A Corporation, Japan), Publications: Goyal publishers.
 2. Nihongo shouhou, Publication: JALTAP
- Other reference material, practice papers & CDs for listening practice.
The extra notes will be provided to the students as per the requirement of the syllabus.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session student will be assessed. Each assessment will be of minimum 10 marks. The best 6 performances of the student will be considered for ISE of 60 marks.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - IV	L	T	P	Credits
Course Code: CS2003	Course Name: Computer Networks	3	-	-	3

Course Description:

Data communication is transmission of digital data through communication systems. This has the objective of sending any documents or books at highest speeds and lowest cost, i.e. data communication as the transfer of information between two points, either via an analogue (sine wave) electrical signal or digital (binary) signal via electrical pulses. This course examines basic fundamental of data communication, encoding, interface & more focus on multiplexing, switching, different network model, & different network component topics.

Course Learning Outcomes:

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

1. Identify and explain the modulation techniques, components used in a communication system.
2. Identify different Network models and protocols of different layers
3. Discuss the concept multiplexing & switching.
4. Recognize and discuss the functions the different protocols in network layer
5. Identify the proper transmission control protocol for given applications
6. Explain the different services at application layer.

Prerequisites:

For to study this course some basic need they have to know:

- Aware of Fundamentals of communication systems engineering
- Basics of Analog and digital signals and techniques.



Effective From: Academic Year 2020 - 21





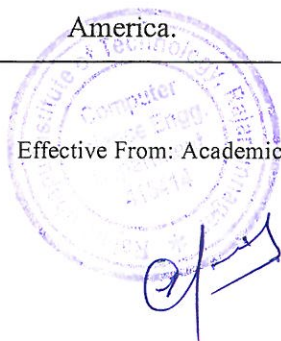
K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

Unit 1	Introduction Data Communications, Networks, the Internet, OSI model, Protocols and Standards. Analog and Digital, Periodic analog signals, digital signals, Transmission Impairments, Data rate limits and Performance. Line coding and line coding schemes, Transmission models. Frequency Division Multiplexing, Wavelength Division Multiplexing and Time Division Multiplexing. Transmission Media.	(6)
Unit 2	Data Link and Medium Access Control Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking,	(7)
Unit 3	MAC and Wired LANs Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA, Random Access, Controlled Access, Ethernet - IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet.	(5)
Unit 4	Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.	(6)
Unit 5	Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	(6)
Unit 6	Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography	(6)

Reference books

1. Data and Computer Communications -- William Stallings (Pearson Education).
2. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: CS2023	Course Name: Formal Language & Automata Theory	3	-	-	3

Course Description:

This subject makes student aware about computation. Basically, this subject deal with various concepts like proofs, Mathematical induction, Regular expression, Finite automate (DFA, NFA), Context-free grammar, Push down automata, Parsing, Turing Machine along with variation in TM. Automata theory is basically covers the basically covers the basic concept required for the compiler construction. Theory of computation is the study of abstract computational devices. In this course we introduce rigorous methods that help us understand the power and limitations of such devices. We will study several models including finite automata, grammars, pushdown automata, and Turing machines.

Course Learning Outcomes:

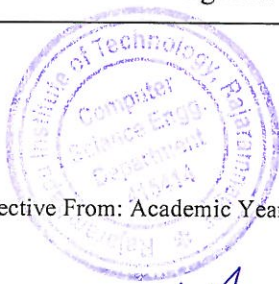
After successful completion of the course, students will be able to:

1. Apply the mathematical techniques for solving the automata problem.
2. Implementation of compiler with the help finite machine model.
3. Build regular expressions for the regular languages.
4. Design a various computation machines like finite automata, pushdown automata, and Turing machines.
5. Analyze the finite machine model.

Prerequisites:

To study this course some basic need they have to know:

- Mathematics
- Logic and set theory.
- Boolean algebra.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

SYLLABUS

Unit 1	Recursive Definitions: Definition and types of grammars and languages, Regular expressions and corresponding regular languages , examples and applications, unions, intersection & complements of regular languages , Finite automata definition and representation, Nondeterministic F.A., NFA with null transitions, Equivalence of FA's , NFA's and NFA's with null transitions.	(6)
Unit 2	Kleene's theorem and parsing Part I & II statements and proofs, minimum state FA for a regular language, minimizing number of states in FA. Top-Down, Recursive Descent and Bottom-Up Parsing	(6)
Unit 3	Grammars and languages Definition, production rules, Formalization, derivation trees, ambiguous grammar, removal of ambiguity. Reduced form grammar - removal of unit productions, production, useless symbols, Chomsky hierarchy, Context Free Grammar (CFG) - definition, simplification of CFG, Context Free Language (CFL)-definition, inherently ambiguous CFLs, Regular grammar - definition, left linear & right linear Regular Grammar. Regular grammar and Finite Automata Normal Forms - Chomsky Normal Form (CNF), Griebach Normal Form (GNF)	(8)
Unit 4	Push Down Automata Definition, deterministic PDA & types of acceptance, Equivalence of CFGs & PDAs.	(7)
Unit 5	CFL's and non CFL's Pumping Lemma and examples, intersection and complements	(3)
Unit 6	Turing Machines and Variations Models of computation, definition of TM as Language acceptors, combining Turing machines, computing a function with a TM. TMs with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM	(6)



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Text Books

1. Introduction to languages & theory of computations – John C. Martin (MGH)
2. Discrete Mathematical Structures with applications to computer science – J.P. Trembley & R. Manohar (MGH).

Reference books

1. Introduction to Automata Theory, Languages and computation – John E. Hopcraft , Rajeev Motwani , Jeffrey D. Ullman (Pearson Edition) .
2. Introduction to theory of computations – Michael Sipser (Thomson Brooks / Cole)
3. Finite Automata and Formal Languages – Linz
4. Introduction to Theory of Computer Science, Languages and machines
5. E.V Krishnamurth, " Theory of Computer Science", EWP publications.
6. Daniel I.A. cohen, "Introduction to computer theory", Wiley Publications

Term Work

It should consist of minimum 8 to 10 tutorials on the above topics.



[Handwritten signature]





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: CE2263	Course Name: Engineering Mechanics	2	-	-	2

Course Description:

Engineering mechanics is a course focuses on the statics, dynamics. The course helps the students to understand facts, concepts, principles and techniques of scientific investigation in the field of engineering. Irrespective of branches of engineering, as it develops the thinking, analytical ability and imaginative skill of student.

Engineering mechanics is an introductory course which supports a study of many other advanced courses like Strength of Materials, Theory of Machines, Fluid Mechanics, Design of Structures etc., which apply engineering concepts in manufacturing automobiles, aircrafts, electric motors, robots, construction of roadways, railways, bridges, satellites, etc.

Course Learning Outcomes:

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

1. Classify various forces and their effects, to analyze real life problems.
2. Analyze engineering problems applying conditions of equilibrium.
3. Determine Centroid & Moment of Inertia of the geometrical plane lamina.
4. Apply fundamental concepts of Kinematics and Kinetics to analyze practical problems.

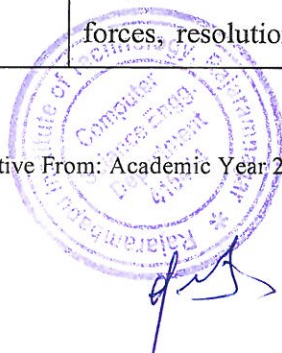
Prerequisites:

For to study this course some basic need they have to know:

- Engineering Physics

SYLLABUS

Unit 1	UNITI-FUNDAMENTALS OF MECHANICS AND FORCE SYSTEMS: Scope of the subject, Fundamental principles of Mechanics: Force, Law of forces, resolution of forces, Moment of a force, couple and its properties,	(6)
---------------	---	------------





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	Varignon's theorem, principle of transmissibility of force. Resultant of force system- parallel, concurrent and non-concurrent coplanar forces.	
Unit 2	UNIT II- EQUILIBRIUM OF FORCE SYSTEM: Free body diagram, conditions of equilibrium, types of loads, types of beams, types of supports and reactions. Analysis of simple beams. Lami's theorem, Friction, Laws of friction, Application to problems involving block friction.	(6)
Unit 3	UNIT III- CENTROID & MOMENT OF INERTIA: Centroid of plane and composite figures, parallel axis and perpendicular axis theorems, radius of gyration, polar MI, Moment of Inertia of plane and composite figures.	(6)
Unit 4	UNIT IV -KINEMATICS AND KINETICS: Kinematics: rectilinear motion with uniform and variable acceleration, circular motion with uniform and variable acceleration, Projectile motion. Kinetics: D' Alembert's Principle, work -energy principle, impulse momentum principle.	(6)

Text Books

1. Bhavikatti S.S. and Rajashekarappa, Engineering Mechanics, New age International publication (India) Pvt. Ltd. New Delhi.
2. Junnerkar S.B, Elements of Applied Mechanics, Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat).
3. S. Ramamrutham, Engineering Mechanics, Dhanpat Rai Publishing Company Ltd. Ansari Road, Darya Gang, New Delhi.

Reference books

1. Ferdinand. P. Beer and E. Russell Johnson, Vector Mechanics for Engineers (Statics and Dynamics), The McGraw Hill Publication, New York.
2. Ferdinand L. Singer; Harper and Collins, Engineering Mechanics (Statics and Dynamics) Publications (India) Pvt. Ltd. Noida.
3. Timoshenko and Young, Engineering Mechanics (Statics and Dynamics), Mc GRAW-HILL International Editions.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: SH2023	Course Name: Engineering Mathematics - III	3	1	-	4

Course Description:

Engineering Mathematics-III is a core subject introduced at second semester of second year B. Tech. Computer Science and Engineering. This course intends to build the competency in the students to apply the knowledge of mathematics to the solution of engineering problems and to analyze it.

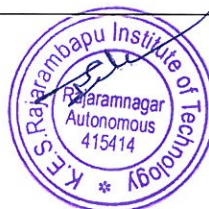
Course Learning Outcomes:

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

1. Compute Karl Pearson's product moment correlation coefficient and fit the lines of regression.
2. Compute discrete probability distribution, continuous probability distributions and joint probability distributions.
3. Apply specific probability distributions to real-life examples.
4. Solve the problems on fuzzy sets.
5. Apply extension principle to fuzzy arithmetic and solve fuzzy equations

SYLLABUS

Unit 1	Linear Regression and correlation Karl Pearson's Product moment correlation Coefficient, Lines of regression of bi-variate data, The fitted Regression line.	(6)
Unit 2	Random Variables and Probability Distributions Concept of random variable, Discrete probability distribution, Continuous probability distributions, Joint probability distributions.	(6)
Unit 3	Some Discrete and Continuous Probability Distributions Binomial Probability distributions, Poisson Probability distributions, Normal Probability distributions, application to computer engineering.	(6)
Unit 4	Fuzzy set theory	(6)





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	Introduction to crisp set: An overview, Fuzzy set: Basic types, Fuzzy sets: Basic concepts, Algebraic operations on Fuzzy Sets, Physical interpretation of ordinary fuzzy set.	
Unit 5	Fuzzy sets versus Crisp sets Additional properties of alpha-cuts, Representation of Fuzzy sets, Extension Principle for Fuzzy sets, Application of Extension principle for Fuzzy sets.	(6)
Unit 6	Fuzzy Arithmetic. Fuzzy number, Linguistic variables, Arithmetic operation on intervals, Arithmetic operation on Fuzzy numbers, Lattice of Fuzzy numbers, Fuzzy equations.	(6)

Text Books:

1. Ronald E. Walpole, Sharon L. Myers and Keying Ye, Probability and Statistics for Engineers and Scientists, 8th, Pearson Prentice Hall
2. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic Theory and Applications, Printice Hall of India Pvt. Ltd.

Reference Books:

1. S. C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, 1982
2. J.-S. R. Jang, C.- T. Sun, E. Mizutani, Neuro-Fuzzy and Soft Computing – A Computational Approach to Learning and Machine Intelligence, PHI Learning Private Limited.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: CS2043	Course Name: Computer Networks Lab	-	-	2	1

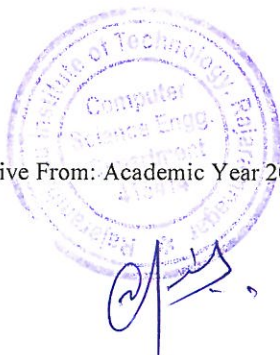
Course Description:

Computer networks lab is a required course for computer engineers. The goal of this course is to introduce the basics computer networks installations and configuration. Students will learn their fundamental layered structure, understand common offered layered services, and examine protocols and algorithms used to operate the network. Topics covered include introduction to computer networks, OSI model, WAN and LAN design issues. Application layer design issues and protocols are discussed. Then, Transport layer design issues, protocols as well as congestion control mechanisms are presented. Socket programming is explained. An in-depth analysis is presented of the Network layer design issues, and internetworking.

Course Learning Outcomes:

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

1. Define and apply architectural principles and mechanisms for data exchange among computer
2. Design, implement and analyse simple computer networks.
3. Identify& analyse the performance of different network layer protocols to formulate and solve network-engineering problems.
4. Identify Operations of TCP/UDP, FTP, HTTP, SMTP, SNMP etc.
5. Analyse to compare performance of different routing protocols.
6. Compare different networking models.
7. Ability to use techniques, skills, and modern networking tools necessary for engineering practice.
8. Demonstrate an understanding of computer communications standards





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: CS2063	Course Name: Object Oriented Programming Lab	2	-	4	4

Course Description:

This course discusses object-oriented programming concepts with the C++ programming language. OOP is the preferred approach for most software projects. OOP offers new and powerful way to cope with complexity. Instead of viewing a program as a series of steps to be carried out, it views it as a group of objects that have certain properties and can take certain actions. It results in programs that are clearer, more reliable, and more easily maintained. The C++ Language is widely accepted as the industry standard for software development. In the course various OOP concepts are discussed by implementing them in the C++ language.

Following are prerequisites to understand the Subject:-

- Understanding of Procedure Oriented Programming Concepts (C Language).
- Algorithm Design & implementation for different computational problems.

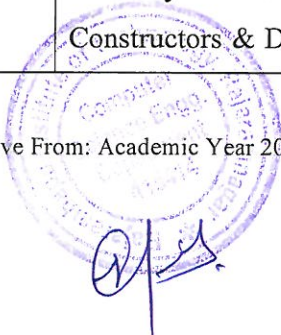
Course Learning Outcomes:

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

1. Describe object-oriented design concepts & apply them in software system design.
2. Implement basic OOP concepts like Class & Object, Inline functions, dynamic memory allocations etc.
3. Demonstrate constructors, destructors, function overloading, operator overloading, and friend functions in C++.
4. Write and Execute C++ programs for different types of Inheritance and virtual functions.
5. Apply advanced features of C++ programming like exception handling, Templates etc.

SYLLABUS

Unit 1	Introduction to Object Oriented Programming	(4)
	The Origins of C++, Abstraction, Encapsulation, Polymorphism, Inheritance, C++ key words. Class and objects, Structures and Union, Inline Functions, Constructors & Destructors, Parameterized constructors, Static class members,	

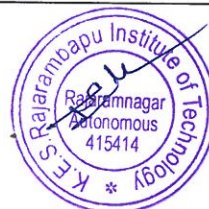




K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	Scope resolution operators, Passing objects to functions, nested classes, local classes, Friend Functions, Friend Classes	
Unit 2	Arrays and Pointers	(5)
	Arrays, Pointers, Dynamic Allocation Operators: Arrays of objects, Pointers to objects, Type checking C++ Pointers, This Pointer, Pointers to derived types, Pointers to class members, Dynamic allocation operators- new & delete operators.	
Unit 3	Functions & Operator Overloading	(3)
	Function Overloading, Operator Overloading, Copy Constructors & Default Arguments: Function overloading, Overloading constructor function, copy constructors, Operator overloading using friend function, Overloading new & delete operators, overloading some special operators like [],(),->,Comma operator.	
Unit 4	Inheritance & Virtual Functions	(3)
	Single Inheritance, multilevel Inheritance, multiple Inheritance, hybrid Inheritance, hierarchical Inheritance, Virtual base classes. Pure virtual function, calling virtual function through a base class, Abstract classes, Early vs. Late binding.	
Unit 5	Files and Streams	(4)
	Streams, String I/O, Character I/O, Object I/O, I/O with multiple objects, File pointers and redirections. C++ streams, C++ stream classes.	
Unit 6	Templates & Exception Handling	(5)
	Generic classes, Generic functions, Applying generic functions, type name & export keyword, power of templates. Exception Fundamentals, catching, throwing & handling of the exception.	

Expt. No.	Description
	It should consist of minimum 10 - 12 experiments based on the syllabus and experiment list mentioned below.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

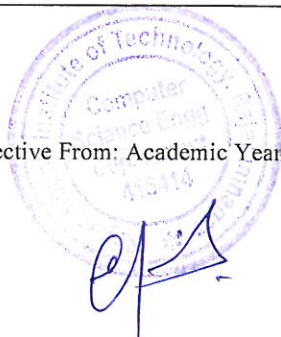
1.	Class & Object
2.	Constructor & Destructor
3.	Function overloading
4.	Inline Function
5.	Operator overloading
6.	Static Variable, function
7.	Inheritance
8.	Virtual function & Virtual class
9.	Friend Function & Friend Class
10.	File handling
11.	Exception handling
12.	Template Function & class

Text Books:

1. E Balagurusamy, "Object Oriented Programming with C++", ISBN-13 9780074620380.

Reference Books:

1. Herbert Schildt, "The Complete Reference: C++", Tata McGraw-Hill Edition, ISBN:9780070532465
2. Robert Lafore, "Object oriented programming in Turbo C++", ISBN: 8185623228
3. Bjarne Stroustrup, "An Overview of The C++ Programming Language", ISBN: 0849331358
4. D. Ravichandran, "Programming with C++", Tata McGraw Hill, ISBN: 0070494886





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: CE2283	Course Name: Engineering Mechanics Lab	-	-	2	1

Course Description:

Engineering Mechanics Lab is the undergraduate course designed for S. Y. B. Tech in semester IV. This course includes different experiments based on Equilibrium, support reactions, centroid, friction etc. The main objective of this course is student will be able to verify the theoretical concepts studied into practicals.

Course Learning Outcomes:

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

1. Compare coefficient of friction of various surfaces in contact.
2. Correlate theoretical and practical results of support reactions and Centroid of plane lamina.
3. Verify law of polygon of forces, law of triangle of forces and principle of moment.

Experiment No.	Description
1.	Verify Law of polygon of forces
2.	Verify principle of moments using Bell Crank Lever
3.	Verify support reactions of beam
4.	Verify support reactions of compound beam
5.	Verify Lami's theorem
6.	Verify position of centroid of plane & composite figures
7.	Compare value of coefficient friction for various contact surfaces
8.	Verify nature of forces in the members of simple truss
9.	Verify triangle Law of forces using Jib crane
10.	Study of Curvilinear motion of a particle





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

11.	Demonstration of D' Alembert's and Work-energy Principle
12.	Verify support reactions of beams by graphical method

Text book:

1. Bhavikatti S.S. and Rajashekarappa, Engineering Mechanics, New age International publication (India) Pvt. Ltd. New Delhi.
2. Junnerkar S.B, Elements of Applied Mechanics, Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat).
3. S. Ramamrutham, Engineering Mechanics, Dhanpat Rai Publishing Company Ltd. Ansari Road, Darya Gang, New Delhi.

Reference books:

1. Ferdinand. P. Beer and E. Russell Johnson, Vector Mechanics for Engineers (Statics and Dynamics), The McGraw Hill Publication, New York.
2. Ferdinand L. Singer; Harper and Collins, Engineering Mechanics (Statics and Dynamics) Publications (India) Pvt. Ltd. Noida.
3. Timoshenko and Young, Engineering Mechanics (Statics and Dynamics), Mc GRAW-HILL International Editions.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: SH2173	Course Name: Environmental Science	1*	-	-	1

Evaluation Scheme: ISE- 50% (Minimum Passing Marks: 40%)
ESE- 50% (Minimum Passing Marks: 40%)

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 the environment with due respect to perceptions and policies. The exposure to the various content of the course like understanding of 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. Discuss the importance and sensitivity of environment.
2. Interpret the over exploitation of natural resources and follow the environmental ethics.
3. Explain methods to protect environment and prevent environmental pollution.
4. Apply their knowledge and skills to solve environment related problems.

SYLLABUS

Unit 1	Natural Resources: Renewable and Non-renewable resources, Forest resources, water resources, Mineral resources, food resources, Energy resources, alternative energy resources Land resources, Role of individual in conservation of natural resources, Equitable use of resources for Sustainable life styles.	(4)
---------------	---	------------





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

Unit 2	Ecology and Environment Definition, Principles and Scope of ecology, Ecosystem: Structure and Functions, biotic and abiotic components, energy flows, food chains, food web, ecological pyramids, Biodiversity, types of biodiversity, conservation of biodiversity.	(4)
Unit 3	Environmental Pollution and Control Measures Environmental Pollution, types of pollution, Air pollution, Water Pollution, Noise Pollution, Soil Pollution, Marine Pollution, Radioactive Pollution, Thermal Pollution (Causes, sources and effects, abatement methods), Pollution Case studies-Bhopal Gas Tragedy, Chernobyl Accident: A nuclear Disaster, Ganga Water Pollution.	(4)
Unit 4	Solid Waste, Hazardous Waste and Disaster Management Solid Waste management, Urban & industrial Waste Management, (Causes, sources, effects & control measures), Hazardous waste management, Plastic waste management, E-waste management, Waste minimization technology, Disaster management. Disaster management and risk analysis: Flood, Earthquakes, Cyclones, Landslides, Draught, Tsunami etc. Artificial and natural Pandemics.	(4)
Unit 5	Environmental Management Environmental impact assessment, Impact Assessment Methodologies, Environmental impact statement and environmental management plan, Environmental audit, Cost-benefit analysis, Role of Central Pollution Control Board (CPCB), State Pollution Control Board, Role of NGO's, Role of Information technology in environment & human health, Environmental Ethics: Issues & possible solutions, Awareness of Environmental Legislation.	(4)
Unit 6	Social Issues and Environment From unsustainable to sustainable development, Urban problems related to energy, Water conservation: Rainwater harvesting, Watershed management, Resettlement & rehabilitation of people: Problems & concerns, Climate change, Global Warming, Ozone layer depletion, Acid Rain, Consumerism & waste	(4)



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Products, Concepts of Eco-labeled products, Eco-mark, Public Environmental education & awareness regarding environmental issues.
--

Text Books:

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

Reference Books:

1. Eldon D Enger, Bradley F. Smith, Environmental science – a study of inter-relationships
Wm C Brown Publishers
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.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester – IV	L	T	P	Credits
Course Code: SH2603	Course Name: Environmental Science Project	-	-	2	1

Evaluation Scheme: ISE- 100% (Minimum Passing Marks: 50%)

Course Description:

Environmental Science 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 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.

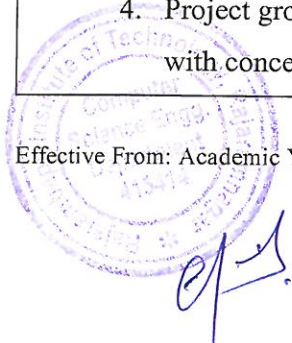
Course Learning Outcomes:

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

1. Utilize 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:

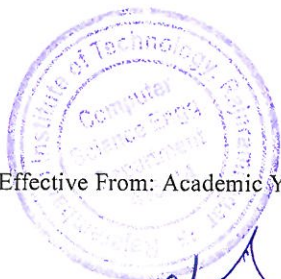
1. Environmental Science project will be the team work consisting min 3 to max 5 students.
2. Project topic should be application oriented and with consideration to Environmental science. problems in their respective stream. Selection and finalization will be through project guide.
3. Prepare project report as per guidelines.
4. Project group must provide complete solution to the selected problem with conceptual clarity.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from **2021 - 2022**

5. The project will be evaluated by respective branch HOD and project guide and senior faculty.
6. The project should be presented before the committee, which shall evaluate for 100 marks.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - SY B. Tech	Semester - IV	L	T	P	Credits
Course Code: CS2083	Course Name: Technical Aptitude-II	-	-	2	1

Course Description:

Comprehensive examination comprises of the courses namely Computer Networks, Formal Language & Automata Theory, Engineering Mathematics - III, Object Oriented Programming Lab. The 100 marks examination will be conducted at the end of the semester as per the GATE examination pattern and this is evaluated for one credit in Second Year Semester - II. This will be helpful for students to prepare for GATE and other competitive examinations.

Course Learning Outcomes:

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

1. Choose proper techniques to find solution for engineering problems
2. Solve various types of problems
3. Develop ability to face competitive examinations
4. Inspect the problem & conclude with proper solution

Pre-requisite:

Knowledge of Computer Networks, Formal Language & Automata Theory, Engineering Mathematics - III, Object Oriented Programming Lab.





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class:- S.Y. B. Tech .	Semester-III/IV
Course Code : SH2633	Course Name : Professional Leadership Skills

L	T	P	Credits
-	-	2	1

Course Description: This course is one of various courses offered under Choice Based Professional Skills Development programme. This course guides those special students who want to be entrepreneurs and professional leaders. This course covers various aspects of Leadership which includes Team formation, conflict management, motivation and presentation skills.

Course Outcomes:

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

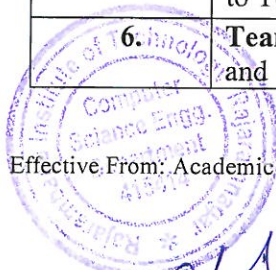
1. Explain the traits of a leadership through real life examples.
2. Exhibit the ability to work effectively in team.
3. Prepare a presentation as per the audience and context requirements.

Prerequisite: A Student, who is going to enroll for this course should have -

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Ability to communicate moderately in English.

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	SMART Goal Setting, SWOT/C Analysis and Action Plan: Discussion on Dos and Don'ts, Advantages, and Generation of the Document by Students and its Assessment	02
2.	Assertiveness and Positive Thinking: Types of Behaviour, Benefits of Being Assertive and Positive Thinking, Developing Positive Attitude, Case Studies and Presentations	02
3.	Self Management: Need of Self Management, Developing Self Acceptance, Steps of Self Management, Individual Classroom Activity and its Assessment	02
4.	Leadership Styles and Change Management: Introduction to Different Types of Leaderships, Effective Organizational Change Management, Individual Classroom Activity and its Assessment	02
5.	Team Formation and Leading a Team-I: Why Teams? Roles and Responsibilities in Teams, Strategies for Team Development, Barriers to Teams, Steps of Team Development	02
6.	Team Formation and Leading a Team – II: Case Studies of Teams and Student Presentations	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

7.	Business Meetings and Decision Making – I: Preparing for the Meeting, Role of Chairperson and Participants in Meetings	02
8.	Business Meetings and Decision Making – II: Mock Meetings, Decision Making Case Studies and Feedback	02
9.	Conflict Management: Types of Personalities, Possible Reasons of Conflicts at Work Place, Conflict Resolution Strategies, Conflict Management Case Studies and Feedback	02
10.	Time Management: Time Management Techniques, Introduction to Time Management Tools, Benefits of Time Management, Case Studies and Presentations	02
11.	Presentation Skills – I: Preparation, Types of Presentations - Informative, Instructional, Arousing, Persuasive, Decision-making, Presentation Tools	02
12.	Presentation Skills – II: Body Language, Managing Questions and Student Presentations Student Presentations and Feedback, Student Presentations and Feedback	02
13.	Creative and Critical Thinking: Approaches to Creative Thinking, Strategies for Creative Thinking, Characteristics and Strategies of Critical Thinking	02
14.	Motivating People: Types of Motivation, Components of Motivation, Steps in Keeping Motivation Level High	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. Krishna Mohan and Meera Banerji; *Developing Communication Skills*, Macmillan India Ltd., New Delhi
2. Masters, L. Ann et al. *Personal Development for Life and Work*, New Delhi: Cengage Learning.
3. Jeff Butterfield, *Soft Skills for Everyone*, Cengage Learning India Private Limited.
4. John Seely, *Oxford Guide to Effective Writing and Speaking*; Oxford University Press.
5. UNLESH the power within... Soft Skills – Infosys Training Manual *Module 1 to 5* (Infosys Campus Connect Programme)

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2613	Course Name : Interpersonal Skills ('Jeevanvidya' for Work Life Balance)	-	-	2	1

Course Description: Jeevan means life and Vidya means knowledge. Jeevanvidya (JV) means science of life and art of successful and happy living. Achieving work-life balance is an art. The science behind work-life balance is based on the universal laws of nature. The aspects of it are applied on the art forms. At a high level, JV consists of management of health, wealth, mind and life. This course offers the tips and techniques to lead a life full of success, prosperity and happiness by changing the current mindset to that of positive and harmonious thinking. It further touches upon important aspects such as priorities in life, how to manage stress, teamwork, laws of nature, human body as a divine computer, power of mind, etc.

Course Outcomes:

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

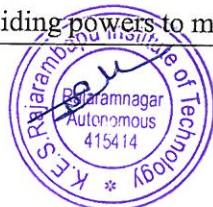
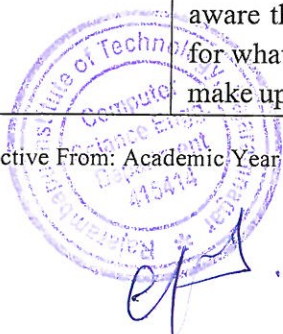
1. Exhibit interpersonal communication skills.
2. Demonstrate decision-making skills.
3. Apply conflict resolution styles appropriate in different situations.
4. Demonstrate skills to manage balance in work and life.
5. Apply Jeevanvidya wisdom in day to day life.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	Importance of Universal Laws of Nature in Human Life.- Overview of Jeevanvidya's Philosophy, scientific, universal, secular, usefulness in every walk and phase of life, overview of Universal Laws of Nature, determining factor in human life, important laws of nature and its influence on life of individual, family, society and world at large. Jeevanvidya's wisdom, living life in tune with laws of nature	02
2.	'You are the Architect of your Destiny' - This unit will make you aware that none else but you alone are responsible and accountable for what you achieve in your life, freedom of decisions, choices to make up your future, guiding powers to make the choices in your life,	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

	achieving life full of health, wealth, success, peace and happiness for yourself and all	
3.	Setting and Achieving Goals – Defining your own goals in life , Concept of power of mind , concepts of interaction of conscious and subconscious levels of mind, tips and techniques to harness the amazing power of subconscious mind to achieve goals, Visualization and auto-suggestion techniques, real life examples	02
4.	Work-life Balance – What ‘Jeevanvidya’ means by work-life balance, priorities in life, time management, its importance, practical tips that enable to achieve work-life balance	02
5.	Art of Harmonious Thinking. – Importance , concept of harmonious thinking, Wishful Thinking, Positive Thinking, difference between Harmonious Thinking and Positive Thinking, powerful techniques to inculcate the habit of Harmonious Thinking, concept of Spiritual Thinking , Divine Universal Prayer – the life changer, Bless All technique, benefits of chanting the prayer	02
6.	Spirituality in Day-to-day Life – Concept of Love Work, 7 dimensions of Love Work, benefits us as individual, family, society and entire human race, important to be a good human being, usefulness to become successful, tools to apply the different ‘Jeevanvidya’ principles in day-to-day life, simple but powerful and useful techniques such as attitude of gratitude , attitude of win-all	02
7.	Human Values – Ethics and Human values, difference in ethics and values, Qualities of human values	02
8.	Communication Skills – Ability to commendably read, write, speak and listen by conforming knowledge and presenting in a structured, cohesive fashion, Understanding and demonstrating workplace communication in the context of organization’s business, understanding one’s core skills for job	02
9.	Interpersonal Skills – Presenting interpersonal skills by amiable and respecting individuals, effective listening to stakeholders, bonding and developing rapport, Team success	02
10.	Decision Making – Importance of correct decision making, Analytical thinking / mind, Information processing ability, Making sound judgment and confident decision	02
11.	Cross cultured sensitizations & Adaptability – Adapting multinational & multicultural environment, embracing diversity, culturally sensitive and bonding to colleagues and stakeholders, sense of belongings and promotion of unity at work place	02
12.	Evaluation of Students for their Understanding of Various Concepts Discussed.	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. Mr. P. W. Pai. JV's Spiritual Wisdom in Day-to-day life, Blog.
2. Satguru Shri W. G. Pai. Towards the goal of beautiful life, Nam Sampradaya Mandal Publication
2. Mr. P. W. Pai. JV's Spiritual Wisdom in Day-to-day life, Blog.
3. Satguru Shri W. G. Pai. Towards the goal of beautiful life, Nam Sampradaya Mandal Publication
4. Satguru Shri W. G. Pai. Master Key to Happy Life, Jeevanvidya Foundation
5. Satguru Shri W. G. Pai. Your Destiny In Your Thoughts: You Are The Architect Of your Destiny, Jeevanvidya Foundation
6. Satguru Shri W. G. Pai. Gift of Wisdom, Jeevanvidya Foundation
7. Satguru Shri W. G. Pai. Search For Happiness, Jeevanvidya Foundation
8. Satguru Shri W. G. Pai. Ideal Parents Ideal Students, Jeevanvidya Foundation
9. Satguru Shri W. G. Pai. Human Body - God Incarnate!, Jeevanvidya Foundation
10. Satguru Shri W. G. Pai. Shape Your Destiny, Jeevanvidya Foundation
11. Satguru Shri W. G. Pai. True Concept of Satguru, Jeevanvidya Foundation
12. Dr. J. Murphy. Power of your subconscious mind, Amazing Reads Publication
13. S. Covey. Seven people of highly effective people, Winx Club Publication
14. D. Carnegie. How to win friends and influence people, Fingerprint! Publishing

Evaluation Scheme: ISE- 60% ESE – 40% (Minimum Passing Marks: 50% (Separate ISE and ESE))

Evaluation Method: In each session student will be assessed. Each assessment will be of minimum 10 marks. In the end of semester ESE for 40 marks shall be conducted. There should be separate passing of 50% in ISE and ESE





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2693	Course Name : Innovation Tools and Methods for Entrepreneurs	-	-	2	1

Course Description: This course helps students to identify different tools for developing the solution that student has already learned to ideate in the previous course "Creativity and Design Thinking". Further, students get information about various tools to carry out competitor analysis and user journey map. It would help him to come up with detailed specifications and USP of the product based on the competitor survey.

Course Outcomes:

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

1. Explain structured approach to define the problem with every possible detail, identify conflicts and solve them
2. Apply User Journey Map to the selected problem to show user interaction at various stages
3. Analyze the solutions provided by competitors for effectiveness and gaps if any.

Prerequisite: A Student who is going to enroll for this course should have following abilities:

1. Creativity and Innovativeness
2. Problem identification
3. Apply design thinking approach to develop working prototype
4. Structured approach to problem solving

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	Systematic Innovation: Define the problem in depth with all details, Trend prediction, Modeling the problem to identify tradeoffs and contradictions	02
2.	TRIZ: Theory of Inventive problem solving (TRIZ), HIT Matrix, Scamper, Algorithms of brain storming and innovation, Functional analysis	02
3.	Frugal and Disruptive Innovation: Biomimicry and frugal innovation for prototyping, Disruptive innovation.	02
4.	User Journey Map: Map showing user interaction at every stage of product/service. Step-by step process of UJM creation	02
5.	Competitor analysis: Analysis of competitor and users for similar products, effectiveness of existing solutions and identifications of gaps	02
6.	Product/Software Design Specifications: Detailed specifications for	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
 S.Y. B. Tech Computer Engineering Syllabus
 With effective from 2021 - 2022

	better product design, detailed UI for software for clarity on user interaction, specify USPs of the product in comparison to the competitors	
7.	Business Canvas: C. Definition of a Business Model D. The 9 Building Blocks: 10. Customer 11. Value Propositions 12. Channels, distribution, 13. Customer relationships 14. Revenue 15. Key Resources 16. Key Activities 17. Key Partnerships 18. Cost Structure	02
8.	Design Thinking (Part I): Customer Insights, Ideation, Visual Thinking.	02
9.	Design Thinking (Part II): D. Prototyping. E. Storytelling. F. Scenarios	02
10.	Institutional arrangement for Entrepreneurship Development: Institutional arrangement for Entrepreneurship Development – DIC, ITCOT, SIDCO, NSIC, SISI, THIC, SIDBI, Commercial Banks	02
11.	Project Report: f) Economic Aspects g) Technical Aspects h) Financial Aspects i) Production Aspects j) Managerial Aspects	02
12.	Investor Pitch Tool: a) Introduction b) Helpful Tips about preparation, pitching and content sharing c) Does and Don'ts d) Introduction e) Problem f) Solution/Product/Service g) Traction h) Market Opportunities/ Size i) Competition j) Go To Market Strategies k) Financials l) Team	02
13.	Revision -I	02
14.	Revision-II	02



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. J. Knapp. Design Sprint, Simon & Schuster Publisher.
2. D. Silverstein. The Innovator's Toolkit, Wiley Publishing House.
3. M. A. Orloff. ABC-TRIZ: Introduction to creative design thinking with modern TRIZ modeling, Springer Publication.
4. M. Laverty. Entrepreneurship, OpenStax Publication.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester-III/IV	L	T	P	Credits
Course Code : SH2593	Course Name : Personal Effectiveness and Body Language	-	-	2	1

Course Description: This course is one of various courses offered under Choice Based Professional Skills Development programme. The course with its interactive and need based sessions helps students in knowing and managing self, set and pursue meaningful goals, and develop positive personal qualities for sustainability in today's global world.

Course Outcomes:

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

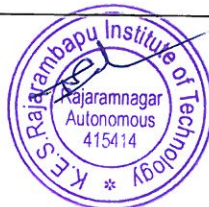
1. Develop skills to build self-esteem and positive attitude.
2. Develop interpersonal skills characterized by effective communication and conflict resolution.
3. Discover ways to overcome procrastination.
4. Demonstrate responsiveness towards stress and health issues.
5. Interpret the non-verbal behaviour of a person.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Minimum 12 sessions will be conducted from the following list.

Course Content		
Experiment No	Description	Hrs
1.	Self-awareness and Self Esteem Meaning, Factors influencing self-esteem- environmental and social factors Developing self-esteem- strategies for building self-esteem	02
2.	Goal Setting Long term and short-term goals, Steps in goal setting (SMART)- - identify strategies - consider possible blocks and ways to deal with them - outline the steps - set deadlines	02
3.	Self-Analysis SWOT Analysis, who am I, Attributes, Importance of Self Confidence	02
4.	Personality Typing Extraversion, Introversion, Sensing, Intuition, Thinking, Feeling, Judging Perceiving	02
5.	Life Skills for Personal Effectiveness Values: Punctuality, Honesty, Loyalty, Dependability, Reliability- Application of Life Skills in day - to- day life - Life Skills for Adolescents and Youth	02



Handwritten signature



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

6.	Time Management Strategies for effective time management (Principles, Planning, Identify & Control time stealers, Prioritize, Problems and Solutions, learn to say NO	02
7.	Stress Management Sources of stress, types, signs and symptoms of stress - positive aspects of stress - negative aspects of stress	02
8.	Stress Management Techniques Coping mechanisms, Deep Breathing Exercise, Meditation and Visual Imagery techniques, Muscle Relaxation, Peer Sharing	02
9.	Emotional Intelligence Meaning –Components of Emotional Intelligence-Significance of managing Emotional intelligence –How to develop Emotional Quotient	02
10.	Decision-making Definition, Informed Decision Making, Consequences of Decision Making and Models of Decision Making	02
11.	Creative Thinking Out-of-the box thinking, Stages of Creative Thinking, Factors hindering creative thinking, Characteristics of Creative thinkers	02
12.	Interpersonal skills Meaning, need to develop interpersonal skills, components of interpersonal skills, techniques to improve skills, benefits with real life examples/case studies	02
13.	Art of Communication Verbal & Non-Verbal Communication, 7'Cs of Effective Communication Importance of Effective Communication	02
14.	Body Language – I Non-verbal codes: Kinesics, Proxemics	02
15.	Body Language – II Vocalics, Haptics, Appearance	02



eps



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

References -

1. S. Hariharan, et al; *Soft Skills*, MJP Publishers, Chennai.
2. Gopaldaswamy Ramesh et al. *The ACE of Soft Skills: Attitude, Communication and Etiquette for Success*, New Delhi: Pearson Education.
3. Jeff Butterfield, *Soft Skills for Everyone*, cengage Learning India Private Limited.
4. UNLESH the power within... *Soft Skills – Infosys Training Manual Module 1 to 5 (Infosys Campus Connect Programme)*
5. Masters, L. Ann et al. *Personal Development for Life and Work*, New Delhi: Cengage Learning.
6. Covey, Stephen R., *Seven Habits of Highly Effective People: Powerful Lessons in Personal Change*
7. Barun K. Mitra, *Personality Development & Soft Skills*, Oxford Publishers, Third impression.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session student will be assessed. Each assessment will be of minimum 10 marks. The best 10 performances of the student will be considered for ISE of 100 marks.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester- IV	L	T	P	Credits
Course Code : SH 2643	Course Name : German Language - Advanced Level	-	-	2	1

Course Description: This course exposes a learner to LSRW skills of German language. The course takes a student's German language skills to advanced level with situational conversations. The course helps learners in creating cross-cultural sensitization and adaptability skills. Here, a student prepares himself for German language examination.

Course Outcomes:

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

1. Interpret the language if the next person is speaking slowly and clearly.
2. Make use of the language in routine life with the routing topics like family, shopping, work etc.
3. Demonstrate the language by self-introduction in German with simple sentences.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

1. Adequate knowledge of basic grammar of English language.
2. Intermediate level vocabulary of English language.
3. Communicate moderately using English language.

Course Content		
Experiment No	Description	Hrs
1.	Body parts and Krankheiten(diseases) and home remedies	02
2.	Grammar- Imperative for du ,ihr, Sie	02
3.	Health tips and conversation at clinic Modal verbs - dürfen & sollen	02
4.	Professions related to health	02
5.	Vocabulary of vacation and activities in vacation	02
6.	Writing a postcard Grammar- Pronoun - man	02
7.	Topic- Weather Reading texts related to vacation and formation of "W" questions	02
8.	Grammar revision for the entire book	02



K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

9.	Explaining the pattern of the exam and explanation of each skill's exam requirement	02
10.	Practice for Skill "Writing" and "Speaking"	02
11.	Practice for skill "Reading" and "Listening"	02
12.	Solving exam set 1 Speaking practice	02
13.	Solving exam set 2 speaking practice	02

References -

1. Studio D – A 1, Cornelsen Verlag, Goyal Publishing House, New Delhi.
2. Tangram aktuell A 1, Goyal Publishing House, New Delhi.
3. Lagune A 1, Goyal Publishing House, New Delhi.
4. Netzwerk A 1, Goyal Publishing House, New Delhi.

The extra notes will be provided to the students to complete the required syllabus.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session students will be assessed. Each assessment will be of minimum 10 marks. The best 06 performances of the student will be considered for ISE. ESE will be conducted separately at the end of the semester.



Effective From: Academic Year 2020 - 21





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

Class: - S.Y. B. Tech.	Semester- IV	L	T	P	Credits
Course Code : SH2623	Course Name : Japanese Language - Level IV	-	-	2	1

Course Description: This course is designed to introduce students to the everyday language of Japan. Lessons are organized around natural conversational topics, leading students from fundamental to advanced aspects of grammar to readings in simple texts.

Course Outcomes:

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

- 1) To be able to make basic conversations in various situations.
- 2) To recognize the sentence patterns.
- 3) To improve Japanese Language proficiency.
- 4) To give students insights about the communication required for living in Japan.
- 5) To expose students to the Japanese work ethics required in their professional careers.

Prerequisite: A Student, who is going to enroll for this course, should have following English language abilities:

- 1) Knowledge of basic grammar of Japanese Language.
- 2) Communicate moderately using Japanese Language.

All the 15 lab sessions will be conducted to meet the needs of following content delivery.

Course Content

Experiment No	Description	Hrs
1	How to make た forms of the verbs.	02
2	To express "have the experience of" using た forms of the verbs.	02
3	To express two or more than two actions in one list using た forms of the verbs.	02
4	Polite forms & plain forms (Style of speech)	02
5	Conversation in plain forms & polite forms.	02





K.E. Society's
Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
S.Y. B. Tech Computer Engineering Syllabus
With effective from 2021 - 2022

6	To express ideas or judgements.	02
7	Report speech.	02
8	To express recommendation, suggestion.	02
9	How to seek agreement or confirmation from the listener.	02
10	Noun modification.	02
11	Describing an appointment, errand.	02
12	Rules while using とき	02
13	Verbs used for giving & receiving of things (polite & plain forms)	02
14	Conditional forms of verbs, adjectives & nouns.	02
15	Subject of subordinate clause.	02

***Note:** Words written phonetically using the Latin alphabet (*romaji*) will be only used in the very initial stage to aid learning pronunciations.

References -

1. Minna No Nihongo I (3A Corporation, Japan), Publications: Goyal publishers.
 2. Nihongo shouhou, Publication: JALTAP
- Other reference material, practice papers & CDs for listening practice.
The extra notes will be provided to the students as per the requirement of the syllabus.

Evaluation Scheme: ISE – 60% and ESE – 40% (Minimum Passing: 50% of ISE & ESE separately)

Evaluation Method: In every session student will be assessed. Each assessment will be of minimum 10 marks. The best 6 performances of the student will be considered for ISE of 60 marks.



Effective From: Academic Year 2020 - 21

