MIT | Academy of Engineering

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For
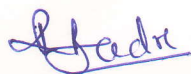
Bachelor of Technology

In

Computer Engineering

(Choice Based Credit System)

2016-2020

BoS Chairman
(Dean, SCET)

Member Secretary
Academic Council
(Dean, Academics)

Chairman
Academic Council
(Director, MITAoE)

CHAIRMAN
BOS-Computer Engineering
MIT Academy of Engineering
(An Autonomous Institute)

MIT Academy of Engineering

An Autonomous Institute Affiliated to Savitribai Phule Pune University

CURRICULUM FRAMEWORK COMPUTER ENGINERING

The B. Tech Program shall be based on the following type of courses

SL. NO.	TYPE OF COURSE	ABBREVIATION
1.	Natural Science	NSC
2.	Engineering Science	ESC
3.	Program Core	PC
4.	Discipline Core	DC
5.	Department Elective	DE
6.	Open Elective	OE
7.	Humanities and Social Science	HSS
8.	Skill Development and Project	SDP

The Course and Credit Distribution shall be as under,

SL. NO.	TYPE OF COURSE	NO. OF COURSES	TOTAL CREDITS	
			NO.	%
1.	Natural Science	4	18	10.98
2.	Engineering Science	4	16	9.76
3.	Program Core	5	20	12.20
4.	Discipline Core	13	48	30.36
5.	Department Elective	2	6	3.66
6.	Open Elective	4	16	9.76
7.	Humanities and Social Science	8/9	16	9.76
8.	Skill Development and Project	10/9	24	14.62
	TOTAL	50	164	100

COURSE DISTRIBUTION: SEMESTER WISE

SL. NO.	TYPE OF COURSE	NO. OF COURSES/SEMESTER								TOTAL
		1	2	3	4	5	6	7	8	
1.	Natural Science	2	2							**4**
2.	Engineering Science	2	2							**4**
3.	Program Core			3	2					**5**
4.	Discipline Core			2	2	4	3	1	1	**13**
5.	Department Elective							1	1	**2**
6.	Open Elective					1	1	1	1	**4**
7.	Humanities & Social Science	1	1		1	1	2	½	1	**8/9**
8.	Skill Development & Project	1	1	1	1	1	1	3/2	1	**10/9**
	TOTAL	**6**	**6**	**6**	**6**	**7**	**7**	**7**	**5**	**50**

CREDIT DISTRIBUTION: SEMESTER WISE

1 Lecture hour = 1 Credit   2 Lab Hours = 1 Credit   1 Tutorial Hour = 1 Credit

SL. NO.	TYPE OF COURSE	NO. OF CREDITS/SEMESTER								TOTAL
		1	2	3	4	5	6	7	8	
1.	Natural Science	9	9							**18**
2.	Engineering Science	8	8							**16**
3.	Program Core			12	8					**20**
4.	Discipline Core			8	8	12	12	4	4	**48**
5.	Department Elective							3	3	**6**
6.	Open Elective					4	4	4	4	**16**
7.	Humanities & Social Science	2	2		2	2	3	3	2	**16**
8.	Skill Development & Project	2	2	2	2	2	2	8	4	**24**
	TOTAL	**21**	**21**	**22**	**20**	**20**	**21**	**22**	**17**	**164**

		CURRICULUM STRUCTURE (2016 - 2020)				
MIT Academy of Engineering (An Autonomous Institute)						
SCHOOLOF COMPUTER ENGINEERING AND TECHNOLOGY			**W.E.F**	**:**	**2016-17**	
FIRST YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING			**RELEASE DATE**	**:**	**01/06/2016**	
			REVISION NO.	**:**	**0.0**	

SEMESTER: I

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	NSC1	AS101	Mathematics – 1	4	1	5
2.	NSC2	AS102 / AS103	Physics / Chemistry	3	2	4
3.	ESC1	EX101 / CV101	Electrical & Electronics Engg. / Applied Mechanics	3	2	4
4.	ESC2	ME101 / IT101	Engineering Graphics/Computer Programming	2	4	4
5.	HSS1	HP101	Language & Communication – 1	1	2	2
6.	SDP1	ME102 / ME103	Engineering Tools & Techniques / Design Thinking	---	4	2
TOTAL				**13**	**15**	**21**

SEMESTER: II

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	NSC3	AS104	Mathematics – 2	4	1	5
2.	NSC4	AS103 / AS102	Chemistry / Physics	3	2	4
3.	ESC3	CV101 / EX101	Applied Mechanics / Electrical& Electronics Engg.	3	2	4
4.	ESC4	IT101 / ME101 /	Computer Programming / Engineering Graphics	2	4	4
5.	HSS2	HP102	Language & Communication – 2	1	2	2
6.	SDP2	ME103 / ME102	Design Thinking / Engineering Tools & Techniques	---	4	2
TOTAL				**13**	**15**	**21**

L: Lecture, P: Practical, T: Tutorial; *Applicable for FY B. Tech

	CURRICULUM STRUCTURE (2016 - 2020)		
SCHOOLOF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F** : **2017-18**		
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**RELEASE DATE** : **01/06/2017**		
	REVISION NO. : **0.0**		

SEMESTER: III

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	PC1	CH201	Environmental Science	2	2	3
2.	PC2	AS202	Applied Mathematics	3	2	4
3.	PC3	ET201	System Engineering	3	2	4
4.	DC1	CS201	Data and File Structures	3	2	4
5.	DC2	CS202	Digital Electronics and Microprocessors	3	2	4
6.	SDP3	ET206	Prototyping	--	4	2
TOTAL				**14**	**14**	**21**

SEMESTER:IV

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	HSS3	HP201	Psychology	3	--	3
2.	PC4	IT201	Engineering Informatics	3	2	4
3.	PC5	ME201	Material Engineering	3	2	4
4.	DC3	CS211	Discrete Structure and Graph Theory	3	2	4
5.	DC4	CS212	Database Management Systems	3	2	4
6.	SDP4	CS213	Minor Project	--	4	2
TOTAL				**15**	**12**	**21**

Note: L: Lecture, P: Practical, T: Tutorial; *Applicable for FY BTech*

			CURRICULUM STRUCTURE (2016 - 2020)			
MIT | academy of Engineering (An Autonomous Institute)						
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY			**W.E.F**	:	**2018-19**	
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING			**RELEASE DATE**	:	**01/12/2017**	
			REVISION NO.	:	**0.0**	

SEMESTER: V

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC5	CS301	Operating System	3	2	4
2.	DC6	CS302	Computer Organization & Architecture	3	--	3
3.	DC7	CS303	Theory of Computation	3	--	3
4.	DC8	CS304	Computer Graphics & Gaming	--	4	2
5.	OE1	IT 311 CS311 CS312	Open Elective - Refer Annexure.	3	2	4
6.	HSS4	HP301	Project Management	1	2	2
7.	SDP5	CS30#	Skill Development Lab	--	4	2
			TOTAL	**13**	**14**	**20**

SEMESTER:VI

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC9	CS321	Design and Analysis of Algorithm	3	2	4
2.	DC10	CS322	Compiler Design	3	2	4
3.	DC11	CS323	Computer Networks	3	2	4
4.	OE2	IT 331 CS331 CS332	Open Elective - Refer Annexure.	3	2	4
5.	HSS5	HP302	Professional Skills	1	2	2
6.	HSS6	HP303	Basics of Entrepreneurship	--	2	1
7.	SDP6	CS324	Mini Project	--	4	2
			TOTAL	**13**	**16**	**21**

MIT | Academy of Engineering
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CURRICULUM STRUCTURE (2016 - 2020)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F	:	2019-20
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE	:	01/12/2017
	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 12	CS401	Software Engineering, Testing and Quality Assurance.	3	2	4
2.	DE 1	CS41#	Department (Program) elective - Ref er Annexure	3	0	3
3.	OE 3	CS42#	Open Elective – Refer Annexure	3	2	4
4.	HSS 6	HP402	Sociology	2	--	2
5.	HSS7/SDP7	HP403/CS40#	Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux)	---	2	1
6.	SDP 8	CS405	Project – I	--	8	4
7.	SDP9	CS406	Summer Internship	--	--	4
		TOTAL		11	14	22

SEMESTER:VIII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 13	CS431	Human Computer Interaction	3	2	4
2.	DE 2	CS44#	Department (Program) elective - Ref er Annexure	3	0	3
3.	OE 4	CS45#	Open Elective – Refer Annexure	3	2	4
4.	HSS8	HP401	Engineering Economics	2	---	2
5.	SDP10	CS432	Project – II	---	8	4
		TOTAL		11	12	17

		CREDITS		
		1 Lecture hour = 1 Credit 2 Lab Hours = 1 Credit 1 Tutorial Hour		
SL. NO.	YEAR	SEMESTER		TOTAL
		1	2	
1.	First Year	21	21	**42**
2.	Second Year	21	21	**42**
3.	Third Year	20	21	**41**
4.	Final Year	22	17	**39**
TOTAL				**164**

		CONTACT HOURS		
SL. NO.	YEAR	SEMESTER		TOTAL
		1	2	
1.	First Year	28	28	**56**
2.	Second Year	28	27	**55**
3.	Third Year	27	29	**56**
4.	Final Year	25	23	**48**
TOTAL				**215**

ANNEXURE

Natural Science (NSC) : 4 Courses		
1.	AS101	Mathematics – 1
2.	AS102	Mathematics – 2
3.	AS103	Physics
4.	AS104	Chemistry

Engineering Science (ESC) : 6 Courses		
1	EX101	Electrical and Electronic Engineering
2	CV101	Applied Mechanics
3	ME101	Engineering Graphics
4	IT101	Computer Programming

Program Core (PC) : 5 Courses		
1.	CH201	Environmental Science
2.	AS201	Applied Mathematics
3.	ET201	System Engineering
4.	IT201	Engineering Informatics
5.	ME201	Material Engineering

Discipline Core (DC) : 13 Courses	
CS201	Data and File Structures
CS202	Digital Electronics and Microprocessors
CS211	Discrete Structure and Graph Theory
CS212	Database Management Systems
CS301	Operating System
CS302	Computer Organization & Architecture
CS303	Theory of Computation
CS304	Computer Graphics & Gaming
CS321	Design and Analysis of Algorithm
CS322	Compiler Design
CS323	Computer Networks
CS401	Software Testing
CS431	Human Computer Interaction

Department Elective (DE) : 6 Courses	
CS411	Operating System Design
CS412	Wireless and Mobile Network
CS413	Information Retrieval
CS441	Distributed System
CS442	Ubiquitous Systems
CS443	Cloud & Virtualization

Open Elective (OE) : 4 Courses		
Sl. No.	Course Code	Course
1	IT311	Cryptography and System Security
2	IT331	Cyber Security
3	IT421	Ethical Hacking & Cyber Laws
4	IT451	Digital Forensics
5	CS311	Descriptive Analytics
6	CS331	Predictive Analytics
7	CS421	Big Data Analytics
8	CS451	Practitioner's Approach for Data Analytics
9	CS312	Artificial Intelligence and Neural Networks
10	CS332	Machine Learning
11	CS422	Deep Learning
12	CS452	Pattern Recognition

Open Elective (OE) :Term – I			
(List of courses for Academic Year 2018-19)			
Chemical			
1	CH311	Process Modeling and Simulation.	
2	CH312	Piping Engineering	
Civil			
3	CV311	Construction Planning & Management	
Computer			
4	CS311	Descriptive Analytics	
5	CS312	Artificial Intelligence and Neural Networks	
Electronics			
6	EX311	Fundamentals of Robotics	
E & TC			
7	ET311	Embedded System Programming (ESP)	
8	ET312	IoT Architecture and Sensors	
IT			
9	IT311	Cryptography & System Security	
Mechanical			
10	ME311	Geometric Modeling & Design	
11	ME312	Fundamentals of Robotics	
12	ME313	Work Process Assessment	

Open Elective (OE) :Term - II			
(List of courses for Academic Year 2018-19)			
Chemical			
1	CH331	Process Engineering.	
2	CH332	Piping Layout	
Civil			
3	CV331	Operation Research	
Computer			
4	CS331	Predictive Analysis	
5	CS332	Machine Learning	
Electronics			
6	EX331	Kinematics and Dynamics of Robotics	
E & TC			
7	ET331	Embedded Processor	
8	ET332	IoT Networks & Protocols	
IT			
9	IT331	Cyber Security	
Mechanical			
10	ME331	Finite Element Analysis	
11	ME332	Kinematics & Dynamics of Robots	
12	ME333	Facility Planning & Design	

Open Elective (OE) :Term - I		
(List of courses for Academic Year 2019-20)		
Chemical		
1	CH421	Process Optimization
2	CH422	Piping Design & Engineering
Civil		
3	CV421	Financial Management
Computer		
4	CS421	Big Data Analytics
5	CS422	Deep Learning
Electronics		
6	EX421	Robotics Vision and Control
E & TC		
7	ET421	Low-Power SoC Architecture & Applications (SoC&A)
8	ET422	Privacy and Security in IoT
IT		
9	IT421	Ethical Hacking & Cyber Laws
Mechanical		
10	ME421	Computational Fluid Dynamics
11	ME422	Robotics Vision and Control
12	ME423	Operations Management

Open Elective (OE) :Term - II (List of courses for Academic Year 2019-20)		
Chemical		
1	CH451	Process Intensification & Integration
2	CH452	Pipeline Engineering
Civil		
3	CV451	Visualization and Information Exchange
Computer		
4	CS451	Practitioner's approach for Data analytics
5	CS452	Pattern Recognition
Electronics		
6	EX451	Intelligent and High-Performance Robotics
E & TC		
7	ET451	Real-Time Embedded System (RES)
8	ET452	Energy Management for IoT Devices
IT		
9	IT451	Digital Forensics
Mechanical		
10	ME451	Advanced Analysis
11	ME452	Intelligent and High Performance Robotics
12	ME453	Supply Chain Management

Humanities and Social Science (HSS) : 9 Courses		
Sl. No.	**Course**	
1.	HP101	Language & Communication – I
2.	HP102	Language & Communication – II
3.	HP201	Psychology
4.	HP301	Project Management
5.	HP302	Professional Skills
6.	HP303	Basics of Entrepreneurship
7.	HP401	Engineering Economics
8	HP402	Sociology
9	HP403	Business Strategies

Skill Development and Project (SDP) : 9 Courses		
Sl. No.	**Course Code**	**Course**
1.	ME102	Engineering Tools and Techniques
2.	ME103	Design Thinking
3.	ET206	Prototyping
4.	CS213	Minor Project
5.	CS30#	Skill development Lab.
6.	CS324	Mini Project
7.	CS40#	Adv Skill development Lab
8.	CS405	Project – I
9.	CS432	Project – II

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

First Year

Bachelor of Technology

2016-2020

(With Effect from Academic Year: 2016-2017)

CURRICULUM STRUCTURE (2016 - 2020)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F	:	2016-2017
FIRST YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE	:	01/06/2016
	REVISION NO.	:	0.0

SEMESTER: I

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P/T*	CREDIT
1.	NSC1	AS 101	Mathematics -1	4	1	5
2.	NSC2	AS 102/ AS 103	Physics/Chemistry	3	2	4
3.	ESC1	EX 101/ CV 101	Electrical & Electronics Engg/Applied Mechanics	3	2	4
4.	ESC2	ME 101/ IT 101	Engineering Graphics/Computer programming.	2	4	4
5.	HSS1	HP 101	Language &Communication -1	1	2	2
6.	SDP1	ME 102/ ME 103	Experimental Tools &Techniques/Design Thinking	--	4	2
TOTAL				13	15	21

SEMESTER:II

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P/T*	CREDIT
1.	NSC3	AS 104	Mathematics -2	4	1	5
2.	NSC4	AS 103/ AS 102	Chemistry/ Physics	3	2	4
3.	ESC3	CV 101/ EX 101	Applied Mechanics/ Electrical & Electronics Engg	3	2	4
4.	ESC4	IT 101/ ME 101	Computer programming/ Engineering Graphics	2	4	4
5.	HSS2	HP 102	Language &Communication -2	1	2	2
6.	SDP2	ME 103/ ME 102	Design Thinking/ Experimental Tools &Techniques	--	4	2
TOTAL				13	15	21

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY		**COURSE NAME**	Mathematics I
		COURSE CODE	AS101
		COURSE CREDITS	5
RELEASED DATE : 01/06/2016		**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
4	1	40	50	10	25	Nil	125

PRE-REQUISITE : Basic elementary Mathematics of XI & XII

COURSE OBJECTIVES :

AS101.CEO.1:To recall and apply the methods of solving system of equations using matrices.

AS101.CEO.2:To find nth derivative and expansion of different functions.

AS101.CEO.3:To classify and solve first order ordinary differential equations.

AS101.CEO.4:To categorize and inspect the applications of first order differential equations.

AS101.CEO.5:To apply the concepts of partial differentiation.

AS101.CEO.6:To demonstrate an understanding towards the applications of partial differentiation.

COURSE OUTCOMES :

The students after completion of the course will be able to,

AS101.CO.1:Inspect system of equations using matrices. [L4]

AS101.CO.2:Illustrate problems based on nth derivative and expansion of functions. [L2]

AS101.CO.3:Solve first order ordinary differential equations. [L3]

AS101.CO.4:Analyze simple real world phenomenon governed by first order ordinary differential equations. [L4]

AS101.CO.5:Infer the problems based on properties of partial differentiation. [L2]

AS101.CO.6:Examine the applications of partial differentiation. [L4]

THEORY		
UNIT 1	**Matrices**	**12 HOURS**
Rank, Solutions of system of linear equations: Homogeneous and Non Homogeneous systems,Linear dependence and independence of vectors, Eigen Values and Eigen vectors, Cayley Hamilton Theorem		
UNIT 2	**Successive Differentiation**	**8 HOURS**
Finding nth derivative of functions, Leibnitz theorem for finding nth derivative, Taylors and Maclaurins theorem for expansion of functions .		
UNIT 3	**First order ordinary differential equations**	**10 HOURS**
Exact differential equations, Differential equations reducible to exact by finding integrating factors, linear differential equations, Differential equations reducible to linear form .		
UNIT 4	**Applications of ftrst order ordinary differential equation**	**10 HOURS**
Newtons law of cooling, Electrical circuits, rectilinear motion, one dimensional heat conduction, Chemical applications- Mixing problems .		
UNIT 5	**Partial Differentiation**	**8 HOURS**
Partial Differentiation: Introduction, Chain rule, Total derivative and differential, Homogeneous functions, Eulers Theorem, Differentiation of Implicit functions.		
UNIT 6	**Applications of Partial Differentiation**	**8 HOURS**
Jacobian, properties of Jacobian, Jacobian of Implicit functions, Finding partial derivative using Jacobians, Functional dependence, maxima and minima of functions of two variables.		

TUTORIAL	
TUTORIAL NO.01	**1 HOURS**
Rank, System of Linear equations: Homogeneous and Non Homogeneous systems.	
TUTORIAL NO.02	**1 HOURS**
Linear Dependence and Independence of vectors, Eigen Values and Eigen vectors, Cayley Hamilton Theorem.	
TUTORIAL NO.03	**1 HOURS**
Finding nth derivative of functions, Leibnitz theorem for finding nth derivative.	
TUTORIAL NO.04	**1 HOURS**
Expansion of functions using Taylors and Maclaurins theorems.	
TUTORIAL NO.05	**1 HOURS**
Finding solutions to exact differential equations, Differential equations reducible to exact by finding integrating factors	
TUTORIAL NO.06	**1 HOURS**
Linear differential equations,Differential equations reducible to linear.	
TUTORIAL NO.07	**1 HOURS**
Newtons law of cooling, Kirchoffs law of electrical circuits, rectilinear motion	
TUTORIAL NO.08	**1 HOURS**
One dimensional heat conduction, Chemical applications Mixing Problems	
TUTORIAL NO.09	**1 HOURS**
Examples on Partial Differentiation and Chain rule,Total derivative and differential	
TUTORIAL NO.10	**1 HOURS**
Examples on Eulers Theorem, Differentiation of an implicit function	
TUTORIAL NO.11	**1 HOURS**
Examples on Jacobian, properties of Jacobian, Functional dependence	
TUTORIAL NO.12	**1 HOURS**
Examples on Functional dependence,Maxima and minima of functions of two variables	

TEXT BOOK

1. Higher Engineering Mathematics by Dr. B.V. Ramana; Tata McGraw Hill, ISBN: 978-0-07-063419-2
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications, 39th edition, ISBN: 81-7409- 195-5

REFERENCE BOOK

1. Thomas Calculus by G.B. Thomas, Maurice D. Weir, Joel R. Hass (ISBN:9789332519091, Pearson Education, 12th edition)
2. Advanced Engineering Mathematics by Erwin Kreyszig(ISBN-13: 9788126554232, Wiley Eastern Ltd., 10th edition)
3. Advanced Engineering Mathematics by R.K. Jain& S.R.K. Iyengar (ISBN No.: 8173194203, Narosa Publishing house)
4. Advanced Engineering Mathematics by Peter V. ONeil (ISBN-13: 9788131503102, Cenage Learning, 7th Edition)
5. Advanced Engineering Mathematics by Dennis G. Zill& Warren S.Wright (ISBN-10: 0-7637-7966-0, ISBN 13: 978-0-7637-7966-5, Jones and Bartlett Publishers, 4th edition)

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Physics
	COURSE CODE	AS102
	COURSE CREDITS	4
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	40	50	10	25	NIL	125

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

AS102.CEO.1:To make students identify the basic concept of measurements and to formulate problems in physical and mathematical terms.(L3).

AS102.CEO.2:To analyze and understand the behavior of light as a wave and get acquaint with different applications in Physics.(L4).

AS102.CEO.3:To apply the concept of behavior of light and understand the polarization phenom-ena.(L3) .

AS102.CEO.4:To classify and understand the difference of classical mechanics and quantum mechan-ics.(L2).

AS102.CEO.5:To derive the basic laws governing the motion of quantum particles.(L4).

AS102.CEO.6:To apply the concept of quantum mechanics to different applications and supplement the reasoning vis--vis understanding of different branches of Physics.(L3).

COURSE OUTCOMES :

The students after completion of the course will be able to,

AS102.CO.1:Evaluate the importance of order of all physical quantities and compare the order of size of different objects.(L5).

AS102.CO.2:Apply the theoretical knowledge of optics to understand the physics behind engineering applications.(L3).

AS102.CO.3:Apply that light is transverse in nature. (L3) .

AS102.CO.4:Demonstrate the necessity of quantum mechanics and the distinction between the domains of classical and quantum mechanics.(L2).

AS102.CO.5:Evaluate and apply the Schrdingers equation to the motion of an electron orbiting round the shell.(L5) .

AS102.CO.6:Apply the concepts of Quantum Physics in different branches of engineering.(L3)
.

THEORY

UNIT 1	**Measurement and importance of span (order) of physical quantities**	**7 HOURS**

Concept of (i)significant numbers, (ii) accuracy versus precision (iii)error versus uncertainty (iv)systematic error versus random error (v) quantifying the uncertainty. Least-count of an apparatus, Methods to measure least-count with specific examples of vernier-calipers, screw-gauge, travelling microscope and spectrometer. Span (orders of magnitude) of prominent physical parameters with specific examples of Gravitational constant(G), Speed of light(c),Planks constant(h), Boltzmann constant(k) and wavelengths of electromagnetic spectrum. Importance of the orders of G, c, h and k alongwith hypothetical picture of world in case of their order becomes unity (1). Length-scale and time-scale of specific physical phenomenon.

UNIT 2	**Optics (Interference and diffraction of Light)**	**7 HOURS**

Particle nature and wave-nature with examples of wave and particle behavior of light, Introduction to wave nature, Concept of thin film, Stokes law of phase-change on reflection from a thin film, Thin film interference, Coating of lenses as an application of thin film interference, Interference in films of uniform and non-uniform thickness (with derivation), Applications of thin-film interference, Newton Ring Experiment and its applications, Diffraction as a particular case of interference.

UNIT 3	**Polarization of Light**	**6 HOURS**

Polarization of light, Production and analysis of polarized light (Brewsters law, Law of Malus), Optical Activity, Specific Rotation due to optically active solutions, Application of Polarized light.

UNIT 4	Quantum Mechanics-I .	8 HOURS

Shortcomings or failure of Classical Mechanics with specific example of blackbody radiation, Plancks quantum law of blackbody radiation, Matter-waves, De-Broglies concept of matter waves, Heisenbergs Uncertainty Principle, Operators, Eigen values and Eigen functions, Expectation Values, Wave-function, Physical significance of wave function.

UNIT 5	Quantum Mechanics-II .	8 HOURS

Schrodingers equations, Time Dependent and Time Independent forms of Schrodinger Equations, Applications of Schrodinger Equation, Electron in an infinite potential well (rigid box), Electron in a finite deep potential well (non-rigid box) and concept of quantum mechanical tunneling, Application of electron in a potential well in case of Bohrs atomic model.

UNIT 6	Applications of Quantum Mechanics-LASER .	6 HOURS

Stimulated Emission of light and its comparison with spontaneous emission, Probabilities of stimulated absorption and emission of light (Einsteins coefficients), Principle and working of LASER with example, Application of LASER in optical fibre communication.

PRACTICALS		
PRACTICAL NO.01		**2 HOURS**
Determination of the mass of electron (me) upto specified significant numbers.		
PRACTICAL NO.02		**2 HOURS**
Determination of the refractive index of a given liquid using Newton Rings Experiment.		
PRACTICAL NO.03		**2 HOURS**
Determination of the line density of a diffraction grating using Laser.		
PRACTICAL NO.04		**2 HOURS**
Determination of the wavelength of Sodium light source using Michelson Interferometer.		
PRACTICAL NO.05		**2 HOURS**
Determination of the phase-difference between two given positions on the path of simple pendulum in periodic motion.		
PRACTICAL NO.06		**2 HOURS**
Verification of Bohrs atomic model using Frank and Hertz experiment.		
PRACTICAL NO.07		**2 HOURS**
Determination of the specific rotation of a sugar solution of a given concentration.		
PRACTICAL NO.08		**2 HOURS**
Determination of wavelength of a laser beam using Lloyds mirror arrangement.		
PRACTICAL NO.09		**2 HOURS**
Determination of Radius of Curvature of a given planoconvex lens using Newtons Rings apparatus.		
PRACTICAL NO.10		**2 HOURS**
Determination of wavelength of different colours present in a white light.		

TEXT BOOK

1. The Feynman Lectures on Physics: Volume-1-Richard. P. Feynman, R.B. Leighton, M.Sands,ISBN:978-81-85015-82-8.(Narosa Publisher)
2. The Feynman Lectures on Physics: Volume-3-Richard. P. Feynman, R.B. Leighton, M.Sands,ISBN:978-81-85015-84-2. (Narosa Publisher)

REFERENCE BOOK

1. Measurement and Instrumentation Principles: Alan S Morris, Butterworth Heinemann, ISBN 07506508184
2. AjoyGhatak ,Optics, Tata Mc Graw Hill Publishing Company. Ltd., 2nd Edition, ISBN- 0-07058583-0
3. Jenkins White, Fundamentals of Optics, Mc Graw Hill Science, ISBN-0070853460.
4. Arthur Beiser, Shobit Mahajan, S. Rai. Choudhary ,Concepts of Modern Physics-, Mc Graw Hill Education (India) Pvt. Ltd., 6th Edition, ISBN-10- 0070151555,
5. L. I. Schiff ,Quantum Mechanics, Tata Mc Graw Hill Education (India) Pvt. Ltd., 3rd Edition, ISBN-10- 0070856435, ISBN- 13- 9780070856431.
6. PAM Dirac,Principles of Quantum Mechanics Cbs publishers and Distributors, ISBN-10- 0195671074, ISBN- 13- 978019567107
7. D J Griffiths, Introduction to Quantum Mechanics, Pearson Prentice Hall Publishers.
8. Serway and Jewett, University Physics for Scientists and Engineers, Cengage Learning Publishers.
9. K. Thyagarajan and AjoyGhatak, Lasers: Fundamentals and applications, Springer, ISBN 9781441964410.
10. Worsnop and Flint; Advanced Practical Physics, Little Hampton book service Ltd., ISBN-10: 0423738909, ISBN-13: 978-0423738902.
11. Robert Eisberg and Robert Resnick; Quantum Mechanics: Of Atoms, Molecules, Solids, Nuclei and Particles; Wiley

	COURSE SYLLABI (2016 – 2020)
MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F** AY: 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME** Electrical & Electronics Engineering
	COURSE CODE EX101
	COURSE CREDITS 4
RELEASED DATE : 01/06/2016	**REVISION NO** 0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	40	50	10	25	Nil	125

PRE-REQUISITE :

COURSE OBJECTIVES :

EX101.CEO.1:To impart knowledge of energy scenario and use of renewable energy systems.

EX101.CEO.2:To explain the fundamentals of single-phase and three-phase systems.

EX101.CEO.3:To explain power supply components, electronic devices.

EX101.CEO.4:To summarize various Digital systems and application.

EX101.CEO.5:To build the knowledge of measuring system and signal conditioning circuits.

EX101.CEO.6:To get acquainted with different electrical machines.

COURSE OUTCOMES :

The students after completion of the course will be able to,

EX101.CO.1:Develop the Renewable energy system (PV) as per given specifications [L3]

EX101.CO.2:Illustrate behavior of single phase A.C. circuits and three phase A.C. circuits. [L2]

EX101.CO.3:Analyze analog circuit applications.[L3]

EX101.CO.4:Design Digital applications.[L5]

EX101.CO.5:the use of Instrumentation system in various fields.[L2]

EX101.CO.6:Identify electrical machines used in typical domestic and industrial sector based on application. [L2]

THEORY		
UNIT 1	**Energy Resources & Technology**	**6 HOURS**

Energy Scenario, Energy Resources, Basic concepts about thermal, hydro and nuclear power stations (block diagram approach only).Energy conversion from thermal and mechanical energy, Energy Conservation, Use of Energy Efficient Technologies, Application of Renewable Energy Systems, Battery technology, Introduction to power quality: Definition, causes, effects, Introduction to energy audit.

UNIT 2	**A.C. Circuits**	**7 HOURS**

A.C. fundamentals, RMS and average value, R-L,R-C,RLC series parallel circuits, phasor diagram, power and power factor. Three phase voltage generation and their waveforms, Star and delta balanced systems, Relationship between phase and line quantities, phasor diagram, power in a three phase circuits, Difference between neutral and ground conductors.

UNIT 3	**Power Supply and Electronics Devices**	**7 HOURS**

Rectifiers and Power Supplies, Elements of IC Regulated Power Supply. BJT - structure and operation, CE, CB, CC configurations, Transistor as a switch and Amplifier. MOSFET- structure (enhancement), operation and application as a switch. Opto-electronic devices Photo conductive cell, Photo Voltaic cell.

UNIT 4	**Digital Systems**	**7 HOURS**

Digital: Logic gates, Boolean algebra, SOP representation, Combinational circuit Design: Half Adder, Full Adder, MUX, DMUX, Comparator, Code converter, Decoder Sequential circuit: Flip-Flop, Registers and Synchronous & Asynchronous Counters. Microprocessor based systems, Embedded systems

UNIT 5	**Measuring System**	**6 HOURS**

Elements of measuring system, Sensors & Transducers Temperature, Flow, Pressure, IR, Speed & LVDT. Op-Amp IC 741 pin configuration, Op-amp parameters, Inverting, Non- Inverting & Differential configuration Applications: Summing & Difference amplifier, Comparator, Voltage follower.

UNIT 6	**Electrical Machines**	**7 HOURS**

Construction of Transformer, principle of operation, EMF equation. Construction, principle of operation and types of three-phase Induction motor and DC motor, PMDC, BLDC, servo motor, stepper motor, Universal motor, Application of Electrical Motors in domestic and Industrial sector.

PRACTICALS : Total 8 Experiments from two groups.		
PRACTICAL NO.01	**Kirchhoffs laws and Superposition theorem**	**2 HOURS**
To develop a circuit for Kirchhoffs laws and Superposition theorem. To build and test it.		
PRACTICAL NO.02	**Single Phase Energy (Watt-hour) measurement.**	**2 HOURS**
To measure energy and power factor. To examine improvement in the power factor. To estimate and compare energy consumption with energy meter.		
PRACTICAL NO.03	**R-L-C series A.C. circuit**	**2 HOURS**
To calculate exact values of R, L and C for lagging and leading power factor To find power losses in R, L and C.		
PRACTICAL NO.04	**Veriftcation of relation between Line and Phase quantities in Star and Delta circuits**	**2 HOURS**
To understand Line & Phase quantities and types of connection along with Three phase supply To connect Bulb load in Star connection and verify the relation. To connect Bulb load in Delta connection and verify the relation.		
PRACTICAL NO.05	**Open circuit & Short circuit test on a Single Phase transformer**	**2 HOURS**
To find iron loss and no load current To find full load copper loss and winding parameters To determine efficiency and regulation of transformer		
PRACTICAL NO.06	**Load test on D.C. Shunt Motor.**	**2 HOURS**
To find the torque and output power of motor To calculate the efficiency of motor.		
PRACTICAL NO.07	**Step angle control of Stepper motor.**	**2 HOURS**
To gain familiarity with the properties of stepper motors. To calculate the step angle of motor.		
PRACTICAL NO.08	**Speed control of BLDC/PMDC Motor.**	**2 HOURS**
To find the relation between voltage and speed of motor To develop any small application.		
PRACTICAL NO.09	**Electronics Components and Measuring instruments:**	**2 HOURS**
To study Passive components Resistors, Capacitors & Inductor. To test semiconducting components Diode, BJT To measure various electronic quantities using CRO, Function generator, DMM		
PRACTICAL NO.10	**DC Regulated Power Supply:**	**2 HOURS**
To design 12V IC based DC regulated power supply (Theoretically). To test and observe waveforms at various stages on CRO and measure the voltage using DMM.		
PRACTICAL NO.11	**BJT as a switch and Amplifter.**	**2 HOURS**
To adapt BJT as a switch On/Off the LED at the output by switching BJT. To adapt BJT as an Amplifier Measure voltages and observe waveforms at input and output of the single stage CE amplifier.		

PRACTICAL NO.12	Combinational Digital Circuits:	2 HOURS

To design and implement Half adder and Full adder (using Half adder). To design and implement 8:1 MUX using IC-74LS153 and verify its truth table.

PRACTICAL NO.13	Sequential Digital Circuits:	2 HOURS

To design and implement Half adder and Full adder (using Half adder). To design and implement 8:1 MUX using IC-74LS153 and verify its truth table.

PRACTICAL NO.14	OP-AMP Applications	2 HOURS

To verify operations of inverting and non-inverting amplifier for various gain factors. To verify application of OPAMP as summing and difference amplifier. To verify the application of OPAMP as voltage follower.

PRACTICAL NO.15	Sensors and Transducer	2 HOURS

To study and verify operation of LVDT. To study and verify the operation of Temperature sensors. (PT100, LM35)

PRACTICAL NO.16	Design and Simulate using MULTISIM(Minimum 2)	2 HOURS

To design a counter to display 2-digit Decimal Number (00 to 99) on 7-Segment Display. To design a Flashing LED Display for a specific Pattern using MUX. To design of Inverting/Non-Inverting Amplifier using Op-Amp IC-741 for a specific gain.

TEXT BOOK

1. B. H. Khan,Non-Conventional Energy Resources, Tata McGraw Hill, 2nd Edition, 2009, 978-0070142763.
2. Edward Hughes, Electrical and Electronic Technology Pearson India, 10th Edition, 2011, ISBN-978-8131733660
3. Neil Storey, Electronics A Systems Approach, Pearson Education Asia, 5th Edition,2013, ISBN-978-0273773276

REFERENCE BOOK

1.1. V. N. Mittle and ArvindMittal, Basic Electrical Engineering, McGraw Hill Education, 2ndEdition,2005,ISBN- 978-0070593572.
2. D. P. Kothari, I. J. Nagrath, Electric Machines, McGraw Hill, 4th Edition, 2010, 978-0070699670.
3. Thomas L. Floyd, Electronics Devices & Circuits, Pearson Education India, 5th Edition, 1998, 978-0136491385.
4. Paul Horowitz, Winfield Hill, The Art of Electronics, Cambridge University press, 3rd Edition, 978-0521809269.
5. Thomas E. Kissell, Industrial Electronics, Prentice Hall of India, 3rd Edition, 2003, 9788120322608

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY		**COURSE NAME**	Engineering Graphics
		COURSE CODE	ME101
		COURSE CREDITS	4
RELEASED DATE : 01/06/2016		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS						
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL	
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
2	4	40	50	10	50	Nil	150	

PRE-REQUISITE :

COURSE OBJECTIVES :

ME101.CEO.1:To impart knowledge about principles/methods related to projections of one, two and three-dimensional objects.

ME101.CEO.2:To develop & apply visualization skill to simple Objects.

ME101.CEO.3:To expose students to computer aided drafting tools.

COURSE OUTCOMES :

The students after completion of the course will be able to,

ME101.CO.1:Recall fundamentals of projections (L1)

ME101.CO.2:Interpret engineering drawings (L2)

ME101.CO.3:Apply visualization skill to draw various views of object (L3)

ME101.CO.4:Analyzeengineeringdrawings (L4)

ME101.CO.5:Decide annotations for two dimensional drawings (L5)

ME101.CO.6:Develop and/or comprehend a simple engineeringdrawing in both First and Third angle orthographic projections(L4)

THEORY		
UNIT 1	**Visual Thinking & Solid Geometry**	**5 HOURS**
Essentials of engineering graphics including technical sketching, Projection of Line, Plane, Solid.		
UNIT 2	**Orthographic Projections & Sectional Views**	**5 HOURS**
Reference Planes, Types of Orthographic Projections, Sectional Orthographic Projections, Sectional Views.		
UNIT 3	**Isometric Projections**	**5 HOURS**
Isometric View, Isometric Scale, Non-isometric Lines, construction of Isometric View from the given orthographic view and construction of isometric View of Pyramid, Cone, Sphere.		
UNIT 4	**Interpretation of given view/ missing view**	**5 HOURS**
Identification of lines/ edges and surfaces, visualization of given orthographic views, adding missing/ third view, adding a sectional view, to convert a given view into sectional view.		
UNIT 5	**Auxiliary Projections**	**4 HOURS**
Auxiliary Planes- Auxiliary Vertical Plane, Auxiliary Inclined Plane, Symmetrical Auxiliary View, Unilateral Auxiliary View, bilateral Auxiliary View.		
UNIT 6	**Freehand Sketching & Technical Drawing**	**4 HOURS**
Free hand sketching- FV & TV of standard machine part- Hexagonal headed nut and bolt, foundation bolts, shafts, keys, couplings, springs, screw thread forms, welded joints, riveted joints, nozzles.		

PRACTICALS : Each Assignment contains 2 questions.	
PRACTICAL NO.01	**10 HOURS**
Projection of Lines, Plane, Solids	
PRACTICAL NO.02	**8 HOURS**
Orthographic Projections, Missing Views	
PRACTICAL NO.03	**6 HOURS**
Isometric Projections	
PRACTICAL NO.04	**4 HOURS**
Auxiliary View	
PRACTICALS : Assignments to be drawn on modelling software package.	
PRACTICAL NO.05	**4 HOURS**
Absolute and Incremental drawing.	
PRACTICAL NO.06	**6 HOURS**
Draw commands, Modify commands, Array, fillet, offset commands	
PRACTICAL NO.07	**2 HOURS**
Project drafting	
PRACTICAL NO.08	**12 HOURS**
Sketching, Solid Modeling, Assembly	
PRACTICAL NO.09	**4 HOURS**
Project modeling	

TEXT BOOK

1. Dhanajay A. Jolhe, Engineering Drawing with an introduction to Auto CAD, TMH Publishing co Ltd, 5th Edition, 2012, (ISBN 13: 9780070648371)
2. Basant Agarwal and C M Agarwal, Engineering Drawing, TMH Publishing co Ltd, 2nd Edition 2013, (ISBN13: 978-1-259-06288-9)
3. K C John, Engineering Graphics for Degree, PHI learning pvt. Ltd. New Delhi,2009, (ISBN: 97881-203-3788-6)
4. R. K. Dhavan, A Text Book of Engineering Drawing, S Chand and co ltd., New Delhi India, 5Th Edition, 2012, ISBN 13: 9788121914314

REFERENCE BOOK

1. Luzadder, Warren J., Duff, John M, Fundamentals of Engineering, Prentice Hall of India,11th Edition, 2010, (ISBN: 978-81-203-0885-5)
2. Basudev Bhattacharya, Machine Drawing includes Autocad Supplements, Oxford University Press India, First Edition, 2011, (ISBN 13: 9780198070771)
3. K. Venugopal, Prabhu Raja V., Engineering Drawing and Graphics, New age Publications, First Edition, 2008, (ISBN: 978-81-224-2457-7)
4. N B Shaha and B C Rana, Engineering Drawing, Pearson Education, 2012, (ISBN: 9788131798058)

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY		**COURSE NAME**	Language and Communication 1
		COURSE CODE	HP101
		COURSE CREDITS	2
RELEASED DATE : 01/06/2016		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
1	2	30	35	10	25	Nil	100

PRE-REQUISITE : Basic proficiency in English at the higher secondary school level

COURSE OBJECTIVES :

HP101.CEO.1:To introduce a variety of English texts to the students.

HP101.CEO.2:To teach basic English grammar.

HP101.CEO.3:To guide the students to write in English coherently and formally.

HP101.CEO.4:To improve the students overall communicative competence in English through activities like group discussions and debates.

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP101.CO.1:Interpret texts written in English. [L2, L5]

HP101.CO.2:Apply English grammar rules correctly. [L3]

HP101.CO.3:Develop sentences and texts in English coherently and formally. [L3, L6]

HP101.CO.4:Demonstrate overall improvement in communication skills. [L 2]

THEORY		
UNIT 1	**Functional Grammar**	**4 HOURS**
Use of tenses in day to day communication and academic writing, Direct and Indirect Speeches, Active and Passive voices, Degrees of comparison, Use of the parts of speech in sentence composition, Verb forms and Modal auxiliaries		
UNIT 2	**Communication**	**8 HOURS**
Concept of communication, Types-verbal and non-verbal, principles of effective communication, barriers to communication, cross-cultural communication		
UNIT 3	**Academic Writing**	**6 HOURS**
Essentials of good writing, Review writing, Letter writing, Report writing, Prcis writing, and Essay writing		

PRACTICALS		
PRACTICAL NO.01	**Common Errors in Communicative English**	**6 HOURS**
A task of identifying and correcting the common errors in general as well as academic English by using audios and relevant academic texts; tips on punctuation.		
PRACTICAL NO.02	**Debate**	**4 HOURS**
Concept, Dos & Donts, Guidelines for participation and success, Expression of thoughts and ideas, body language and interpersonal & analytical skills		
PRACTICAL NO.03	**Group Discussion**	**4 HOURS**
Concept of GD, Criteria for evaluation, types of GD General, Creative and Technical, Dos & Donts, Guidelines for participation and success, Group Dynamics, Expression of thoughts and ideas, body language and interpersonal & analytical skills		
PRACTICAL NO.04	**Role Play**	**4 HOURS**
Role-play for verbal communication, team building and group dynamics, decision making, leadership, analytical and creative thinking, group presentation		
PRACTICAL NO.05	**Review and Letter Writing**	**4 HOURS**
How to write a review, characteristics and essentials of a good review, writing a review on a book or short story, types of letters- formal, informal; layout of business letters		
PRACTICAL NO.06	**Report Writing and Prcis Writing**	**4 HOURS**
Types of reports, format and writing a report, What is prcis writing? Rules of prcis writing		
PRACTICAL NO.07	**Essay Writing**	**2 HOURS**
What is an essay? Tips to write a good essay, Types of essays		

REFERENCE BOOK

1. 1. Michael Swan: Practical English Usage, Oxford, 3rd Edition, ISBN-13: 978-0194420983
2. Raymund Murphy: Essential Grammar in Use, Cambridge, 3rd Edition, ISBN-13: 9780521133890
3. William Sanborn Pfeiffer: Technical Communication A Practical Approach, 6th Edition, Pearson Education, ISBN-13: 978-8131700884
4. Dutt et.al. : A Course in Communication Skills, Foundation, 1st Edition
5. Lynch: Listening, Cambridge, 1st edition, ISBN- 0521707757
6. Malcom Goodale: Professional Presentations, Cambridge, ISBN- 8175962577
7. S. Aggarwal: Essential Communication Skills, Ane Books pvt. Ltd, ISBN- 8180522806
8. Jennings: Communication Basics, Cengage Learning, 1st edition, ISBN- 8131515206

MIT Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Experimental Tools and Techniques- I
	COURSE CODE	ME102
	COURSE CREDITS	2
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
-	4	-	-	30	-	20	50

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

ME102.CEO.1:To introduce different tools and study the various measurement techniques.

ME102.CEO.2:To study different parts of the system along with its functions and applications.

ME102.CEO.3:To list various tools used for the said application.

ME102.CEO.4:To identify the function of various parts of system.

ME102.CEO.5:To impart comprehensive knowledge for selection of appropriate techniques to the said application.

ME102.CEO.6:To apply the knowledge to find the solutions for basic engineering problems.

COURSE OUTCOMES :

The students after completion of the course will be able to,

ME102.CO.1:Recall the tools required for measurements. (L1)

ME102.CO.2:Summarize the applications of various engineering tools used. (L2)

ME102.CO.3:Identify the right tool for selected purpose. (L3)

ME102.CO.4:Inspect various parts of the system .(L4)

ME102.CO.5:Justify the most appropriate technique which can be compatible with the existing environment. (L5)

ME102.CO.6:Develop the system which will give appropriate solution to the identified problem. (L6)

PRACTICALS		
PRACTICAL NO.01	**Information Technology/Computer Engineering (Minimum 6 practicals from the following**	**12 HOURS**

1. Study and analysis of various components on the motherboard of a standard desktop computer.
2. Installation of various components like hard disk drive on the motherboard and check the system setup for verification.
3. Formatting the hard disk drive and installation of Windows and Linux operating system making the system dual boot
4. Study of various network components like switch, Router and configure the devices.
5. Crimping of Unshielded Twisted Pair cable. (Cat-6) 6. Study of TCP/IP Stack, and configure as well as develop a Local Area Network.
7. Configuration of Network Monitoring tool and checking the results
8. Installation of DHCP server and checking the results.
9. Installation of web server and checking the results.
10. Configuration of MS Access and Deploying Access 2007 Runtime-Based Solutions
11. Study and usage of Google Tools (creating Forms, Blog).
12. Using the Google form with add on, create a PDF file of the form.
13. Designing a static HTML page
14. Uploading the pages using FTP server on a web site
15. Deploy a simple web site using LAMP server creation of a web site using Google sites.

PRACTICAL NO.02	**Electronics Engineering (Minimum 6 practicals from the following**	**12 HOURS**

1. Basic electronics component and switches
2. PCB and Soldering Tools And Technique
3. Relay and application
4. Manufacturing of extension board/Spike Guard
5. Series and parallel connection of Electrical Load
6. Actuators and application (Electrical and Mechanical).
7. PCB Wizard
8. Proteus
9. Virtual Instrumentation.
10. Cathode Ray Oscilloscope
11. Power Supply

PRACTICAL NO.03	**Mechanical Engineering Laboratories (Minimum 6practicals from the following**	**12 HOURS**

1. Linear and angular measurements.
2. Types of mechanism and making any one mechanism containing four links using card board.
3. Open a household component and explain it with free hand sketches.
4. Draw the outline of the problem identified for project on software package.
5. Measurement of RPM of rotating machine using contact and non-contact type tachometer.
6. Measurement of transmission ratio in Belt drive, Chain drive, and Gear drive.
7. Measurement of Barometric pressure, introduction to pressure measuring devices like bourdon tube pressure gauge and manometer. Fabrication of simple type manometer.
8. Introduction to temperature measuring devices. Making and calibration of thermo couple and using it with temperature indicator.
9. Measurement of Relative humidity of air in the lab.
10. Measurement of hardness of Steel and Aluminum.
11. Measurement of stiffness of helical spring (compression or tension). Open IT
12. Mixer or kitchen machine/ Printer.
13. Refrigerator/ Window Air Conditioner.
14. Boiler and accessories / thermal power plant (Mini).
15. Two stroke or four stroke engine.
16. Assembly and Disassembly of parts in any software package.
17. Introduction to threaded fasteners and joints using threaded fasteners.

PRACTICAL NO.04	**Chemical Engineering (Minimum 3 practicals from the following**	**06 HOURS**

1. Determination of specific gravity of liquid
2. Study of molecular diffusion
3. Liquid liquid extraction: Separation of one liquid component from the solution.
4. Solid-liquid separation from filtration
5. Membrane Separation process
6. Fuel from Plastic
7. Demonstration of mechanical operation models.
8. Production of Biodiesel
9. Open and Study Heat Exchangers.
10. Water purifier (Household)

PRACTICAL NO.05	**Civil Engineering (Mimimum 3 Practicals from the following)**	**06 HOURS**

1. To find the area and included angle of given plot and fix boundary from given plan.

2. To determine the level difference between 5 points with level tube and determine height of tower with trigonometry.

3. To draw the plan of given housing to a given scale.

4. To draw line diagram of household water supply line and sewage line with list of materials used.

5. To draw line diagram of rain water harvesting unit with all details and its importance.

6. To make report on daily water requirement in public building and its waste water disposal, and reuse.

7. To identify and make report on the earthquake resisting structural members of building and its role.

8. To demonstrate the lifesaving dos and donts during the different natural calamities.

9. To demonstrate the dos and donts after different natural calamities.

TEXT BOOK

1. Bruce Hallberg, Networking A Beginners Guide , 4th edition, Tata McGraw-Hill,2005, ISBN 0-07-060791-5
2. R.S. Khandpur, Printed Circuit Boards Design, Fabrication, Assembly and Testing, Tata McGraw-Hill Education, 2005, ISBN 0070588147, 9780070588141.
3. S R Dara, Engineering Chemistry, 5th edition, S.Chand , ISBN 81-219-0359-9

REFERENCE BOOK

1. Mackenzie L. Davis, Water and Wastewater Engineering, 13th edition, Tata McGraw- Hill, ISBN 978-1-25-906483-8
2. R. S. Khurmi, J. K. Gupta, Theory of Machines, 14th edition, S. Chand, ISBN 81-219-2524-X
3. Philip Wankat, Seperation Process Engineering , 3rd edition, Pearson, ISBN 978-93-325-2484-2
4. N.V. Ragvendra, L. Krishnamurthy, Engineering Metrology and Measurements, Oxford University Press, ISBN 978-0-19-808549-2.
5. Dr. Vinod Hosur, Earthquake- Resistant Design of Building Structures, Wiley, ISBN 978-81265-3859-1
6. M. S. Shetty, Concrete Technology, S. Chand, 2008, ISBN 9788121900034.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 – 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Mathematics II
	COURSE CODE	AS104
	COURSE CREDITS	5
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
4	1	40	50	10	25	Nil	125

PRE-REQUISITE : Basic elementary Mathematics of XI & XII, Mathematics I

COURSE OBJECTIVES :

AS104.CEO.1:To identify different methods to evaluate integrals.

AS104.CEO.2:To classify and solve linear differential equations of higher order

AS104.CEO.3:To demonstrate an understanding towards evaluating multiple integrals.

AS104.CEO.4:To relate and examine the applications of multiple integrals.

AS104.CEO.5:Analyse different probability distribution functions.

AS104.CEO.6:To study different statistical methods for solving problems

COURSE OUTCOMES :

The students after completion of the course will be able to,

AS104.CO.1:Distnguish different methods to evaluate integrals.(L4)

AS104.CO.2:Conclude solutions for higher order lineardifferential equations(L4)

AS104.CO.3:Evaluate the multiple integrals(L5)

AS104.CO.4:Apply the knowledge of multiple integrals wherever required(L3)

AS104.CO.5:Solve the probability distribution problems(L3)

AS104.CO.6:Assess statistical problems(L5)

THEORY COURSE CONTENT		
UNIT 1	**Integral Calculus**	**8 HOURS**
Reduction Formulae , Beta - Gamma functions and Differentiation under integral sign.		
UNIT 2	**Linear Differential Equations of higher order**	**8 HOURS**
General solution of Linear Differential equations with constant coefficients, Method of Variation of parameters, Equations reducible to Linear Differential equation with constant coefficients: Cauchy&Legendres linear differential equations		
UNIT 3	**Multiple Integrals**	**8 HOURS**
Tracing ofCurves: Cartesian curves, Polar curves, Parametric curves ,Double Integration, Evaluation of Double Integration, Change of order of integration, Integration by transforming Cartesian to Polar Coordinate system, Triple integration, Integration by transforming to spherical and cylindrical polar coordinates		
UNIT 4	**Applications of Multiple Integrals**	**8 HOURS**
Applications of multiple integrals to find Area, Volume, Centre of Gravity, and Moment of Inertia		
UNIT 5	**Probability**	**8 HOURS**
Probability, probability density function, probability distribution:Binomial, Poisson, Normal .		
UNIT 6	**Statistics**	**8 HOURS**
Measures of central tendency, standard deviation, coefficient of variation, moments, skewness and kurtosis, correlation(Karl Pearsons coefficient of correlation) and regression.		

TUTORIAL		
TUTORIAL NO.01		**1 HOURS**
Examples on Reduction Formulae, Beta and Gamma functions. Examples on Differentiation under integral sign		
TUTORIAL NO.02		**1 HOURS**
General solution of Linear Differential equations with constant coefficients , Method of Variation of parameters.		
TUTORIAL NO.03		**1 HOURS**
Equations reducible to Linear Differential equation with constant coefficients: Cauchy- Euler equations		
TUTORIAL NO.04		**1 HOURS**
Tracing of Cartesian curves .Tracing of Polar and Parametric curves .Double Integration, Evaluation of Double Integration, Change the order of integration.		
TUTORIAL NO.05		**1 HOURS**
Integration by transforming Cartesian to Polar Coordinate system, Triple integration,Integration by transforming to spherical and cylindrical polar coordinates.Applications of multiple integrals:To find Area, Volume		
TUTORIAL NO.06		**1 HOURS**
Applications of multiple integrals: To find Centre of Gravity of an arc, plane lamina and a solid.		
TUTORIAL NO.07		**1 HOURS**
Applications of multiple integrals: To find Moment of Inertia about an arc, plane and solid		
TUTORIAL NO.08		**1 HOURS**
Probability, probability density function, Probability distribution:Binomial		
TUTORIAL NO.09		**1 HOURS**
Probabilitydistribution :Poisson, Normal. Measures of central tendency, standard deviation, coefficient of variation		
TUTORIAL NO.10		**1 HOURS**
Moments, skewness and kurtosis,correlation and regression.		

TEXT BOOK

1. Higher Engineering Mathematics by Dr. B.V. Ramana; Tata McGraw Hill, ISBN: 978-0-07-063419-2
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications, 39th edition, ISBN: 81-7409- 195-5

REFERENCE BOOK

1. Calculus by G.B. Thomas &R.L.Finney (ISBN:81-7758-325-5, Pearson Education, 9th edition)
2. Advanced Engineering Mathematics by Erwin Kreyszig, Volume I & II (ISBN-10: 8126543132, ISBN-13: 978-8126543137, Wiley Eastern Ltd.)
3. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar (ISBN No.: 8173194203, Narosa Publishing house)
4. Advanced Engineering Mathematics by Peter V. ONeil (ISBN-13: 9788131503102, Cenage Learning, 7th Edition)
5. Advanced Engineering Mathematics by Dennis G. Zill& Warren S. Wright; Jones and Bartlett Publishers, 4th edition, ISBN-10: 0-7637-7966-0, ISBN 13: 978-0-7637-7966-5.
6. Higher Engineering Mathematics by B.S. Grewal (ISBN:81-7409-195-5,Khanna Publications,39 th edition)
7. Applied statistics and probability for engineers fourth edition by Douglas C. montgomery , George C runger(ISBN No:978-81-265-2315-3 wiley)
8. Miller& Freunds Probability and statistics for engineers by richard A johnson, irwin-miller,johnfreund(ISBN no:978-93325-5041-4,Pearson)

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Chemistry
	COURSE CODE	AS103
	COURSE CREDITS	4
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	40	50	10	25	NIL	125

PRE-REQUISITE : Basic Chemistry of XI and XII

COURSE OBJECTIVES :

AS103.CEO.1:To summarize the basic chemistry and classic methods of analysis, which includes solution, concentrations and indicators.

AS103.CEO.2:To outline the technology involved in improving quality of water for its industrial use.

AS103.CEO.3:To illustrate the basic concepts of analytical techniques that facilitates rapid and reliable measurements.

AS103.CEO.4:To demonstrate the use of ultra violet visible spectroscopy as invaluable tools in synthetic chemistry.

AS103.CEO.5:To list and explain the principle & techniques of separation methods.

AS103.CEO.6:To define the basic aspects of advanced materials & their applications.

COURSE OUTCOMES :

On successful completion of the course the student will be able to

AS103.CO.1:Relate classic methods of analysis by preparing solutions of desired concentrations & carrying out quantitative analysis by volumetric methods. (L1)

AS103.CO.2::Identify different methodologies for water quality analysis for industrial application. (L3)

AS103.CO.3:Apply basic concepts of electro-analytical techniques for analysis of various chemical compounds and solutions. (L3)

AS103.CO.4:Extend the knowledge of calculating wavelength of absorption of various chemical compounds using UV-Visible spectroscopy. (L2)

AS103.CO.5:Outline the different methods for separation of mixtures of various chemical compounds.(L2)

AS103.CO.6:Categorize the different engineering materials and to solve engineering problems.(L4)

THEORY

UNIT 1	Instrumental volumetric analysis	7 HOURS

Introduction, methods of expressing concentrations (Self-study), primary and secondary standard solutions. Instrumental & non instrumental analysis principles & types; Types of Titrations based on reaction, AcidBase titrations: Indicatorstheory of indicators, acid base indicators, mixed and universal indicators; Titration curve for Strong acidStrong base type, Introduction to Weak acidStrong base, Strong acid-Weak base titration, Precipitation titration, Applications in quantitative analysis.

UNIT 2	Water treatment and effluent management	7 HOURS

Introduction to conventional water treatment: Complexometric titrations: Principle, EDTA titrations, choice of indicators, Hardness of water & Alkalinity of water, causes, types, numerical, internal methods of water softening, Advanced wastewater & water Treatment: i) filtration method: Carbon adsorption ii) ion-exchange method iii) membrane techniques: reverse osmosis and electro-dialysis & their applications in water purification.

UNIT 3	Electroanalytical Techniques	7 HOURS

Introduction to electrodes, pH metry: Standardization of pH meter, titration curve for the mixture of acids Vs strong base, differential plots, Conductometry: Introduction, Kohlrauschs law, measurement of conductance, Application of conductometer in Acid-Base titrations & Precipitation titrations. Potentiometry: Introduction, application in redox titrations example of Fe/Ce titration.

UNIT 4	Ultra Violet Spectroscopy	7 HOURS

Introduction, nature of UV, Beers law, absorption of UV radiation by organic molecule leading to different excitation, Terms used in UV Spectroscopy- Chromophore, Auxochrome, Bathochromic shift(Red shift), hypsochromic shift(Blue shift), hyperchromic and hypochromic effect. Instrumentation,Effect of conjugation on position of UV band. Calculation of max by Woodward and Fisher rules for dienes and enone systems, Applications of UV Spectroscopy- Determination of structure, Determination of stereo chemistry (Cis and trans)

UNIT 5	: Chromatography	6 HOURS

Introduction and classification of chromatographic methods, Theory, Principle, technique and applications of-Column Chromatography, Thin layer Chromatography, Paper Chromatography, Gas Chromatography. Applications of chromatographic techniques

UNIT 6	: Engineering Materials.	8 HOURS

Introduction to Material Sciences, Polymers: Introduction, Specialty polymers, Applications in electronic gadgets, housing & construction, automobiles etc. Biomaterials: Introduction, characteristics, examples, challenges, Carbon nano materials: Introduction, types & applications. Smart materials: Introduction, types, examples like piezo materials, shape memory, thermo responsive etc..

PRACTICAL		
PRACTICAL NO.01		**2 HOURS**
Preparation and Standardization of solutions		
PRACTICAL NO.02		**2 HOURS**
Estimation of ions from given solution by Redox titration		
PRACTICAL NO.03		**2 HOURS**
Determination of the total hardness of a given water sample by EDTA method		
PRACTICAL NO.04		**2 HOURS**
Adsorption: Removal of organic dyes by activated charcoal		
PRACTICAL NO.05		**2 HOURS**
Determination of the dissociation constant of a weak acid using pH meter		
PRACTICAL NO.06		**2 HOURS**
Conduct metric titrations		
PRACTICAL NO.07		**2 HOURS**
Verification of Beers law & colorimetric estimation		
PRACTICAL NO.08		**2 HOURS**
Determination of max of organic/ inorganic compound using UV-visible spectrophotometer		
PRACTICAL NO.09		**2 HOURS**
Separation of mixture of two organic compounds by Thin Layer Chromatography		
PRACTICAL NO.10		**2 HOURS**
Separation of two cations by paper chromatography		
PRACTICAL NO.11		**2 HOURS**
Separation & purification of chemical compounds by Gas chromatography		

TEXT BOOK

1. Jain & Jain, Engineering Chemistry, 15th Edition, Dhanpat Rai Publications company
2. S.M. Khopkar , Basic Concept of Analytical Chemistry,2nd edition, New Age Science Ltd ISBN-10: 1906574006 ISBN-13: 978- 1906574000
3. Dr. B. S. Chauhan , Engineering Chemistry, 3rd Edition, Laxmi Publications Pvt. Ltd.

REFERENCE BOOK

1. V.M.Parikh , Absorption Spectroscopy of Organic Molecules, Addison Wesley Longman Publishing Co, ISBN 10: 0201057085,ISBN 13: 9780201057089.
2. Skoog, Fundamentals of Analytical Chemistry, Cengage Learning, ISBN-13: 978-0495558286, ISBN-10: 0495558281
3. Willard, Merritt, Dean and Settle, Instrumental Methods of chemical analysis, 6th edition, Wadsworth Publishing Co. ISBN-10: 0534081428, ISBN-13: 978-0534081423.
4. Donald R. Askeland, Pradeep Fulay, W. J. Wright, The Science & Engineering of Materials, 6th Edition, Cengage Learning, 2010
5. O. P. Virmani & A. K. Narula , Applied Chemistry: Theory and Practice , New Age International Pvt. Ltd. Publishers, ISBN-10: 8122408141, ISBN-13: 978-8122408140

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY		**COURSE NAME**	Applied Mechanics
		COURSE CODE	CV101
		COURSE CREDITS	4
RELEASED DATE : 01/06/2016		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	40	50	10	25	Nil	125

PRE-REQUISITE : Physics and Mathematics of XI & XII

COURSE OBJECTIVES :

CV101.CEO.1:To classify force systems and explain the conditions of equilibrium.

CV101.CEO.2:To illustrate laws of friction.

CV101.CEO.3:To demonstrate the concepts of centroid and moment of inertia.

CV101.CEO.4:To describe kinematic parameters of motion.

CV101.CEO.5:To make use of laws of motion for kinetics.

CV101.CEO.6:To explain energy and momentum methods.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CV101.CO.1:Determine the resultant and support reactions.(L5)

CV101.CO.2:Analyze bodies involving frictional forces. (L4)

CV101.CO.3:Evaluate centroids of bodies and moment of inertia of sections. (L5)

CV101.CO.4:Identify the type of motion and its kinematic parameters. (L3)

CV101.CO.5:Analyze the motion under action of constant and variable forces. (L4)

CV101.CO.6:Apply energy and momentum methods for kinetics. (L3)

THEORY		
UNIT 1	**Fundamentals of statics**	**8 HOURS**

Basic concepts and fundamental principles, force, moment of a force, couple, resolution and composition of forces, Free body diagrams, equations of equilibrium, equilibrium of coplanar and non-coplanar force system, applications to jib crane, beams, and cables.

UNIT 2	**Friction**	**6 HOURS**

Introduction, types of friction, laws of friction, angle of friction, angle of repose, cone of friction, engineering applications - blocks and wedges, ladder friction, screw jack, pulley and belt drives, band brakes.

UNIT 3	**Properties of surfaces**	**6 HOURS**

Concept of Centroid and centre of gravity, centroids of composite 1D and 2D objects. Introduction to moment of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, MI of composite objects. Distributed loading, fluid pressure-application to dams and gates.

UNIT 4	**Kinematics**	**8 HOURS**

Basic concepts in kinematics, Motion with uniform and variable acceleration, Motion curves, Curvilinear Motion in Rectangular coordinates, path coordinates, polar coordinates. Kinematic Link and Kinematic Pair, Kinematic Chain, Mechanisms and its inversions, instantaneous centre of rotation, Kennedy's Theorem, Applications- slider and crank mechanism, Railway engine and its supporting flywheel motions, Linkage mechanism of excavator and its system.

UNIT 5	**Kinetics**	**6 HOURS**

Kinetics of rectilinear and circular motion of a particle acted upon by a constant and variable force system, Newtons second laws of Motion, Equations of motion, concept of dynamic equilibrium, and motion of connected bodies. Basic principles of vehicle dynamics, Forces acting on a vehicle, tire mechanics, Dynamics of linear and lateral motion.

UNIT 6	**Applications of Partial Differentiation**	**8 HOURS**

Work, power and energy, Principles of work and Energy,Motion under a ConservativeCentral Force. Application to Space Mechanics. Impulse, momentum, Principle of Impulse and Momentum, Collisions-elastic and plastic, Direct central impact, coefficients of restitution.Applications-vehicle collisions, sports viz. cricket, tennis, billiard.

PRACTICALS		
PRACTICAL NO.01	**Group 1] Basic principles/laws**	**2 HOURS**

1. To verify triangle law/ Lami's theorem
2. To verify polygon law of forces.
3. To verify law of moments.
4. To verify equilibrium of parallel forces. (Beam Reactions)
5. To verify equilibrium of concurrent forces in space.

PRACTICAL NO.02	**Group 2] Friction**	**2 HOURS**

1. To verify laws of friction.
2. To determine angle of repose for a given block and surface.
3. To determine static coefficient of friction for a block on horizontal plane.
4. To determine static coefficient of friction for a block on inclined plane.
5. To determine static coefficient of friction for flat belt and drum.

PRACTICAL NO.03	**Group 3] Centroid/centre of gravity**	**2 HOURS**

1. To determine centroid of irregular triangular lamina.
2. To determine centroid of polygonal lamina.
3. To determine centre of gravity of a wire bend.
4. To determine centroid of a composite lamina.
5. To find the shift of centroid after cutting some part of lamina.

PRACTICAL NO.04	**Group 4] Motion(Dynamics)**	**2 HOURS**

1. To study curvilinear motion of a particle.
2. To verify value of g using compound pendulum.
3. To determine coefficient of restitution.
4. To determine mass moment of inertia of a fly wheel.
5. To verify law of conservation of momentum.

PRACTICAL NO.05	**Group 5] Graphical Exercises**	**2 HOURS**

1. To determine resultant of concurrent forces.
2. To determine resultant of parallel/general forces.
3. To determine reactions for a simple beam.
4. To draw motion curves for given kinematics problem.
5. To determine relative velocity by graphical method.

Part B] Students will have to complete a task/activity after each practical which will be based on the theme of that group. (10 Hrs)

TEXT BOOK

1. A. Nelson "Engineering Mechanics: Statics and Dynamics", Tata McGraw-Hill Education, ISBN: 978-0-07-014614-3
2. R.C Hibbeler "Engineering Mechanics", Pearson Education, ISBN: 978-0136077909

REFERENCE BOOK

1. F. P. Beer and E. R. Johnston "Vector Mechanics for Engineers Vol.I and II", Tata Mc-Graw, ISBN: 978-0077402327
2. Ferdinand Singer, Harper and Row "Engineering Mechanics Statics and Dynamics", ISBN:0063506610
3. Manoj K Harbola "Engineering Mechanics", Cengage Learning, ISBN:8131509907

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Computer Programming
	COURSE CODE	IT101
	COURSE CREDITS	4
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
2	4	40	50	10	25	NIL	125

PRE-REQUISITE : Knowledge of computer system.

COURSE OBJECTIVES :

IT101.CEO.1:To define and summarize the basic terminologies used in computer programming.

IT101.CEO.2:To develop and demonstrate logic for a given problem using algorithms and Flowcharts.

IT101.CEO.3:To evaluate solutions for the given problem using problem solving tools.

IT101.CEO.4:To identify and analyze different control structures.

IT101.CEO.5:To understand and use of simple data structures using Python.

IT101.CEO.6:To demonstrate and understand different computer applications in engineering.

COURSE OUTCOMES :

The students after completion of the course will be able to,

IT101.CO.1:Analyze a problem and identify and define the computing requirements appropriate to its solution[L3][L4].

IT101.CO.2:Apply the knowledge and strategies for structuring code, dividing problems up into pieces that can be solved independently, then integrating the pieces into a whole to solve a large problem [L3].

IT101.CO.3:Analyze when to select the different types of data structures such as arrays and lists as a framework for solving a problem [L4].

IT101.CO.4:Design, correctly implement and document solutions to problems using Python [L6].

IT101.CO.5:Analyze and compare alternative solutions to computing problems [L2][L4]

IT101.CO.6:Adapt to new developments in the field of computer science [L6].

THEORY		
UNIT 1	**Problem Solving Concepts**	**6 HOURS**

General Problem Solving Concepts-types of problems, problem solving with computers, difficulties with problem solving, Problem solving concepts for the computer: Constants, Variables, Data types, operators, Expressions, Equations, Problem solving tools.Programming structure-Modules and their functions, Cohesion and Coupling, Local and Global Variables, Parameters, return values

UNIT 2	**Problem solving and Logic structure**	**8 HOURS**

Logic structures, Problem solving with sequential logic structure - The sequential logic structure, solution development. Problem Solving with Decisions decision logic structure, multiple Decision instructions, straight-through logic, positive logic, negative logic, logic conversion, Problem solving with loops and case logic structures.

UNIT 3	**Arrays, Strings and File Processing**	**8 HOURS**

One dimensional, multidimensional array,finding maximum number in a set, Partitioning of array, finding smallest element, searching an array for a range. String Handling Operations: Concatenation, Copy, Substring, Compare, Length, Case Change, and Reverse. File handling and file handling operations, File Handling Modes.

UNIT 4	**Programming Applications**	**6 HOURS**

Programming applications, Predictive analysis with examples, Graphics and animation, working with matrices, Graphics & Visualization, Differential Equation: Linear Differential Equations, Digital Signal Processing: Plotting different waveforms.

PRACTICALS	
PRACTICAL NO.01	**6 HOURS**

1. Find the result of all the arithmetic operations (Addition, Subtraction, Multiply, Division and modulo) in Python.
2. Show the distance in miles per gallon with respect user defined value in Python.
3. Find the kinetic energy of an object.

PRACTICAL NO.02	**6 HOURS**

1. Write a Python program for printing result of five subjects for five students.
2. Choose any value and find whether the number is even or odd.
3. Identify whether the number entered by user is prime or not.

PRACTICAL NO.03	**6 HOURS**

1. Solve the Fibonacci sequence using recursive function in Python.
2. Illustrate factorial of non-negative numbers in Python.
3. Build asterisk (*) graph in Python

PRACTICAL NO.04	**6 HOURS**

Electric circuits, Chemical applications- Mixing problems.

PRACTICAL NO.05	**6 HOURS**

1. Select the number from the entered list and find its position in Python (use Linear Search).
2. Select the number and find its position of in Python (use Binary search).
3. Choose cricket team of eleven players find the captain of the team (consider tallest person as a captain)

PRACTICAL NO.06	**6 HOURS**

1. Select a text file and count number of words, repeated words in a file.
2. Choose the words from the file, store in the list and sort the list is ascending order.
3. Create duplicate the file from an original file.

PRACTICAL NO.07	**6 HOURS**

1. Predict whether the entered string is palindrome or not.
2. Compare two strings and convert in opposite case in Python.
3. Select any two words and perform concatenation operation

PRACTICAL NO.08	**14 HOURS**

1. Create a simple picture in python using graphics package.
2. Construct 2D and 3D plotting the Objects.
3. Create Sine waveform, Cosine waveform, Square waveform, Saw-tooth waveform, using MATLAB and discrete the same.
4. Solve the matrix operations (Addition, Multiplication, and Transverse) in MATLAB.
5. Design an application to display student result using predictive analysis

TEXT BOOK

1.1. Problem Solving and Programming Concepts ,Maureen Sprankle , Pearson Publication, Seventh Edition, ISBN 81-317-0711-3.

2. How to think like a Computer Scientist, Learning with Python Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press ISBN: 0-9716775-0-6.

REFERENCE BOOK

1.1. Learning Python Mark Lutz Oreilly Publication 5th Edition ISBN-13: 978-1449355739.

2. A MATLAB Exercise Book LudmilaKuncheva, Cameron Gray, Perfect-bound Paperback, ISBN 9781291784794.

3. How to solve it by Computer, R.G.Dromey, First Edition, Pearson Publication, ISBN 978-81-315-0562-9.

4. Introduction To Computation And Programming Using Python "Guttag John V, PHI(2014), ISBN-13 : 978-8120348660.

<table>
<tr><td rowspan="3">MIT Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="3">COURSE SYLLABI
(2016 – 2020)</td></tr>
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MIT | Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Language and Communication 2
	COURSE CODE	HP102
	COURSE CREDITS	2
RELEASED DATE : 01/06/2016	**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
1	2	30	35	10	25	Nil	100

PRE-REQUISITE : Basic proficiency in English at the higher secondary school level; Language and Communication- 1

COURSE OBJECTIVES :

HP102.CEO.1:To familarise the students with sounds in English and introduce phonemic transcription.

HP102.CEO.2:CEO.2: To enrich the vocabulary of the students with AWL and NAWL.

HP102.CEO.3:To acquaint the students with public speaking, presentation and interview skills in English.

HP102.CEO.4:To develop the students reading and listening skills with the use of written audio and video texts.

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP102.CO.1:Recognise and reproduce the sounds in English effectively. [L1]

HP102.CO.2:Choose and employ appropriate words from AWL and NAWL in communication. [L1, L3]

HP102.CO.3:Express their ideas effectively and demonstrate skills in interpersonal communication. [L2, L3]

HP102.CO.4:Analyse and infer from written, audio and video texts. [L 2, L4]

THEORY		
UNIT 1	**Phonetics and Vocabulary**	**3 HOURS**
Phonemes in English and phonemic transcription; Essential academic vocabulary (Academic Word List and New Academic Word List); Dictionary Skills; Phrasal verbs and collocations		
UNIT 2	**Oral Communication**	**4 HOURS**
Public Speaking; Presentation Skills; Interview Skills and telephonic communication; Meetings (types, agenda and minutes)		
UNIT 3	**Active Listening and Reading with Comprehension**	**5 HOURS**
Concept and types of listening; Steps in listening with comprehension; Essentials of good listening; Concept and types of reading; Guidelines for reading with comprehension; Analytical reading		

PRACTICALS		
PRACTICAL NO.01	**Pronunciation and Phonemic Transcription**	**2 HOURS**
Identification of correct pronunciation of words by decoding phonemic scripts; writing phonemic transcriptions of the given words		
PRACTICAL NO.02	**Vocabulary Enrichment**	**2 HOURS**
Online exercises on AWL and NAWL using web-based applications; Dictionary Skills		
PRACTICAL NO.03	**Phrasal Verbs and Collocations**	**2 HOURS**
Use of phrasal verbs and collocations; reading literary pieces, essays to identify phrasal verbs in context; story-telling		
PRACTICAL NO.04	**Public Speaking**	**2 HOURS**
Attributes of a good public speaker; prepared and extemporaneous speech; Listening to and Reading famous speeches		
PRACTICAL NO.05	**: Presentations**	**2 HOURS**
Essentials of effective presentations; Data collection and compilation; Preparation of outlines; PPT and Prezi		
PRACTICAL NO.06	**Interview Skills and Telephonic Communication**	**2 HOURS**
Etiquettes of attending interviews; Preparation; Telephonic communication; Mock Interviews		
PRACTICAL NO.07	**Mock Meetings**	**2 HOURS**
Importance of effective interpersonal communication; working in teams; Mock Meetings		
PRACTICAL NO.08	**Active Listening**	**6 HOURS**
Active listening; Conversations, audio and video clips; Listening with comprehension		
PRACTICAL NO.09	**Reading with Comprehension**	**4 HOURS**
Techniques of reading- Intensive, Extensive, Skimming and Scanning; Reading Comprehensions		

REFERENCE BOOK

1. Michael Swan: Practical English Usage, Oxford, 3rd Edition, ISBN-13: 978-0194420983
2. Dutt et.al. : A Course in Communication Skills, Foundation, 1 edition
3. Peter Roach: English Phonetics and Phonology, 4th Edition, Cambridge, ISBN-0521149215
4. Lynch: Listening, Cambridge, 1st edition, ISBN- 0521707757
5. Malcom Goodale: Professional Presentations, Cambridge, ISBN- 8175962577
6. S. Aggarwal: Essential Communication Skills, Ane Books pvt. Ltd, ISBN- 8180522806
7. Jennings: Communication Basics, Cengage Learning, 1st edition, ISBN- 8131515206

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2016 - 2017
FIRST YEAR BACHELOR OF TECHNOLOGY		**COURSE NAME**	Design Thinking
		COURSE CODE	ME103
		COURSE CREDITS	2
RELEASED DATE : 01/06/2016		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
-	4	-	-	25	-	25	50

PRE-REQUISITE : -

COURSE OBJECTIVES :

ME103.CEO.1:Disseminate the philosophy of design thinking.

ME103.CEO.2:Impart the information regarding User centric approach.

ME103.CEO.3:Give exposure to information collection tools to clearly define user centric problem.

ME103.CEO.4:Enhancethinking in order to inspect diverse solutions.

ME103.CEO.5:Sensitize about the feasibility, desirability and viability criterias for selection of appropriate solution.

ME103.CEO.6:Educate about different types of prototyping.

COURSE OUTCOMES :

The students after completion of the course will be able to,

ME103.CO.1:Recall fundamental principles of design thinking (L1)

ME103.CO.2:Explain all the dimensions of user and his needs using design thinking approach (L2)

ME103.CO.3:Identify user centric problem by using information gathering techniques (L3)

ME103.CO.4:Compare multiple solutions through ideation process (L4)

ME103.CO.5:Justify most appropriate solution for defined user centric problem (L5)

ME103.CO.6:Develop the most optimum solution (L6)

SESSION		
SESSION 1		**2 HOURS**
Design thinking Methodology General Problem Statement, Random check list, mind mapping, Categorization of random check list.		
SESSION 2		**2 HOURS**
Brainstorming of problem areas, Research Methodology Information gathering Primary, Secondary Sources, data presentation, Preparation of survey forms		
SESSION 3		**2 HOURS**
SWOT analysis, drawing inferences, translation of inferences into design criteria, specific problem statement, Ideation free hand sketching drawing of cuboids, cylinders, simple form products (Isometric views) Ideation sketches, Ergonomic and aesthetic consideration in design		
SESSION 4		**2 HOURS**
Concept validation, evaluation and detailing, prototyping		

PROJECT		
PHASE NO.01		**4 HOURS**
General Problem Statement and problem background		
PHASE NO.02		**4 HOURS**
Research methodology		
PHASE NO.03		**4 HOURS**
Design Brief		
PHASE NO.04		**8 HOURS**
Ideation		
PHASE NO.05		**4 HOURS**
Concept Evaluation, Validation and Concept detailing		
PHASE NO.06		**8 HOURS**
Prototyping		
PHASE NO.07		**8 HOURS**
Report Writing		

TEXT BOOK

1. Engineering Design Process, Second Edition Yousef Haik and Tamer Shahin Publisher, Global Engineering. Cengage Learning. ISBN-13: 978-0-495-66814-5.

2. Product Design and Development, Kevin Otto and Kristin Wood, Product Design: Techniques in Reverse Engineering and New Product Development, Pearson Education Inc. ISBN-10: 0130212717.

3. Product Lifecycle Management, Grieves, Michael, McGraw-Hill, 2006. ISBN 0071452303.

4. Lateral Thinking: Creativity Step by Step Harper Perennial; Reissue edition (24 February 2015) (Perennial Library) Six Thinking Hats by Edward de Bono Paperback ISBN-10: 0060903252.

5. Design Methods, John Chris Jones., John Wiley & Sons, David Fulton Publishers, London,

Web references

1.www.designcouncil.org.uk

2.www.surveymonkey.com

3.http://en.red-dot.org

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Second Year

Bachelor of Technology in Computer Engineering

2016-2020

(With Effect from Academic Year: 2017-2018)

SCHOOLOF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F	:	2017- 18
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE	:	01/06/2017
	REVISION NO.	:	0.0

SEMESTER: III

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	PC1	CH201	Environmental Science	2	2	3
2.	PC2	AS202	Applied Mathematics	3	2	4
3.	PC3	ET201	System Engineering	3	2	4
4.	DC1	CS201	Data and File Structures	3	4	4
5.	DC2	CS202	Digital Electronics and Microprocessors	3	4	4
6.	SDP3	ET206	Prototyping	--	4	2
TOTAL				14	14	21

SEMESTER:IV

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	HSS3	HP201	Psychology	3	--	3
2.	PC4	IT201	Engineering Informatics	3	2	4
3.	PC5	ME201	Material Engineering	3	2	4
4.	DC3	CS211	Discrete Structure and Graph Theory	3	2	4
5.	DC4	CS212	Database Management Systems	3	2	4
6.	SDP4	CS213	Minor Project	--	4	2
TOTAL				15	12	21

Note: L: Lecture, P: Practical, T: Tutorial; *Applicable for FY BTech*

		COURSE SYLLABI
MIT Academy of Engineering (An Autonomous Institute Affiliated to SPPU)		**(2016 – 2020)**
SCHOOL OF CHEMICAL ENGINEERING	**W.E.F**	**AY:** 2016 - 2017
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTR ENGINEERING	**COURSE NAME**	Environmental Science
	COURSE CODE	CH201
	COURSE CREDITS	4
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	20	40	15	-	50	125

PRE-REQUISITE : AS103: Chemistry

COURSE OBJECTIVES :

CH201.CEO.1:Give an overview of exploitation of various natural resources and its impact on the environment.

CH201.CEO.2:Understand the ecosystem and biodiversity.

CH201.CEO.3:Understand the importance of environment and its conservation.

CH201.CEO.4:Learn about the environmental pollution sources, effects and control measures.

CH201.CEO.5:Make aware of the national and international issue for the environment.

CH201.CEO.6:Make aware about the social and environmental responsibility.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CH201.CO.1:Identify the various human activities adversely affecting the natural resources and the balance ecosystem.

CH201.CO.2:Observe the various aspects of ecosystems and suggest ways to protect them.

CH201.CO.3:Experiment the pollution of given locality and suggest steps to mitigate pollution.

CH201.CO.4:Record the sources of pollution and their controls.

CH201.CO.5:Compare laws and standards for pollution.

CH201.CO.6:Categorize the social and professional responsibility towards environment.

THEORY COURSE CONTENT		
UNIT 1	**Environment**	**5 HOURS**
Importance of environment, Biosphere, Structure and function of an ecosystem, ecological pyramids, effects of population growth on environment. Natural cycles: hydrologic, carbon, nitrogen, phosphorus and Sulphur cycle. Understanding carbon foot prints, Role of the environmental engineer. Need of environmental legislations and environmental Acts in India. Functions of central and state pollution control boards.		
UNIT 2	**Resources**	**4 HOURS**
Natural, conventional and non-conventional, Natural and manmade disasters on environment. Case studies on use and Impact of overutilization of natural resources: Food, forest, water, energy, land.		
UNIT 3	**Pollution**	**4 HOURS**
Structure and composition of atmosphere, Pollution, types of pollution, causes of pollution effects, control and prevention. Air, solid and water waste management Pollution prevention and control act.		
UNIT 4	**Pollution Impact**	**5 HOURS**
Case study on Nuclear Accidents; floods; land slid; climate change; air pollution in cities, water pollution; noise pollution. Case study on drought situation in Vidarbha-Marathwada.		
UNIT 5	**Social Issues**	**5 HOURS**
Case study on Plastic waste management, domestic waste issue, food problem in India & globally. Modernization of agriculture, traffic and pollution, e-waste disposal.		
UNIT 6	**Sustainable Development**	**5 HOURS**
Concept of sustainable development. Utilization and conservation of natural resources. Rainwater harvesting & Water management techniques. Role of an individual in environment protection. Energy audit, disaster management.		

PRACTICAL		
PRACTICAL NO.01	**Fukushima Japan Nuclear Accident**	**2 HOURS**
Details of the accident will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of accidents.		
PRACTICAL NO.02	**Malin Land Slide**	**2 HOURS**
Details of the accident will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of accidents.		
PRACTICAL NO.03	**Drought Situation in Vidarbha & Marathwada**	**2 HOURS**
Details of the drought situation will be discussed with the students. Students are supposed to write a case study report on the incident w. r. t. causes, effects & preventive measures to avoid such type of situations.		
PRACTICAL NO.04	**River water pollution case study**	**2 HOURS**
Details of the River pollution of Ganga, Indrayani etc. will be discussed with the students. Students are supposed to write a case study report on the various causes of river pollution, preventive measures to avoid this & water treatment methodologies forriver water treatment.		
PRACTICAL NO.05	**Project**	**16 HOURS**
General solutions of linear differential equations with constant coefficients, Method of variation of parameters.		

TEXT BOOKS

1. Rao C.S. Environmental Pollution Control Engineering, Wiley Eastern Publications. ISBN: 9780470217634.
2. Kamaraj. P & Arthanareeswari .M, Environmental Science Challenges and Changes, 4th Edition, Sudhandhira Publications, 2010.
3. Sharma. B.K. and Kaur, Environmental Chemistry, Goel Publishing House, Meerut, 1994 ISBN:8182830125.
4. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. ISBN-10: 1111988935 ISBN: 9781111988937
5. Metcalf Eddy Wastewater engineering: Treatment and reuse, McGraw Hill, ISBN: 007041878.

REFERENCE BOOKS

1. Garg, S.K and Garg, R., Ecological and Environmental Studies, Khanna Publishers, Delhi, 2006.ISBN: 9788174092182.

2. H. S. Peavy, D. R. Rowe, G. Tchobanoglous, Environmental Engineering, McGraw Hill, ISBN: 8428204470.

3. Helen Kavitha. P Principles of Environmental Science, Sci tech Publications, 2nd Edition, 2008. ISBN: 9780444430243.

4. Henry J.G. and Heinke G.W., Environmental Science and Engineering, 2nd Edition, Prentice Hall of India, New Delhi, 2004, ISBN: 978-0131206502.

5. Masters G.M., Introduction to Environmental Engineering and Science, 2nd Edition, Prentice Hall of India, New Delhi, 2004. ISBN: 0131481932 ISBN: 9780131481930.

SCHOOL OF ELECTRICAL ENGINEERING	**W.E.F**	**AY:** 2017 – 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	System Engineering
	COURSE CODE	ET201
	COURSE CREDITS	4
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**						
(HOURS/WEEK)		**THEORY**					**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**ICE**	**ECE**	**IA**	**PRACTICAL**		**DEMONSTRATION**	
3	2	30	50	20	NIL		25	125

PRE-REQUISITE :

1:ME102 Engineering Tools and Techniques

2:ME103 Design Thinking

COURSE OBJECTIVES :

ET201.CEO.1:To describe the rationale for using systems thinking for complex adaptive systems

ET201.CEO.2:To prioritize with stakeholders in a participatory way for research study

ET201.CEO.3:To design system engineering frame work

ET201.CEO.4:To apply system engineering tools

ET201.CEO.5:To evaluate the system

COURSE OUTCOMES :

The students after completion of the course will be able to,

ET201.CO.1:Explain the rationale for using systems thinking for complex adaptive systems.

ET201.CO.2:Analyze interaction with stakeholders in a participatory way for research study.

ET201.CO.3:Design System Engineering framework.

ET201.CO.4:Apply system engineering tools.

ET201.CO.5:Evaluate the system.

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Systems Thinking**	**4 HOURS**

Introduction to Systems Thinking and Understanding simple systems, Complex and Complex Adaptive Systems, Stakeholders and their engagement.

Further Reading : Case studies - Public health system, transportation system, solid waste management system.

UNIT 2	**System Dynamics Simulation**	**6 HOURS**

Standard test system conceptualization and mapping: an introduction to causal loop diagrams (Systems Thinking Diagrams; Influence Diagrams), principles of stock-and-flow diagrams, Application of stock and flow diagrams to engineering problems, Analysis using agent-based models, Application of systems thinking to policy decision making.

Further Reading : Case studies - Understand how to use Vensim PLE / Netlogo (Free academic version) to develop causal loop diagrams. Application of Stock and Flow Diagrams to public Health.

UNIT 3	**Introduction to Systems Engineering**	**8 HOURS**

History and definitions, mission of system, types of system, system and its environment, System as a product, Systems Engineering as a profession, System Engineering Process and Management, Life cycle Integration.

Further Reading: Case studies - London Walkie-Scorchie Skyscraper, BRT system,
garbage collection, Unmanned aerial vehicle, Washing machine etc.

UNIT 4	**System Engineering Design**	**8 HOURS**

System development process - Systems engineering method, Systems testing through out development. Requirement Engineering - Inputs, requirement types, purpose, Requirement analysis, requirement outputs. Case studies – Unmanned Aerial System. Functional Analysis - Schematic, Functional block diagram. Design Synthesis - Process, Product realization, Product implementation, Product Integration, Product verification, product validation, product transition.

Further Reading: Development approaches – Waterfall, incremental spiral, evolutionary acquisition.

UNIT 5	**System Engineering Tools**	**8 HOURS**

Context diagrams, QFD (Quality function deployment), House of quality, Timeline analysis sheet and requirement allocation sheet, Functional flow diagrams, Design synthesis tools- Concept description sheet (CDS), Functional matrix diagram, Requirement break down structure, N2 diagrams, data flow diagrams, control flow diagrams, behavioral diagrams.

Further Reading: Popular System life cycle models (DoDMIL STD 499B, IEEE 1220 SEP, EIA 632 SEP, ISO/IEC15288, Professional Engineering model, NASA model, software life cycle models).

UNIT 6	**Partial Differential equations.**	**7 HOURS**

Verifying and validating the system, managing the configuration of the system, managing technical risk, project management, ILS (Integrated logistic support).

Further Reading: Case studies - Aircraft system.

PRACTICAL	
PRACTICAL NO.01	**2 HOURS**

Community based causal mapping – Developing causal loop diagrams for health care using Vensim.

PRACTICAL NO.02	**2 HOURS**

Developing stock-and-flow diagrams for health care system using Vensim.

PRACTICAL NO.03	**2 HOURS**

(Any 02)

1. Unmanned aerial vehicle
2. Conduct some research into the London building known as the Walkie Scorchie. Identify what circumstances led to the building earning that unfortunate name and suggest which aspects of the systems engineering process may not have been followed correctly (at least as the issues have been reported in the media).The following links may assist in your investigations.

http://www.dezeen.com/2013/09/06/we-made-a-lot-of-mistakes-with-this-building-says-walkie-scorchie- architect-vinoly/

http://www.ibtimes.co.uk/walkie-scorchie-talkie-building-sunlight-london-reflects-504342.

3. Examine in detail the BRT of New Delhi,Identify what circumstances led to the failure of the system.
4. Garbage collection
5. Washing machine

PRACTICAL NO.04	**2 HOURS**

Determine the typical structure and contents of the system requirements specification (SyRS) for any one of the case study.

PRACTICAL NO.05	**2 HOURS**

Choose an example related to your own discipline and then list and describe three detailed design tools to come up with a satisfactory design for anyone of the case study.

PRACTICAL NO.06	**2 HOURS**

We want to modify our house (or from any one of the case studies) by for futuristic requirement to accommodate your children after marriage.Explain how accurate technical data on the house (as confirmed by PCA and FCA) supports this modification. Explain how the early design stages could have assisted with this modification if expandability/ future growth had been accounted for.

PRACTICAL NO.07	**2 HOURS**

Mini project based on society, science and technology problem clubbed with Field visit and presentation (Define problem, data collection, requirement analysis,functional analysis.Design solution, progressive presentation of solution and final presentation).

Note: The group of students should be from different program (Multidisciplinary group).

PRACTICAL NO.08		**2 HOURS**

Watch the movie The Pentagon wars and write a two page report to assess what aspects System Engineering went wrong. (https://www.youtube.com/watch?v=iDYpRhoZqBY) .

PRACTICAL NO.09		**2 HOURS**

Field visit / Industrial visit from system engineering point of view.

PRACTICAL NO.10		**2 HOURS**

Working model case study of Quad copter/ aero modeling from system engineering point of view.

TEXT BOOK

1. John D Sterman, "Business dynamics- Systems Thinking and modelling for a complex world", McGrawHill, ISBN: 007238915X.
2. Weinberg, G.M., An Introduction to General Systems Thinking, New York, NY: Dorset House Publishing, 2001, ISBN-13: 978-0932633491.
3. Alexander Kossiakoff, William N.Sweet, Systems Engineering: Principles and Practice, Wiley, 2009, ISBN-13: 978-8126524532.

TEXT BOOK

1. R. C. Dorf Dennis M Buede,The Engineering Design of systems, Wiley; 2nd edition, 2002, ISBN-13: 978-0070530393.
2. International Council of Systems Engineering, Systems Engineering Handbook, A guide for System Life Cycle Processes and Activities, version 3.2.1, January 2011.
3. Department of defense, systems engineering fundamentals, defense acquisition university press (Free e-book), https://www.scribd.com/document/321957824/SEFGuide-01-01.
4. Michael Ryschkewitsch, The Art and Science of Systems Engineering, (free e-book), https://www.nasa.gov/pdf/311198main-Art-and-Sci-of-SE-LONG-1-20-09.pdf
5. EIA 632 standard - www.psconsultech.com/yahoo-site-admin/assets/docs/EIA632.9212432.pdf
6. MIL standard - www.product-lifecycle-management.com/download/mil-std-499b-draft1993.pdf.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 – 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Data and File Structures
	COURSE CODE	CS201
	COURSE CREDITS	4
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	4	30	50	20	25	25	150

PRE-REQUISITE : 1. IT101 – Computer Programming

COURSE OBJECTIVES :

CS201.CEO.1:To illustrate fundamental data structures and their applications in programming and problem solving.

CS201.CEO.2:To build the ability to synthesize and analyze algorithms.

CS201.CEO.3:To identify appropriate data structure for the specified problem.

CS201.CEO.4:To analyze different sorting and searching algorithms.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS201.CO.1:Explain the concept of data structure.

CS201.CO.2:Develop efficient algorithm for a given problem.

CS201.CO.3:Choose effective data structures in approaching a problem solution.

CS201.CO.4:Make use of appropriate sorting and searching algorithm for a given application.

THEORY COURSE CONTENT		
UNIT 1	**Introduction To Data Structures**	**6 HOURS**

App/System/Case Study:

Social networking, Recommender system (Election Voting System, Slide puzzle game system)

Contents:

Introduction to Data Structures: Data object, Abstract Data Types (ADT), classification of data structure, time and space complexity, big-Oh notation, efficiency of algorithms, performance measures for data structures, Arrays: Representation of array, operations on arrays: Insertion, deletion, searching and traversing

Self-study: Fast transpose of sparse matrix

Further Reading: Array and database

UNIT 2	**Linked Lists**	**7 HOURS**

App/System/Case Study:

Process management in Linux, Polynomial and its operations (Account Management System, Shuffle and merging system for set of two integer sets)

Contents:

Linked lists: Representation of linked list, comparison of sequential and linked list organizations, singly linked lists and memory representation, operations of linked list (Insertion, Deletion, Concatenation, Copying, Traversing and Searching), doubly linked list, circular link list

Self-study: Garbage collection and link list

Further reading: Web indexing using linked list

UNIT 3	**Stacks And Queues**	**5 HOURS**

App/System/Case Study:

Expression conversion (infix, prefix, postfix), Expression evaluation, Josephus problem, CPU Scheduling, Queue simulation (Syntax checker system for matching braces, Maze solving system using Stack /Queue)

Contents:

Stacks: Stack as ADT, representation and implementation of stack using sequential and linked organization, operations on stack, recursion and stack Queues: Queue as ADT, representation and implementation of linear queue and circular queue using sequential and linked organization, double ended queue, multi queue and Priority queue.

Self-study: Role of stack in memory management

Further reading: Concurrent priority queues

UNIT 4	Trees	8 HOURS

App/System/Case Study:

Expression parsers and expression solvers, Data compression (Word frequency computation system, Players best scores system for online game)

Contents:

Trees: Introduction, representation of trees, operation on trees: creation, insertion, deletion, searching, traversal, searching. Transformation of trees into binary trees, Types of trees: Binary tree, complete binary tree, binary search tree, operations on binary search trees: creation, insertion, deletion. AVL trees, threaded binary trees, heap tree, B trees

Self-study: Optimal Binary Search Tree

Further reading: Optimal Binary Search Tree

UNIT 5	Graphs	5 HOURS

App/System/Case Study:

Communication networking, Road maps (Game path finding system, Web graph system)

Contents:

Graph: Introduction, types of graph, representation of graphs: adjacency matrix, adjacency list, BFS, DFS and traversal, spanning trees, shortest path algorithms, topological sorting

Self-study: Warshall's algorithm

Further reading: Page ranking

UNIT 6	Sorting, Searching And File Organization	8 HOURS

App/System/Case Study:

Lexical analyzer for numerical expressions (Merging two sorted files system, Employee leave management system, compression system for simple text files)

Contents:

Sorting (Quick sort, Heap sort), Searching: Linear Search, Binary Search, Comparison of sorting and searching,Hashing: hash function, hash table, collision resolution techniques Files: Introduction to file structures, file organizations: sequential, direct access, indexed sequential file organization and file processing operations.

Self-study: Selection sort

Further reading: Concurrent Hash Tables

PRACTICAL	
PRACTICAL NO.01	**4 HOURS**

Design and implement a program that will help a salesperson to keep track of customer records

PRACTICAL NO.02	**6 HOURS**

Design and develop a program for an institution having three departments Computer Engineering, Electronics and mechanical. The institute considers SSC, HSC and entry test marks for registering a student and calculate an aggregate based on a specific criteria. The program should find in which dept. a student should be registered, store its record and provide facility for adding other departments in the institute and changing admission criteria and provide a facility for retrieving a record of particular student.

PRACTICAL NO.03	**6 HOURS**

Design and develop Snake ladder game using appropriate data structure

PRACTICAL NO.04	**4 HOURS**

Design and implement a program to generate a computerized telephone directory for a cellular service consisting of name and cell phone number. Present the user with a menu that allows the user to search the directory for a specified record, insert a new record, delete an existing record, or print the entire phone list.

PRACTICAL NO.05	**4 HOURS**

Design and develop a program for implementing SCET database using suitable data structure to store the database record. Each database record contains the name of the city and coordinates of the city expressed as integer X and Y co-ordinates. Your database should allow records to be inserted, deleted by name or co-ordinates and search by name or co-ordinate, another operation that should be supported is to print all records within given distance of specified point.

PRACTICAL NO.06	**Mini Project**	**24 HOURS**

Mini project is to be carried out by providing facilities for insertion of new data, modification of data, deletion provision, provide facility for searching a particular data required by user using appropriate data structure.

TEXT BOOK

1. E. Horowitz S. Sahani, D. Mehta, "Fundamentals of Data Structures in C++" , Seventh Edition, Universities Press ,2008, ISBN-13: 978-8173716065.
2. T. Cormen, C Leiserson, R. Rivest, C Stein, "Introduction to Algorithms", MIT press,2009, ISBN-13: 978- 0262533058
3. Michael T. Goodrich, Roberto Tamassia, David M. Mount, "Data Structures and Algorithms in C++", John Wiley & Sons, ISBN-13: 978-0470383278

REFERENCE BOOK

1. Richard F. Gilberg, Behrouz A Forouzan, " Data structures- A pseudocode Approach with C++" Second edition , Cengagel earning, 2004, 9780534390808.
2. E. Horowitzs S. Sahani, S. Rajashekharan, "Fundametals of Computer Algorithm s", Universities Press, 2008,ISBN-13: 978-8 173716126
3. J. Tremblay, P. Sorenson, " An Introduction to data structures with applications", 2nd Edition, McGraw-Hill Edition, 1984, ISBN 9780070651579
4. A. Tharp, "File organization and processing", 2008, Willey India, ISBN: 9788126 518685
5. DebasisSamanta, " Classic Data Structures", Second Edition, TMH, 2009, ISBN-13: 978-8120337312

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 – 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Digital Electronics and Microprocessor
	COURSE CODE	CS202
	COURSE CREDITS	4
**RELEASED DATE : ** 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME	EVALUATION SCHEME :						
(HOURS/WEEK)		THEORY			PRACTICAL	PRESENTATION/	TOTAL
LECT URE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	4	30	50	20	25	25	150

PRE-REQUISITE : 1. EX101 –Electrical and Electronics Engineering

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COURSE OBJECTIVES :

CS202.CEO.1:To understand the functionality and design of Combinational and Sequential Circuits.

CS202.CEO.2:To understand and compare functionalities, properties and applicability of logic families

CS202.CEO.3:To learn the architecture and programmer's model of microprocessor 80386.

CS202.CEO.4:To acquaint the learner with instruction set and logic to build assembly language programs.

CS202.CEO.5:To acquaint the architecture and Programmer's model of Microcontroller 8051.

COURSE OUTCOMES :

Students successfully completing the course will be able to,

CS202.CO.1:Design Combinational digital circuits as per the specifications. (Apply)

CS202.CO.2:Design Sequential digital circuits as per the specifications. (Apply)

CS202.CO.3:Apply the knowledge to select the logic families IC packages as per the design specifications. (Apply)

CS202.CO.4:Explain the architecture of the microprocessor 80386. (Understand)

CS202.CO.5:Develop assembly language programs using 32/64 bit registers. (Apply)

CS202.CO.6:Explain the architecture of the Microcontroller 8051. (Understand).

THEORY COURSE CONTENTS		
UNIT 1	**Combinational Logic and Sequential logic**	**6 HOURS**

Application/ Case Study/ System:

Programmable Logic Devices, Field Programmable Gate Array

Contents:

Reduction techniques: K-Maps up to 4 variables and Quine-McClusky technique Flip- flop: SR, JK, D, T; Preset Clear, Master and Slave Flip Flops their truth tables and excitation tables, Shift Registers, Counters: Asynchronous counter (Ripple Counter), UP/DOWN Counters, Modulus of the counter, Synchronous counter Design

Self-Study: Asynchronous Sequential Circuits

Further Reading: Synchronous Sequential Circuit Design(Moore Machines and Mealy Machines)

UNIT 2	**Logic Families**	**4 HOURS**

Application/ Case Study/ System:

Mini Computers and Mainframe processor

Contents:

TTL, CMOS Logic, Interfacing CMOS and TTL

Self-study: RTL, DTL

Further Reading: DCTL

UNIT 3	**Basic Architecture Of 80386 Processor**	**8 HOURS**

Application/ Case Study/ System:

Future Generation Processors, Mobile Computers

Contents:

History of Microprocessor, 80386 Architecture,Memory Organization and Segmentation- Global Descriptor Table, Local Descriptor Table, Interrupt Descriptor Table, Data Types, Registers, Instruction Format, Operand Selection, Addressing modes

Self-study: Architecture of 80486

Further Reading: Architecture of Pentium processor

UNIT 4	**Assembly Language Programming**	**6 HOURS**

Application/ Case Study/ System:

Device Drivers, NASM

Contents:

Instruction Set- Data Movement Instructions, Binary Arithmetic Instructions, Decimal Arithmetic Instructions, Logical Instructions, Control Transfer Instructions, String Instructions, Flag Control Instructions, Segment Register Instructions

Self - Study: Assembly instruction for 80486

Further Reading: Use of assembly language instruction for embedded application.

UNIT 5	Memory Management, Protection And Multitasking In 80386 Processor	6 HOURS

Application/ Case Study/ System:

Pentium Processors: Memories

Contents:

Memory Management- Segment Translation, Page Translation, Combining Segment and Page Translation. Protection- Need of Protection, Overview of 80386DX Protection Mechanisms, Multitasking- Task State Segment, TSS Descriptor, Task Register, Task Gate Descriptor, Task Switching, Task Linking, Task Address Space

Self-Study: Memory organization of 80486.

Further reading: Memory organization and segmentation of Intel processor.

UNIT 6	Microcontroller	6 HOURS

Application/ Case Study/ System:

Obstacle Avoidance Robotic Vehicle Project, Patient health monitoring system with location details by GPS, Electronic Voting Machines and Digital Sensor based Temperature Control

Contents:

Microcontroller 8051: Features, architecture, Pin description, Programming model– Special Function Registers, addressing modes, instruction set, Timers and Counters, serial communication, Interrupts, Interfacing with ADC

Self-Study: Interfacing with DAC

Further reading: Applications of Microcontroller in Industries

PRACTICAL:		
Practical NO.01		**4 HOURS**
Design and Analysis of Digital Circuit using Logic Circuit Simulator.		
Practical NO.02		**4 HOURS**
Design and Analysis of logic circuits that carry out addition of binary digits.		
Practical NO.03		**4 HOURS**
Conversion of flip- flops.		
Practical NO.04		**4 HOURS**
Realization of Boolean expression using multiplexer.		
Practical NO.05		**4 HOURS**
Up-down counter using JK flip-flop.		
Practical NO.06		**4 HOURS**
Use of Data transfer and Arithmetic instructions in Assembly Language Programming		
Practical NO.07		**24 HOURS**
Mini Project: Identify Basic gates, Derived gates and Universal gates for given application. Design of combinational and sequential circuits. Use of Flip Flops in the design of registers and memories. Use of various simulator software's like CPUsim, Retro2, Logisim. Use of Microcontrollers and embedded system in real time application.		

TEXT BOOKS

1. R. P. Jain, "Modern Digital Electronics", 4th Edition, Tata McGraw-Hill, 2010.
2. M Morris Mano "Digital Logic and Computer Design" 1/e Pearson, June 2016.
3. Intel 80386 Programmer's Reference Manual 1986, Intel Corporation, Order no.: 231630-011, December 1995.
4. Barry B. Brey, "The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 ... - Architec- ture, Programming, and Interfacing".
5. Muhammas Mazidi, Janice Mazidi and Rolin McKinlay, "The 8051 Microcontroller and Em- bedded Systems using Assembly and C", Pearson Educatio, ISBN-13::9788131758991

REFERENCE BOOKS

1. John M. Yarbrough, "Digital Logic applications and Design" Thomson
2. William H. Gothmann, "Digital Electronics: An Introduction to Theory and Practice" 2nd Edition, PHI publication
3. Walter A. Triebel, "The 80386, 80486, and Pentium Microprocessor: Hardware, Software and Interfacing"
4. Nilesh Bahadure," The 8086/8088, 80186/80286, 80386/80486 and the Pentium Family" Kindle Edition
5. Scott Mackenzie, Raphael C.W. Phan, "The 8051 Microcontroller", Prentice Hall India, ISBN-13:978- 0130195623

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 – 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Prototyping
	COURSE CODE	ET206
	COURSE CREDITS	02
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS						
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL	
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
-	4	-	-	-	-	75	75	

PRE-REQUISITE :

1. ME101 - Engineering Graphics
2. ME102 - Engineering Tools and Techniques
3. ME103 - Design Thinking
4. EX101 - Electrical and Electronics Engineering
5. CV101 - Applied Mechanics
6. IT101 - Computer Programming

COURSE OBJECTIVES :

ET206.CEO.1:Learn about materiality and techniques.

ET206.CEO.2:Justify the product development cycle through prototype project.

ET206.CEO.3:Inculcate implementation of skills by proper budget planning with effective troubleshooting and practices in aesthetics & ergonomics.

ET206.CEO.4:Develop abilities to transmit technical information clearly and test the same by delivery of presentation based on the prototype Project.

COURSE OUTCOMES :

The students after completion of the course will be able to,

ET206.CO.1:Consolidate the techniques, skills and modern engineering tools.
ET206.CO.2:Apply acquired skills to the construction of a prototype project.
ET206.CO.3:Develop a prototype project by performing tasks in team.
ET206.CO.4:Demonstrate the work carried out in a team.

PRACTICAL:

Course Introduction:

This course is aiming at a Project Based Learning methodology. Through a series of projects, students will learn to design, build, and debug engineering prototype systems. They will cover multiple aspects of the prototyping process.

Students will complete four modules in rotational manner,

1.Mechanical Prototyping (MP)

2.Electronic Prototyping (EP)

3.Software Prototyping(SP)

4.Civil Prototyping(CP)

Each module will have on an average six laboratory sessions. The students will complete them in rotational manner. Every module will award for 75 marks.

Marks of all four course modules will be averaged and if student secures passing marks (passing grade) after averaging; then the required credits of the course will be earned.

MODULE: 1/4	**Mechanical Prototyping (MP)**	**28 HOURS**
PRACTICAL:		

PRACTICAL NO. 01	**Introduction to prototyping**	**02 HOURS**

1.Introduction to Prototyping, traditional prototyping vs. advance rapid Prototyping, different types of prototyping techniques (clay modeling, casting, carpentry, metal art etc.) and their working principle.

2.Suitable materials and their properties.

3.Applications and need of prototype in emerging field like Bio - medicals, defense, manufacturing, aerospace etc.

4.Formation of a group of 5 students per project team.

PRACTICAL NO. 02	**Design of models**	**04 HOURS**

1.Introduction of CAD software and its interaction with prototype machine.

2.3D Modeling using CAD software package.

3.Identify physical constraints of prototyping

PRACTICAL NO. 03	Preprocessing of prototype	06 HOURS

1.Generating STL files from the 3D models & working on STL files.

2.Pre-Processing the 3D Model in KISslicer / Cuba software.

3.Suitable filament selection and its properties.

PRACTICAL NO. 04	Orientation and support generation	04 HOURS

1.Operate Repeater / Cuba software, Selection of Orientation, Supports generation.

2.Slicing pattern, tool path generation, G Code and gives input to prototype machine for actual part/object manufacturing.

PRACTICAL NO. 05	Assembly of model	08 HOURS

1.Complete machine setup.

2.Hands on experience of rapid prototype machine for part/object, assembly manufacturing.

3.Material selection, cost benefit analysis for prototyping, financial aspect.

PRACTICAL NO. 06	Project presentation	04 HOURS

1.Final Presentation and report submission (assessment).

REFERENCE BOOK

1.Rapid Prototyping: Principles and Applications in Manufacturing, Chua C K, Leong K F, Chu S L, World Scientific, ISBN-13: 978-9812778987.
2.Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, Gibson D W Rosen, Brent Stucker, Springer, ISBN: 978-1-4419-1119-3.
3.Rapid Prototyping: Principles and Applications in Manufacturing,Noorani R, John Wiley & Sons, ISBN: 978-0-471-73001-9.
4.Rapid Tooling: Technologies and Industrial Applications, Hilton P, Jacobs P F, CRC press. ISBN:978-0824787882
5.Rapid Prototyping and Engineering applications: A tool box for prototype development, Liou W L, Liou F W, CRC Press, ISBN: 978-0849334092.
6.Rapid Prototyping: Theory & practice, Kamrani A K, Nasr E A, Springer, ISBN: 978-0-387-23291-1.
7.Kenneth Cooper, Rapid Prototyping Technology: Selection and Application, Marcel Dekker, Inc. New York, ISBN: 082470261.

MODULE: 2/4	Electronic Prototyping (EP)	28 HOURS

PRACTICAL:		
PRACTICAL NO. 01	**Introduction to design and construction of electronic prototyping**	**02 HOURS**

1. Gain familiarity with basic stages; Conceptualization, Detailed Design and Implementation.

2. Acquire concepts of basic processes in electronic prototyping.

3. Form a group of students. (03 max)

4. Perform Brainstorming and develop a simple electronic product idea based on given pre-declared theme in given time span.

5. Develop a plan for construction of electronic proto from a concept.

PRACTICAL NO. 02	**Basic electronic prototyping skills**	**02 HOURS**

1. Soldering

- Demonstrate structure of solder wire, soldering temperature, soldering station and gun.
- Highlight Industrial safety norms, use of lead free solder, extractor fan etc.
- Use of flux, desoldering gun, desoldering techniques, removing components/wires.
- Fix Solder defects and inspect quality of solder joints.

2. Wiring

- Cleaning, stripping and tinning the wires.
- Connections and protections for wires.
- Using cable ties , heat shrink tubes, sleeves and other wire dressing techniques.

3. Breadboard

- Bending wires and making connections on breadboards.
- Placing components on breadboards.
- Testing circuits using breadboards.

4. Perfboards

- Wire connections and component assembly on perfborads.
- Debugging assembled circuit and increasing stability.

PRACTICAL NO. 03	**PCB design using basic Electronic Design Automation (EDA)tools**	**04 HOURS**

1.Gain familiarity with PCB Design software.

2.Draw schematics for PCB design.

3.Make PCB layout as per circuit diagram.

4.Learn PCB design standards.

5.Export PCB files like gerber (.gbr), .pdf etc.

PRACTICAL NO. 04	**PCB fabrication**	**08 HOURS**

1.Develop negative imprints of top and bottom sides and expose to PCB.

2.Perform etching process for PCB.

3.Perform cleaning and shearing for required size.

4.Check continuity of tracks.

5.Use drilling machine to make drills.

PRACTICAL NO. 05	**Assembly and testing of electronic proto**	**08 HOURS**

1.Make assembly of electronic prototype as per IPC 610 D.

2.Insert components, perform lead cutting with standard clearance.

3.Review mechanical fitment of PCB with component insertion.

4.Solder components and make wiring.

5.Test prototype for electrical functionality, to perform rework if required.

6.Assemble PCB with mechanical fitments and assemblies.

7.Analyze performance and compare with specifications.

PRACTICAL NO. 06	**Final project presentation**	**04 HOURS**

1.Demonstrate an electronic prototype in a team.

2.Write a report on implementation of prototype. (10-15 pages max)

3.Present prototype implementation in a team by Power Point presentation.

4.Enumerate proposed specifications of electronic prototype.

5.Highlight financial aspects including proposed cost and bill of material.

REFERENCE BOOK

1. Printed Circuit Boards: Design and Technology, Walter C. Bosshart, Tata McGraw-Hill Education, 1983, ISBN: 978-0074515495.
2. Electronic Assembly Fabrication, Charles A. Harper, 1st ed.,McGraw-Hill Education, 2002 ISBN: 978-0071378826.
3. Soldering in Electronics Assembly, Frank Riley, 1st ed., Springer, 2013, ISBN: 978-3-662-13163-3.
4. Electronic Techniques: Shop Practices and Construction, R. S. Villanucci, A. W. Avtgis, W.F. Megow, 6th ed., Practice-Hall, 1999. ISBN: 978-0130195661.
5. Printed Circuit Boards: Design, Fabrication, and Assembly, R. S. Khandpur, 1st ed. McGraw-Hill Education, 2005, ISBN: 978-0071464208.
6. Practical Electronics for Inventors, Paul Scherz , Simon Monk ,3rd Edition, McGraw-Hill Education, 2013, ISBN 978-0071771337 (Available on TAB edition, Kindle)
7. IPC-J-STD-001E-2010, Requirements for Soldered Electrical and Electronic Assemblies, IPC. , ISBN: 9781580986922.
8. IPC-A-610 D-2014, Acceptability of Electronic Assemblies, IPC. ISBN: 9781611931549.

MODULE: 3/4	Software Prototyping (SP)	28 HOURS
PRACTICAL:		

PRACTICAL NO. 01	Introduction to software engineering	04 HOURS

Concepts, Software development life cycle (SDLC). Student need to use AEIOU Framework (Design Thinking) to decide the problem statement. Students will work in group of three on AEIOU framework

PRACTICAL NO. 02	Design UML Diagrams for given problem statement	04 HOURS

Students have to work in group on Project Development canvas and then design following,

1. Creation of data Flow diagram

2. Creation of block diagram

3. Design a Activity Diagram

PRACTICAL NO. 03	Requirement analysis	04 HOURS

1. Find the requirement specification of given problem statement and formulate the feasible solution.

2. Paper (low-fidelity) prototype: choose the interface intend to develop, giving the reasons (pros and cons) and describing it summarily - choose the similar interface, indicating its key characteristics.

PRACTICAL NO. 04	**Design analysis**	**06 HOURS**

1. Make an Inspiration board.

2. Start an inspiration board by listing 5-10 words that relate to your design idea or point of view. These words can be anything – from similar designs to feelings that the idea evokes.

3. Once you've listed your words, come up with at least five inspirations, and share them by providing links or images within your assignment submission. For each inspiration, give a brief (1-2 sentences) and insightful explanation of why you chose it (What did you take away from it? What did you learn from it. In other words, why did it inspire you?). Each of these inspirations should offer a different perspective to the design you are working on.

PRACTICAL NO. 05	**Design analysis**	**06 HOURS**

1. Create Storyboards

2. A storyboard is a comic-strip-like set of drawings about what interface does and how it is used to accomplish tasks in a real usage scenario. A good storyboard should clearly demonstrate who the user is, the usage situation, and the user's motivations for using the interface. It should show what the user can accomplish with interface, but it needn't (and often shouldn't) show a specific user interface design. For a storyboard including an app screen, the details of the screen are not relevant, but what those screens enable you to accomplish is. Each storyboard should comprise 5-8 panels and will provide all details of end product.

PRACTICAL NO. 06	**Presentation**	**04 HOURS**

1. Each group will be given 10 min to present their work.

REFERENCE BOOK

1. Software Engineering A practitioner's Approach, Roger S, Pressman, 7th Edition, ISBN: 978–0–07–337597–7
2. Effective prototyping for software Makers, Jonathan Arnowitz, MIchaleArent by, ACM Digital Library,ISBN-13:978-0120885688
3. Rapid prototyping: Principles and applications in manufacturing, Chua, C. K., Leong, K. F. (1997). New York: Wiley, ISBN: 978-9812778987.
4. Fab - The coming revolution on your desktop - from personal computer to personal fabrication, Gershenfeld, N. (2005). New York: Basic Books. ISBN:978-0465027453
5. Rapid prototyping: Principles and applications, Noorani, R. (2006). Hoboken, NJ: Wiley.ISBN: 978-0-471-73001-9.
6. Rapid manufacturing: The technologies and applications of rapid prototyping and rapid tooling, Pham D. T.,Dimov S. S. (2001). New York: Springer. .ISBN: 978-1447111825
7. Digital design and manufacturing: CAD/CAM applications in architecture and design, Schodek D., Bechthold M., Griggs K., Kao K. M., Steinberg M. (2005). Hoboken, NJ: Wiley , ISBN: 978-0471456360

MODULE: 4/4	Civil Prototyping (CP))	28 HOURS

PRACTICAL:

PRACTICAL NO. 01	Introduction to civil prototyping	04 HOURS

Introduction of bamboo as a construction material, its physical, mechanical properties, selection, seasoning and treatment, testing, joinery, case studies of bamboo buildings.

PRACTICAL NO. 02	Analysis of determinant trusses.	04 HOURS

Study of different types of trusses, analysis of determinant trusses by method of joint and method of section

PRACTICAL NO. 03	Design bamboo trusses	04 HOURS

Design of different bamboo trusses (span more than 3m), Hands on for different types of joinery, axial and angular joints by different methods

PRACTICAL NO. 04	Making bamboo truss	08 HOURS

Making of bamboo truss

PRACTICAL NO. 05	Testing bamboo truss	04 HOURS

Testing of different bamboo truss

PRACTICAL NO. 06	Final project presentation	04 HOURS
Comparative study of analytical and test results of forces in truss members, final project presentation.		

REFERENCE BOOK

1. Vector mechanics for Engineers: statics and dynamics by Beer Johnston 10th edition, McGraw Hill Education , ISBN: 978-0073398242
2. Bamboo Architecture Design (Architecture Materials), by Chris van Uffelen, , ISBN: 978-3037681824
3. Designing and Building with Bamboo ,Jules J.A. Janssen Technical University of Eindhoven Eindhoven, The Netherlands, ISBN 978-8186247464
4. Codes and standards

   ISO 1902:1993.Code of Practice for preservation of bamboo and cane for non-structural purposes.

   ISO 6874:1973 Methods of test for round bamboos

   ISO 7344:1974 Specification for bamboo tent bamboos.

   ISO 8242:1976 Methods of tests for split bamboos

   ISO 8295 (Part 1): 1976 Specification for bamboo chicks

   ISO 22157 Standard guidelines for tensile, compressive, shear and bending Strength Parallel to grain and Perpendicular to grain.

REFERENCE

1. Paris Agreement(http://unfccc.int/paris $_a greement/items/9485.php$)
2. Kyoto Protocol(http://unfccc.int/kyoto$_p rotocol/items/2830.php$)
3. Green Building Objectives Checklist, Auroville Bamboo Centre, Pudducherry, Tamil-nadu.(http://aurovillebamboocentre.org/)

MIT	ACADEMY of Engineering	COURSE SYLLABI
	(An autonomous Institute Affiliated to SPPU)	(2016 – 2020)

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	W.E.F	AY: 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY	COURSE NAME	Psychology
All Branches	COURSE CODE	HP201
	COURSE CREDITS	2
RELEASED DATE : 01/06/2017	REVISION NO	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
2	NIL	20	40	15	NIL	NIL	75

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

HP201.CEO.1:To introduce the basic concept and scope of Organizational Behavior.

HP201.CEO.2:To teach the theory of personality and its implications in the organization.

HP201.CEO.3:To evince types and styles of Leadership and the impact of values on the same.

HP201.CEO.4:To guide learners through a decision making process.

HP201.CEO.5:To enhance participants skills when practicing team work concepts through business games.

HP201.CEO.6:To introduce the concept of Motivation and constructive ways of coping.

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP201.CO.1:Explain human behavior in the workplace from an individual, group, and Organizational perspective.

HP201.CO.2:Develop an ability to analyze ones own personality and that of others in Organizations.

HP201.CO.3:Compare different leadership styles with an understanding of how core values affect Leadership.

HP201.CO.4:Demonstrate decision making ability

HP201.CO.5:Identify the problems associated with organizing and managing teams.

HP201.CO.6:Comprehend the correlation amongst stress, motivation and personality.

THEORY		
UNIT 1	**Organizational Behaviour**	**6 HOURS**
Meaning of Psychology and Organizational Behaviour, Psychology in Organization: History of Organizational Psychology; Scope and Research in Organizational Behaviour, Structure of Organization, Organizational culture, Strong vs Weak culture, Culture vs Formalization.		
UNIT 2	**Perception and Decision Making**	**6 HOURS**
Meaning, process and determinants of Perception, Process of Decision Making, The link between Perception and Individual Decision Making, Influences on Decision Making: Individual Differences & Organizational constraints, Process and ethics of decision making.		
UNIT 3	**Personality, Values and Leadership**	**6 HOURS**
What is Personality, The Big Five Personality Model, The importance of values; values and ethical behavior, Leadership, Understanding Personality, values and Leadership, Emotional Intelligence-Personal and Social Competence.		
UNIT 4	**Understanding Team Work and Conflict Resolution**	**6 HOURS**
Difference between groups and teams, Types of teams, Turning Individuals into Team players, Team building and Team based work, Team dynamics, Types of conflict and conflict resolution.		
UNIT 5	**Motivation & Stress**	**4 HOURS**
Motivation and its types, Content and Process Theories of Motivation, Concept and reactions to stress, Potential effects of stress, Coping with and managing stress.		

TEXT BOOK

1.S. P. Robbins, Organizational Behavior Prentice-Hall India, 1995, ISBN-11:81-203-2875-2.

2.F. Luthans, Organizational Behavior. McGraw-Hill, 1995, ISBN-13: 0072873876.

3.U. Sekarn, Organizational Behavior: Text and Cases, Tata McGraw Hill, 1996, ISBN: 0074603663.

4.Furnham, The Psychology of Behavior at Work, Psychology Press, 1997, ISBN: 1841695041 .

REFERENCE BOOK

1.M. D. Dunnett, Handbook of Industrial-Organizational Psychology, Jaico Press, 1990, ISBN: 978089106-041-3.

2.M. A. - Ansari, Managing people at work: Leadership styles and influence strategies, Sage, 1990, ISBN: 0803996500.

3.J. B. P. Sinha, Work Culture in Indian Context, Sage, 1990, ISBN: 0019-5286.

4.D.M. Pestonjee, Stress and Coping: The Indian Experience, 2nd ed., Sage Publications, 1999, ISBN: 0761993126.

5.L. N. Jewell & M. Siegall, Contemporary Industrial/Organizational Psychology, West Publishing Company, 1990, ISBN: 0314715991.

6.D. Katz and-R. L. Kahn, The Social Psychology of Organizations, Wiley, 1966, ISBN: 978-0-471-023553.

7.M.L. Blum, and J.C. Naylor, Industrial Psychology, CBS Publishers & Distributors, 1984, ISBN: 8123908601.

8.K. H. Blanchard and P. Hersey, Management of Organizational Behavior: Utilizing Human Resources, Prentice-Hall India, 1993, ISBN: 0-13-5512868-9.

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Engineering Informatics
		COURSE CODE	IT201
		COURSE CREDITS	4
RELEASED DATE : 01/06/2017		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**						
(HOURS/WEEK)		**THEORY**			**PRACTICAL/**	**PRESENTATION/**	**TOTAL**	
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**		
3	2	30	50	20	30	20	150	

PRE-REQUISITE : IT101 – Computer Programming, ME102 – Engineering Tools and Techniques

COURSE OBJECTIVES :

IT201.CEO.1:To introduce facts, concept and theory of an information system.

IT201.CEO.2:To understand evolution of an information system.

IT201.CEO.3:To explain an information life cycle.

IT201.CEO.4:To develop IoT based information system.

COURSE OUTCOMES :

The students after completion of the course will be able to,

IT201.CO.1:Interpretation of Data, Information and Knowledge. [Apply]

IT201.CO.2:Make use of data acquisition techniques for an information system. [Apply]

IT201.CO.3:Categories different storage techniques. [Analyze]

IT201.CO.4:Develop dashboard for effective communication of information. [Apply]

IT201.CO.5:Determine components of Human computer interaction. [Evaluate]

IT201.CO.6:Design IoT based information system. [Analyze].

THEORY COURSE CONTENT		
UNIT 1	**Evolution Of Information**	**6 HOURS**
Data, Types of Data: Primary data, Secondary data, Meta data, Operational data and Derived data Information: Life Cycle, Semantics of information, Knowledge Data forms: Analog and Digital (Telephone and Stenography) ADC, DAC Evolution of Information- Man Machine Interaction Self-Study: Grade Sheet Generation system **Further Reading:** Railway reservation, Inventory machine		
UNIT 2	**Information Generation**	**6 HOURS**
Data Acquisition, Human interface, Hardware Interface: Input / Output devices Data Transformation: Rearranging, Classifying, Calculating, Summarizing; Self-Study: Weather forecasting System **Further Reading:** Data Acquisition Applications		
UNIT 3	**Information Storage And Transmission**	**4 HOURS**
Case Study: Dial up, Broadband Need of data storage, Types of storage: stand alone, centralized, distributed, and cloud. Encryption and decryption (define and need) Transmission Type, Synchronous, Asynchronous, Serial, Parallel, Satellite, radio **Self-Study:** Stand Alone and Disk storage **Further Reading:** Wireless–(Bluetooth, XBEE)		
UNIT 4	**Information Visualization**	**4 HOURS**
Representations: Graphs and Charts: Pi Chart, Scatter plot, Histogram, Heat map, Maps, Geo maps Case Study: Dynamic dashboard		
UNIT 5	**Human Computer Interface**	**4 HOURS**
Introduction of HCI, Types – mobile, stand-alone, computer etc, Interactive devices – touch screen, mic, keys, keyboard, scanner, camera etc., HCI design principles- standards, Usability principles – portability, scalability, GUI design and evaluation, Interactive Multimedia document search- image, audio, video, animation Case study: Ticket Generation Kiosk Self-Study: Web based systems interactivity **Further Reading:** Usable GUI Design		
UNIT 6	**Internet Of Things**	**4 HOURS**
IoT: Overview, Characteristics and Architecture Embedded Devices: Sensors, Actuators, Arduino and RaspberryPI IOT Ecosystem: Basic elements / building blocks of IOT application, Systematic method to design IOT application Applications: Asset management, Industrial automation, Smart cities **Self- Study:** IoT Essentials. **Further Reading:** IOT and big Data		

PRACTICAL		
PRACTICAL NO.01	**Data Acquisition , Storage and Retrieval Systems**	**8 HOURS**

In traditional manual information systems, the storage, retrieval, and update operations on elementary data item, records and files are handled manually. In the context of automation, design an information system that summarizes data while providing storage and retrieval facilities for offline analysis. This automated information system should follow:

Identification of an interdependent elementary data items which have facts and figures

Data collection through sensors

Processing using Arduino

Data Storage using MySQL in an accessible form

Data visualization using graphs

PRACTICAL NO.02	**Dashboard Design**	**8 HOURS**

Over the last year, the three locations of fast-food restaurant have produced mixed financial results. You have been asked to analyze the performance data from each location and identifying the causes of these results. For the same, design the dashboard to monitor key performance indicators for given system.

Create a graph showing how revenue evolves throughout the year for each of the sales channels

Create an interactive chart that can be used to switch between different sales channels.

Create three different views of the data: monthly sales revenue, sales revenue by category, and revenue by the top five distributors..

PRACTICAL NO.03	**IoT Application**	**8 HOURS**

Deploy an IoT based automation system for controlling home appliances such as fan, lights, water pumps, etc. using Raspberry Pi. Identify the home appliances that require human interaction for its operations and state the need of automation.

Identify system component

Design circuit diagram

Assemble system components

Program the interface

System Testing

System Deployment

TEXT BOOK

1. Ralph M Stair, George W Reynolds, "Fundamentals of Information Systems", Course Technology Inc; 5th edition, 2008, ISBN 978-1423925811.
2. Benny Raphael, Ian F. C. Smith, "Engineering Informatics: Fundamentals of Computer-Aided Engineering", Wiley-Blackwell; 2nd Revised edition, 2013, ISBN-13: 978-1119953418.
3. Paul Mcfedries, "Excel Data Analysis: Your Visual Blueprint for Analyzing Data, Charts and Pivot Tables", Wiley; Fourth edition 2013, ISBN-13 978-8126544004

REFERENCE

1. Gerard Jounghyun Kim, "Human–Computer Interaction: Fundamentals and Practice", CRC Press, Auerbach Publications, 1 edition, 2015 ISBN 9781482233896
2. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2013 ISBN-13: 978-1118430620

MIT | Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI** **(2016 – 2020)**		
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 - 2018	
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Materials Engineering	
	COURSE CODE	ME201	
	COURSE CREDITS	4	
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0	

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	50	20	Nil	25	125

PRE-REQUISITE : Physics, Chemistry

COURSE OBJECTIVES :

ME201.CEO.1:To select material for engineering application.

ME201.CEO.2:To classify the available materials.

ME201.CEO.3:To utilize available material for specified purpose.

ME201.CEO.4:To compare desired quality of materials from standard data.

ME201.CEO.5:To measure useful properties of materials.

COURSE OUTCOMES :

The students after completion of the course will be able to,

ME201.CO.1:Select material for engineering application.

ME201.CO.2:Classify the available materials.

ME201.CO.3:Utilize available material for specified purpose.

ME201.CO.4:Compare desired quality of materials from standard data.

ME201.CO.5:Measure useful properties of materials.

THEORY COURSE CONTENT		
UNIT 1	**Ferrous, Nonferrous metals and alloys**	**8 HOURS**

Classifications and specifications of steels and cast iron. Heat treatment of steels, Defects due to heat treatment and remedial measures. Classification of surface hardening treatments. Classification, Composition, Properties & applications of: Copper and Its alloys, Nickel and Its alloys, Aluminum and Its alloys. Specific alloys: soldering & brazing alloy, Precipitation hardening alloys. Bearing materials and their applications.

UNIT 2	**Engineering Polymers, Ceramics and Glass**	**6 HOURS**

Classification of polymers, Polymer types-thermoplastics-thermoset-Elastomers, Polymer synthesis and processing-injection moulding-extrusion-blow moulding-calendaring, Degradation of polymers-chemical, thermal, -biological-mechanical. Polymer recycling methods Introduction to Advanced Ceramics-Barium Titanate, Ferrites, Silicon Carbide, Alumina, Ceramics, its classifications and their applications, Introduction to Cermets and its application. HIGH PERFORMANCE POLYMERS:Acrylo Butadiene Styrene- Polycarbonate-Polyamide, Polymethyl Methacrylate: Characteristic, properties and evaluation

UNIT 3	**Composite Materials**	**6 HOURS**

Need of composites. Particle-reinforced composites, large-particle composites, dispersion-strengthened composites. Fiber-reinforced composites, polymer-matrix composites, metal-matrix composites, ceramic-matrix composites, carbon–carbon composites, fiber-reinforced composites, structural composites, laminar composites.

UNIT 4	**Electronic and Photonic materials**	**6 HOURS**

Electronic Materials: Intrinsic and extrinsic semiconductors-p-n junction, Bandgap diagrams for conductor, semiconductor and insulator, IR detectors, Hall effect Superconducting Materials: Normal and High temperature superconductivity, Applications. Photonic Materials: LED, LCD, Photo conducting materials, Photo detectors, Photonic crystals and applications. Advancements in electronic materials: Smart materials

UNIT 5	**Testing of Engineering Materials**	**8 HOURS**

Need and Comparison of destructive and non-destructive tests, Study of destructive testing: Engineering stress-strain curve, true stress-strain curve, Jominy End Quench Test for hardenability, Izod and Charpy Impact Test. Vickers, Rockwell hardness tests. Non –Destructive Testing Non-Destructive testing: Principles & procedure, advantages, disadvantages and Industrial applications of NDT like Sonic & Ultrasonic testing and Radiography tests. Brief overview of another NDT test- Eddy current test, Magnetic Particle Test

UNIT 6	**Nanomaterials.**	**6 HOURS**

Basic concepts of Nano science and Nanotechnology, Carbon nanotubes, Principle of SEM, TEM and AFM, X ray diffraction Fundamentals principles of SEM, SE and BSE imaging modes, Fracture mode analysis and failure analysis using SEM. Potential uses of nonmaterial's' in electronics, robotics, sports equipment, mobile electronic devices, Medical applications of nanomaterials-Cancer, AIDS treatment.

PRACTICAL: Perform the following experiments.		
PRACTICAL NO.01	**Jominy End Quench Test**	**2 HOURS**
Jominy End Quench Test for hardenability.		
PRACTICAL NO.02	**Izod / Charpy Impact Test**	**2 HOURS**
Izod / Charpy Impact Test.		
PRACTICAL NO.03	**Hardness Test**	**4 HOURS**
Vickers,/ Rockwell, Brinell/Durometers & Poldi Hardness Test.		
PRACTICAL NO.04	**Magnetic Particle & Dye Penetrant Test**	**4 HOURS**
Magnetic Particle & Dye Penetrant Test.		
PRACTICAL NO.05	**Ultra-sonic Test**	**4 HOURS**
Ultra sonic test for detection of flaws in materials.		
PRACTICAL NO.06	**Determination of Hall coefficient**	**4 HOURS**
Determination of Hall coefficient for a semiconducting material.		
PRACTICAL NO.07	**Soldering**	**4 HOURS**
Hard and Soft soldering using soldering materials.		
PRACTICAL NO.08	**Industrial Visit**	
Visit to advanced materials characterization laboratory.		

TEXT BOOK

1. Material Science & Metallurgy for Engineers, Dr. V.D. Kodgire & S. V. Kodgire, Everest Publications.31st Edition, ISBN No: 8186314008
2. Mechanical Behavior & Testing of Materials, A. K. Bhargava, C.P. Sharma P H I Learning Private Ltd. 2011 edition, ISBN No 13-9788120342507

REFERENCE BOOK

1. Engineering Metallurgy, Higgins R. A., Viva books Pvt. Ltd., 2004 ISBN No 13-9788176490276
2. Material Science & Engineering, Raghavan V., Prentice Hall of India, New Delhi. 2003 ISBN No 13-9788120324558
3. Introduction to Physical Metallurgy, Avner, S. H., Tata McGraw-Hill, 2014, ISBN 13-9780074630068
4. Materials Science & Engineering, W. Callister, Wiley Publications,2013, ISBN No 13-9788126521432
5. Physical Metallurgy for Engineers, Clarke D.S. & Varney W.R. Affiliated East-West Press, New Delhi ISBN No 13-978-8176710350

		COURSE SYLLABI **(2016 – 2020)**	

MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)

	COURSE SYLLABI (2016 – 2020)		
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 - 2018	
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Discrete Structures and Graph Theory	
	COURSE CODE	CS211	
	COURSE CREDITS	4	
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0	

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	50	20	30	20	150

PRE-REQUISITE : IT101 – Computer Programming

COURSE OBJECTIVES :

CS211.CEO.1:To learn logic and proof techniques to explore mathematical reasoning.

CS211.CEO.2:To formulate problems precisely, solve the problems, apply formal proof techniques, and explain their reasoning clearly

CS211.CEO.3:To use appropriate set, function, or relation models to analyze practical examples, interpret the associated operations and terminology in context

CS211.CEO.4:To explore number of logical possibilities and algebraic structures.

COURSE OUTCOMES :

Students successfully completing the course will be able to,

CS211.CO.1:Develop the notion of mathematical thinking, mathematical proofs and reasoning in problem solving (Applying).

CS211.CO.2:Make use of set, function, relation models, associated operations and terminology in context(Applying).

CS211.CO.3:Demonstrate the use of algebraic structure, logical possibilities for algorithmic design.

CS211.CO.4:Model problems of computing using graphs and trees(Applying).

THEORY COURSE CONTENT		
UNIT 1	**Sets And Propositions**	**6 HOURS**

Application/System/Case Study:

Bank Management System, Online Shopping System: Specialization and Generalization

Contents:

Sets and Propositions: Sets, Combination of sets, Finite and Infinite sets, Principle of inclusion and ex-clusion, Propositions, Conditional Propositions, Logical Connectivity, Prepositional calculus, Universal and Existential Quantifiers, Rules of inference, methods of proofs, Mathematical Induction.

Self-Study: Multi-Sets, Use of Multi Sets

Further Reading: Applications of Mathematical Induction

UNIT 2	**Relations And Functions**	**8 HOURS**

App/System/Case Study:

Employee Management, Time-Table Scheduling, Job scheduling Problem: Relation between sets and associated functions.

Contents:

Relations and Functions: Properties of Binary Relations, Closure of relations, Warshall's algorithm, Equivalence relations and partitions, Partial ordering relations and lattices, Chains and Antichains. Functions, Composition of functions, Invertible functions, discrete numeric functions and generating functions. Recurrence relation.

Self-Study: Application Recurrence Relation for Analysis of Algorithm

Further Reading: Linear Recurrence Relations With constant Coefficients, Homogeneous Solutions.

UNIT 3	**Counting And Mathematical Modelling**	**6 HOURS**

App/System/Case Study:

Library Management System, Diet Planning System: Mathematical Representation of Computing System.

Contents:

Counting and Mathematical Modeling: Rule of sum and product, Permutations, Combinations, Pigeonhole Principle, Mathematical model, Elements of a mathematical model, Classifications: Linear vs. nonlinear, Static vs. dynamic, Explicit vs. implicit, Discrete vs. continuous, Deterministic vs. probabilistic (stochastic), Scope of the model, Applications

Self-Study: Algorithms for generation of Permutations and Combinations, Discrete Probability Theory,

Further Reading: Deterministic Finite Automata and Non-deterministic Finite Automata

UNIT 4	Groups And Rings	6 HOURS

App/System/Case Study:

Cryptography, Error Correction Systems: Number Theory

Contents:

Groups and Rings: Algebraic Systems, Groups, Semi-Groups, Monoids, Subgroups, Permutation Groups, Codes and Group codes, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups, Ring, Integral Domain, Field, Cryptography, Number Theory, Modular Arithmetic and Euclidean algorithm.

Self-Study: Ring Homomorphism, Polynomial Rings, and Cyclic Codes

Further Reading: Cyclic Groups

UNIT 5	Graph Theory	8 HOURS

App/System/Case Study:

Traveling salesman problem, Map Coloring Problem: Graph Represen- tation

Contents:

Graph Theory: Basic terminology, representation of a graph in computer memory, multi- graphs and weighted graphs, Sub graphs, Isomorphic graphs, Complete, Regular and Bipartite graphs, operations on graph, Paths and Circuits, Hamiltonian and Euler paths and circuits, Shortest path in weighted graphs (Dijkstra's algorithm), and Graph Coloring

Self-Study: Self-Practice Problems on Graph Representation in Computer Memory

Further Reading: Factors of a graph, Planer graph

UNIT 6	Trees	8 HOURS

App/System/Case Study:

Compression Systems, Transport network: Tree Representations.

Contents:

Trees: Basic terminology and characterization of trees, Prefix codes and optimal prefix codes, binary search trees, Tree traversal, Spanning trees, Fundamental Trees and cut sets, Minimal Spanning trees, Kruskal's and Prim's algorithms for minimal spanning trees, The Max flow- Min-Cut Theorem.

Self-Study: Network Models

Further Reading: Decision Trees

PRACTICAL	

PRACTICAL NO.01		4 HOURS

Write a program to implement the principle of inclusion and exclusion for deciding the eligibility of students for placement.

PRACTICAL NO.02		4 HOURS

Design and implementation of inference engine using logical connectivity for given problem definition.

PRACTICAL NO.03		4 HOURS

Write a program for discovering connectivity between cities using Warshall's Algorithm.

PRACTICAL NO.04		4 HOURS

Write a program using linear recurrence relations for loan department.

PRACTICAL NO.05		4 HOURS

Write a program for finding permutation and combination for a person who wants to join the gym and want to find the best diet plan according to calories and unit prize.

PRACTICAL NO.06		4 HOURS

Design and implement a program that helps an on-call doctor to reach his patients in different parts of the city using Dijkstra's Algorithm.

PRACTICAL NO.07	Mini Project	12 HOURS

1. Define data models, specializations, a generalization of selected computing real world problems using – sets and its operation. Draw Use Case and Object Diagram.
2. Define relation model on sets, types, and constraints of relations. Identify associated functions Draw Class Diagram.
3. Define Mathematical Model and objective function using mathematical notations. 4. Draw Deployment Diagram and System Architecture.
5. Identify data structures and Implement required functionality and objective function of the system.
6. Define outcome and output set with its properties. Mini Project Report.

TEXT BOOK

1. R. Johnsonbaugh, "Discrete Mathematics", 5th Edition, Pearson Education, 2009, ISBN 81 – 7808 – 279 - 9.
2. C. L. Liu and D. P. Mohapatra, "Elements of Discrete Mathematics", SiE Edition, TataMcGraw-Hill, 2008, ISBN 10:0-07-066913-9.

REFERENCE BOOK

1. N. Biggs, "Discrete Mathematics", 3rd Edition, Oxford University Press, ISBN 0 –19 –850717–8.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 6th edition, McGraw-Hill, 2007. ISBN 978-0-07- 288008-3.
3. E. Goodaire and M. Parmenter, "Discrete Mathematics with Graph Theory", 2nd edition, Pearson Education, 2003 ISBN 81 – 7808 – 827 – 4 .
4. Semyour Lipschutz Marc Lipson, " Discrete Mathematics", McGraw-Hill, 3rd Special Indian Edition, ISBN-13 : 978-0-07-060174-1.
5. B. Kolman, R. Busby and S. Ross, "Discrete Mathematical Structures", 4th Edition, Pearson Education, 2002, ISBN 81-7808-556-9.
6. N. Deo, "Graph Theory with application to Engineering and Computer Science", Prentice Hall of India, 1990, 0 – 87692 – 145 – 4.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Database Management Systems
	COURSE CODE	CS212
	COURSE CREDITS	4
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	50	20	30	20	150

PRE-REQUISITE :
CS201 – Data and File Structures

COURSE OBJECTIVES :

CS212.CEO.1:To define and summarize the basic concepts of database management system.

CS212.CEO.2:To understand basic operations with DBMS.

CS212.CEO.3:To apply various data models to describe the structure of the database.

CS212.CEO.4:To develop database design using normalization.

CS212.CEO.5:To understand concurrency control mechanism and query optimization.

COURSE OUTCOMES :

Students successfully completing the course will be able to,

CS212.CO.1:Explain basic concepts of database management system.

CS212.CO.2:Perform basic operation with DBMS.

CS212.CO.3:Design and develop database application using ER diagram and normalization.

CS212.CO.4:Handle various concurrency and recovery issues.

CS212.CO.5:Optimize the performance of database.

THEORY		
UNIT 1	**Introduction**	**8 HOURS**

App/System/Case study:

Banking system, Student Information system using traditional file processing system

Contents:

Database system – concept – architecture. Data models, Entity- relationships model. Mapping ER model to relational model. Case study ERD and Table design.

Self-study: Database users and DBA

Further reading: Modeling concept for object oriented and object relational database.

UNIT 2	**Relational Model**	**6 HOURS**

App/System/Case study:

Relational model for Banking system, University database

Contents:

Basic concept, Integrity concept. Relational Query Languages – Relational algebra,Tuple relational calculus.

Self-study: Equivalence of relational calculus and relational algebra.

Further reading Domain relational calculus

UNIT 3	**SQL**	**8 HOURS**

App/System/Case study:

SQL queries for Banking system, shop management system, Tiwtter data analysis

Contents:

SQL Queries – Nested queries – Aggregate operators – Null values, Views, Index, PL/ SQL block, exceptions, packages, looping, Concept of stored procedures, cursor, Triggers.

Self-study: Transaction control language – commit, Rollback, save points.

Further Reading: Recursive Queries

UNIT 4	**Database design.**	**6 HOURS**

App/System/Case study:

Student Information system, Employee database system

Contents:

Concept of Normalization, Functional dependencies. Decomposition – Armstrong's axioms, 1NF, 2NF, 3NF, BCNF.

Self-study: Multi valued dependency, 4NF

Further Reading: XML and web databases.

UNIT 5	Transaction Management	6 HOURS

App/System/Case study:

ATM system, Banking system

Contents:

 Basic concept, ACID properties, Concept of schedule, Serializability: conflict and view, Recovery, Concurrency control.

Self-study: Buffer management and remote backup

Further Reading: ARIES Recovery

UNIT 6	Query Optimization	6 HOURS

App/System/Case study:

ATM system, Banking system

Contents:

Various techniques for query optimization, cost based optimization. Introduction to NOSQL database, Comparative study of SQL and NOSQL.

Self-study: Security: Discretionary access control and Mandatory access control.

Further Reading: Advanced query optimization techniques and plans.

PRACTICAL:		
PRACTICAL NO.01		**4 HOURS**
Design and draw an ER/EER diagram using standard notations for given problem definition and convert this diagram into Database Tables. Be sure to underline all primary keys, include all necessary foreign keys and indicate referential integrity constraints.		
PRACTICAL NO.02		**8 HOURS**
For above example use SQL DML statement such as INSERT, UPDATE and DELETE to insert the data into tables and to update/delete the data inserted into/from tables. Write and execute SQL queries to extract information from the table.		
PRACTICAL NO.03		**4 HOURS**
Create and perform Database Operations using Oracle as Back End and Java as Front End. Use JDBC connectivity.		
PRACTICAL NO.04		**4 HOURS**
1. Create a PL/SQL Block which accepts a number below 10.If this number is less than 5.it computes sum of numbers from 1 to accepted number else it finds the product of numbers from 1 to accepted number and then inserts the result into temporary table. 2. Write a PL/SQL Block which use cursor FOR LOOP to select 5 highest earners from EMP table and write their details into Message Table. Practical		
PRACTICAL NO.05	**Transaction Management**	**4 HOURS**
For the following relational schema: Works(eid: integer, did: integer, pct time: integer) Emp(eid: integer, ename: string, age: integer, salary: real) Works(eid: integer, did: integer, pct time: integer) Dept(did: integer, dname: string, budget: real, managerid: integer) Write a stored procedure which will read the amount and department name updates the salary of each employee in that department by adding specified amount to his/her salary. Write a trigger on Emp table to ensure that the employee's salary does not exceed the Department Budget.		
PRACTICAL NO.06		**4 HOURS**
DBMS using connections (Client-Data server, 2 tier) Oracle (JDBC) SQL joins.		
PRACTICAL NO.07		**8 HOURS**
Mini Project: Database Project Life Cycle Design any database application and implement Database navigation operations (add, delete, edit etc.) using JDBC. Write a program to access stored procedure and functions using JDBC.		

TEXT BOOK

1. Silberschatz A., Korth H., Sudarshan S., ''Database System Concepts'', 6th Edition, McGraw Hill Publishers, 2006, ISBN 978-0-07-352332-3
2. Elmasri R., Navathe S., ''Fundamentals of Database Systems'', 4th Edition, Pearson, Education, 2003, ISBN 8129702282

REFERENCE BOOK

1. Rab P. Coronel C. ''Database Systems Design, Implementation and Management'', 5th Edition, Thomson Course Technology, 2002, ISBN 981-243-135-7
2. Connally T., Begg C., ''Database Systems'', 3rd Edition, Pearson Education, 2002, ISBN 81-7808- 861-4
3. Date C., ''An Introduction to Database Systems'', 7th Edition, Pearson Education, 2002,ISBN 81 -7808-23
4. H Garcia-Molina, JD Ullman and Widom, Database Systems: The Complete Book,2nd Ed., Prentice-Hall, 2008.

MIT Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Minor Project
	COURSE CODE	CS213
	COURSE CREDITS	2
RELEASED DATE : 01/06/2017	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
—	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
—	4	–	–	–	–	75	75

PRE-REQUISITE :

1) ME102 – Engineering Tools and Techniques,

2) ME103 – Design Thinking,

3) ET206 – Prototyping

COURSE OBJECTIVES :

CS213.CEO.1:To identify and define a problem to be solved.

CS213.CEO.2:To develop a design for the solution of the problem using engineering tools available.

CS213.CEO.3:To prepare prototype/working model for solving the problem

CS213.CEO.4:To evaluate the model built for its functionality, reliability, sustainability, maintainability and affordability

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS213.CO.1:Define the problem to be solved.

CS213.CO.2:Apply knowledge of various engineering tools to develop the solution to the problem.

CS213.CO.3:Critically analyze the options available to solve the problem and select the one identified most effective.

CS213.CO.4:Justify the selection of the method to solve the problem is-a-vis other options considered.

CS213.CO.5::Build the working model of the solution to solve the problem.

PREAMBLE : It is a need of the time to pay attention to the societal needs by an engineering graduate to solve some of the real life societal problems by providing affordable technological solutions. The concept of the minor project follows the same theme. The minor project aims to identify the problems from the society and develop the solutions for the same using science and technology for the betterment of society or human life.

GUIDELINES:

1. Every student shall undertake the Minor Project in semester IV.

2. Every student shall work on an approved project, a group of 03 students (maximum) shall be allotted for each minor project.

3. The group members could be from different departments to support the interdisciplinary functioning.

4. The students have to identify the social problem by discussion with various stakeholders, site visits and expert-opinions

5. Collect the sufficient data to establish the criticality of the problem to be solved.

7. Define the actual problem.

8. Enumerate various approaches and solutions to solve the problem

9. Select and justify one of the solutions identified based on the feasibility, affordability and ease of use

10. Develop prototype or model for its testing before implementation

11. The three-member committee of jury members will be appointed to monitor the progress and continuous evaluation of each project. One of the members will be the project guide. Assessment of the project for award of grade shall be done jointly by the guide and committee of jury members.

TIMELINES:

1. Project group formation: 1 Week.
2. Identification of the problem to be solved: 2 Weeks.
3. Data collection to prove the validity of the problem: 2 Weeks
4. Identification of the various approaches to solve the problem: 2 weeks.
5. Justification of the approach selected to solve the problem: 1 week
6. Building the solution to the problem using prototype or implementation: 6 Weeks
7. Report writing: 2Weeks

ASSESSMENT:

Presentation 1: Motivation and need for the selected problem to be solved
Presentation 2: To prove the validity of the problem to be solved using data collected
Presentation 3: Identified approaches to solve the problem and justification of approach selected
Presentation 4: Progress towards the prototyping or implementation of the solution to the problem
Presentation 5: Final demonstration

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Third Year

Bachelor of Technology in Computer Engineering

2016-2020

(With Effect from Academic Year: 2018-2019)

CURRICULUM STRUCTURE (2016 - 2020)

MIT | Academy of Engineering
(An Autonomous Institute)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F** : **2018-19**	
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**RELEASE DATE** : **01/12/2017**	
	REVISION NO. : **0.0**	

SEMESTER: V

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	**P**	**CREDIT**
1.	DC5	CS301	Operating System	3	2	4
2.	DC6	CS302	Computer Organization & Architecture	3	--	3
3.	DC7	CS303	Theory of Computation	3	--	3
4.	DC8	CS304	Computer Graphics & Gaming	--	4	2
5.	OE1	IT 311 CS311 CS312	Open Elective - Refer Annexure.	3	2	4
6.	HSS4	HP301	Project Management	1	2	2
7.	SDP5	CS30#	Skill Development Lab	--	4	2
TOTAL				**13**	**14**	**20**

SEMESTER: VI

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	**P**	**CREDIT**
1.	DC9	CS321	Design and Analysis of Algorithm	3	2	4
2.	DC10	CS322	Compiler Design	3	2	4
3.	DC11	CS323	Computer Networks	3	2	4
4.	OE2	IT 331 CS331 CS332	Open Elective - Refer Annexure.	3	2	4
5.	HSS5	HP302	Professional Skills	1	2	2
6.	HSS6	HP303	Basics of Entrepreneurship	--	2	1
7.	SDP6	CS324	Mini Project	--	4	2
TOTAL				**13**	**16**	**21**

MIT	Academy of Engineering	**COURSE SYLLABI**	
(An autonomous Institute Affiliated to SPPU)		**(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**A.Y.** 2018- 19
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Operating System
		COURSE CODE	CS301
		COURSE CREDITS	4
RELEASED DATE : 01/06/2018		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	25	25	150

PRE-REQUISITE : 1. CS301-Data and File Structures

COURSE OBJECTIVES :

CS301.CEO.1:To describe the services of an operating system.

CS301.CEO.2:To introduce the concepts of a process, its life cycle and threads.

CS301.CEO.3:To explore inter process communication and CPU scheduling.

CS301.CEO.4:To understand memory management in operating system

CS301.CEO.5:To understand the deadlock handling methods

CS301.CEO.6:To discuss idea of file-system and its implementation

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COURSE OUTCOMES :

The students after completion of the course will be able to,

CS301.CO.1:State the basic principles of operating systems and its computational resources.

CS301.CO.2:Discuss various scheduling algorithm.

CS301.CO.3:Recognize deadlock to resolve the related issues.

CS301.CO.4:Solve or interpret problems regarding memory management.

CS301.CO.5:Analyze the efficiency of File System.

THEORY COURSE CONTENT		
UNIT 1	**Introduction**	**8 HOURS**

App/System/Case study: Linux Booting and Login Process
Content: Basics of Operating Systems, Linux vs Windows, Abstract View of computer System Components, Types of Operating Systems, Functions of Operating System ,System Calls and its types. Booting and Shutting Down, Bootstrapping, Booting PCs, GRUB: The GRand Unified Boot loader, Booting to single-user mode. Working with Startup scripts, Rebooting and Shutting down.
Self-Study: Open Source Operating Systems-Fedora.
Further Reading: Special Purpose Systems.

UNIT 2	**Process and Threads**	**6 HOURS**

App/System/Case study : Multitasking In Mobile Systems.
Content: Process: Concept, Operation, Scheduling, Thread Overview: Multicore Programming, Multithreading Models, Thread Libraries, and Implicit Threading.
Self-Study: Threading Issues.
Further Reading: Operating System Generation Debugging.

UNIT 3	**CPU Scheduling and Inter-Process Communication**	**6 HOURS**

App/System/Case study : Multi process-Any Web Browser
Content: Basic Concepts of CPU scheduling, Scheduling criteria, Scheduling Algorithm, Thread Scheduling, Multiple Processor Scheduling, Inter-process Communication, Shared-Memory Systems, Message-Passing Systems.
Self-Study: Real Time Scheduling
Further Reading: Examples of IPC Systems.

UNIT 4	**Process Synchronization and Deadlock**	**8 HOURS**

App/System/Case study : Java Monitor.
Content: Process Synchronization overview, The critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problem of synchronization, Monitors, Deadlock, Methods for Handling Deadlocks, Modified Deadlock.
Self-Study: Synchronization examples
Further Reading: Alternative Approaches.

UNIT 5	**Memory Management**	**8 HOURS**

App/System/Case study : ARM architecture.
Content: Main memory-Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of page table, Virtual Memory-Demand Paging, Page Replacement, Allocation of frames, Thrashing Memory Mapped Files, Allocating Kernel Memory.
Self-Study: Linux memory management schemes.
Further Reading: Examples of Intel 32 and 64 bit Architecture.

UNIT 6	File and IO Management	8 HOURS

App/System/Case study : File locking in Java, Permission in UNIX.

Content: File Concepts, Access Methods, Directory and Disk Structure, File System Mounting, File Sharing, Protection. File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery, I/O Hardware, Application I/O Subsystem, Transforming I/O request to hardware operations.

Self-Study: WAFL File System.

Further Reading:NFS

PRACTICAL : Perform following experiments using Open source tools	
PRACTICAL NO.01	**4 HOURS**
Basic Shell Programming. (Basic System Calls and Shell Scripting)	
PRACTICAL NO.02	**4 HOURS**
Implement Process scheduling algorithm in C/C++/Java for following algorithm 1.FCFS,2.SJF,3.Round Robin, Priority based algorithm	
PRACTICAL NO.03	**4 HOURS**
Design a program using ordinary pipes in which one process sends a string message to a second process, and the second process reverses the case of each character in the message and sends it back to the first process. For example, if the first process sends the message Hello Friends, the second process will return hELLO fRIENDS.	
PRACTICAL NO.04	**4 HOURS**
In a real computer system, neither the resources available nor the demands of processes for resources are consistent over long periods (months). Resources break or are replaced, new processes come and go, and new resources are bought and added to the system. If deadlock is controlled by the banker's algorithm, which of the following changes can be made safely (without introducing the possibility of deadlock), and under what circumstances? a. Increase Available (new resources added). b. Decrease Available (resource permanently removed from system).	
PRACTICAL NO.05	**4 HOURS**
Implement Page Replacement for following algorithm 1.LRU, 2.FIFO, 3.Optimal	
PRACTICAL NO.06	**4 HOURS**
Write a LINUX/UNIX C++ program to simulate the following file organization techniques: a) Single level directory b) Two level directory c) Hierarchical.	
MINI PROJECT	**8 HOURS**
The Course Mini Project work will be started in Semester V. The work of the mini projects will be starting at beginning of term in alignment with laboratory assignments. It may be done by groups of 3 students. However if project is done in groups, each student will be given a responsibility for a distinct module and the progress of individual modules is independent of others and performance of individual modules will be tracked periodically. The final evaluation will be done at the end of term through presentation, project demonstration and report.	

TEXT BOOK

1. Silberschatz, Galvin, Gagne, Operating System Concepts: International Student Version, 9th Edition, Paperback: 992 pages Publisher: Wiley; Eighth edition (20 April 2009) Paperback – 20 Apr 2009, Language: English, ISBN-10: 8126520515, ISBN-13: 978-8126520510.
2. Tanenbaum, Modern Operating Systems, 4th Edition, Paperback: 1136 pages, Publisher: Pearson Education India; Fourth edition (31 August 2016), Language: English, ISBN-10: 9332575770, ISBN-13: 978-9332575776

REFERENCE BOOK

1. Gary Nutt, Operating Systems, 3rd Edition, Publisher: Pearson Education Singapore Pvt. Ltd (2004), ISBN-10: 8131723593, ISBN-13: 978-8131723593, ASIN: B007YTM00I.
2. Ann McHoes and Ida M. Flynn, Understanding Operating Systems, 6th edition, Mendel Rosenblum and John K. Ousterhout, Paperback: 590 pages, Publisher: Cengage; 6 edition (1 December 2013), Language: English, ISBN-10: 8131521567, ISBN-13: 978-8131521564.
3. Tanenbaum, Operating Systems Design and Implementation, Paperback: 1080 pages, Publisher: Pearson Education India; 3 edition (2015), Language: English, ISBN-10: 9332550514, ISBN-13: 978-9332550513.
4. Deitel, Operating System, 3rd Edition, Paperback: 1270 pages, Publisher: Pearson Education India; edition (2007), Language: English, ISBN-10: 8131712893, ISBN-13: 978-8131712894.

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	A.Y. 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Computer Organization and Architecture
	COURSE CODE	CS302
	COURSE CREDITS	3
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**				**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**ICE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
3	--	30	40	30	–	-	100

PRE-REQUISITE : 1. CS302: Digital Electronics and Microprocessors

COURSE OBJECTIVES :

CS302.CEO.1:To understand the fundamental structure of computer system.

CS302.CEO.2:To get familiar with the different components of the computer system.

CS302.CEO.3:To learn input-output organization of computer system.

CS302.CEO.4:To learn working of arithmetic unit of the computer system.

CS302.CEO.5:To Learn various techniques for high performance computing.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS302.CO.1:Identify the different components of the computer system.

CS302.CO.2:Illustrate different types of commercial processors.

CS302.CO.3:Explain the working of ALU of the processor.

CS302.CO.4:Explain the memory hierarchy in the computer system.

CS302.CO.5:Trace the flow of information from one component to another component of computer system.

CS302.CO.6:Implement parallel computing environment.

THEORY COURSE CONTENT		
UNIT 1	**Fundamentals of computers**	**8 HOURS**

App/System/Case study: Computer types
Content: Functional units, basic operation concepts, Bus structure, software, performance, multi-processors and multicomputer. Historical perspective, Machine Instructions and programs: numbers, arithmetic operations and characters, Memory locations and addresses, memory operations, Instructions and instruction sequencing, Addressing modes, Basic input/operations, Additional instructions.
Self-Study: stack and queues
Further Reading: Subroutines

UNIT 2	**IA-32 Pentium processors and Input/output organization**	**8 HOURS**

App/System/Case study:
Types of processors
Content:
IA-32 Pentium example: Registers and addressing , IA-32 instructions, Program flow control, Logic and shift rotate instructions, input-Output Organization: Accessing I/O devices, Interrupts, exceptions, processor examples, direct memory access. Buses.
Self-Study: Interface Circuits.
Further Reading:IA-64 Architecture

UNIT 3	**The Memory System**	**8 HOURS**

App/System/Case study:
Importance of computer memory
Content:
Basic concepts, semiconductor RAM memories, read-only memories, speed, size and cost, cache memories, performance considerations, virtual memories, memory management requirements, Secondary storage.
Self-Study: Cache memory
Further Reading: Pentium 4 cache memory.

UNIT 4	**Computer Arithmetic**	**6 HOURS**

App/System/Case study:
Integer Representation
Content:
The Arithmetic and Logic Unit (ALU), Integer Arithmetic, Floating-Point Representation, Floating-Point Arithmetic.
Self-Study: Static arithmetic pipeline
Further Reading: Multi functional arithmetic pipelining.

UNIT 5	Parallel Processing	6 HOURS
App/System/Case study: CUDA Architecture. **Content:** Multiple Processor organizations, Symmetric Multiprocessors,Cache Coherence and the MESI Protocol, Multithreading and Chip Multiprocessors , Clusters, Non uniform Memory Access, basic concepts of pipelining. **Self-Study:** Superscalar operations. **Further Reading:**GPU Architecture		

UNIT 6	Multi-core Computers	6 HOURS
App/System/Case study: Supercomputer Architecture **Content:** Hardware Performance issues, Software Performance Issues, Multicore Organization, Intel x86 Multicore Organization, programmer's view of shared memory and massage passing, performance considerations. **Self-Study:** ARM11 MPCore. **Further Reading:**AMD Accelerated Processing Unit		

TEXT BOOK

1. W. Stallings, "Computer Organization and Architecture: Designing for performance", Pearson Education/ Prentice Hall of India, 2003, ISBN 978-93-325-1870-4, 7th Edition.
2. Zaky S, Hamacher, "Computer Organization", 5th Edition, McGraw-Hill Publications, 2001, ISBN- 978-1-25-900537-5, 5th Edition.

REFERENCE BOOK

1. Kauffmann, Computer System Architecture by M. Mano, 2001, Prentice-Hall ISBN 72157661505664197
2. John P Hays, "Computer Architecture and Organization", McGraw-Hill Publication, 1998, ISBN:9781259028564, 3rd Edition. .

MIT Academy of Engineering	COURSE SYLLABI
(An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI (2016 – 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	2018 - 2019

	COURSE NAME	Theory of Computation
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE CODE**	CS303
	COURSE CREDITS	3
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	--	30	40	30	–	-	100

PRE-REQUISITE : 1. CS303: Discrete Structure Graph Theory

COURSE OBJECTIVES :

CS303.CEO.1:To introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability

CS303.CEO.2:To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

CS303.CEO.3:To provide an understanding of the theoretical development of computer science, particularly for finite representations of languages and machines

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS303.CO.1:List the various types of languages, respective recognition machines, and various classes of problems.(L1)

CS303.CO.2:Differentiate between various types of languages, respective recognition machines, classes of problems. (L2)

CS303.CO.3:Apply the steps for the construction of various types of machines from language and vice versa. (L3)

CS303.CO.4:Analyze the type of machine to be used to recognize the particular language.(L3)

CS303.CO.5:Design the machine for the given specification of language(L4)

CS303.CO.6:Justify the complexity of the given class of problem.(L5)

THEORY COURSE CONTENT		
UNIT 1	**Foundation**	**3 HOURS**

App/System/Case study:

Shop arrangements/ Road system

Content:

Automata, Computability and complexity:- Complexity Theory, computability Theory Automata Theory Mathematical Notations Terminology:- -Sets, Sequences and Tuples-Functions Relations-Graphs, strings and languages-Boolean Logic-Summary of Mathematical Terms Definitions, Theorems Proofs:- Finding Proof, Types of proof- Proof by Construction, Proof by construction, Proof by Induction Abstract Machines and computation, Formal Languages and Grammars.

Self-Study: Proving theorems using induction

Further Reading: Types of proofs

UNIT 2	**Finite Automata Theory**	**8 HOURS**

App/System/Case study:

Working of Vending Machines

Content:

Regular Languages, Finite state Machines, Deterministic Non Deterministic Finite state Machines, Regular grammars, Regular Expressions, Equivalence of the three Models, Epsilon –NFA, FA with output: -Moore Mealy Machines- Definitions, Models Inter Conversion.

Self-Study: Latest Developments in the area of Automata Theory

Further Reading: Timed Automata

UNIT 3	**Regular Expression**	**8 HOURS**

App/System/Case study:

Form validation using Regular Expressions, grep utility of Linux

Content:

Operators of R.E, Building R.E, Precedence of Operators, Algebraic Laws for R.E, conversion of NFA to DFA, DFA to R.E Conversion, state loop elimination, Ardens Theorem, Properties of Regular languages, pumping lemma for Regular Languages.

Self-Study: Latest Developments in the area of Information Retrieval related to searching Techniques.

Further Reading: Application of regular expressions in Lexical Analysis

UNIT 4	**Context Free Grammar**	**7 HOURS**

App/System/Case study:

Design of Parser for Compilers or Interpreters/ Web crawler

Content:

Context Free Language Models, context free grammars, simplification of CFG, Chomsky normal form(CNF), Greibach normal form(GNF), Closure Properties, Application of CFG:- Parser, Mark up languages, XML Document Type Definition, Chomsky Hierarchy, Regular Grammar. Self -Study: Application of CFG in Parsers

UNIT 5	Push Down Automata	8 HOURS

App/System/Case study:

Parser design for Compilers or Interpreters

Content:

Push Down Stack Memory Machine Formal Definition, PDA, DPDA, NPDA, PDA to CFG, CFG to PDA.

Self-Study: Multi – Stack Push Down Automata

Further Reading: Post Machines

UNIT 6	Turing Machines	8 HOURS

App/System/Case study:

Representation of a given algorithm into Turing Machine

Content:

Turing Machines Introduction, Definitions, Model, Comparison of T.M with other machines, Examples of T.M, Universal T.M, Recursive Sets, Churches T.M, Halting Problem, Incompleteness Un-Decidability, Semi solvability and Insolvability.

Self-Study: Multi Tape Turing Machines

Further Reading: Various decidable and Undecidable Problems

TEXT BOOK

1. John E. Hopcoroft, Rajeev Motwani, Jeffrey D-Ullman, Introduction to Automata Theory Languages And Computation, LPE
2. K.L.P. Mishra Chandrashekharan, Theory Of Computer Science.
3. Michael Spicer, Introduction to Theory of Computation, Third Edition, Cengage Learning

REFERENCE BOOK

1. "Theory of Computation", Vivek Kulkarni, Oxford University Press,(ISBN: 0-19-808458-7)
2. "Introduction to Languages and Theory of Computation", John Martin McGraw-Hill, (ISBN:978-0-07-066048)

MIT Academy of Engineering (An Autonomous Institute) (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Computer Graphics and Gaming
	COURSE CODE	CS304
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME:					
		THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA			
–	4	–	–	–	50	25	75

PRE-REQUISITE :

Applied Mathematics , Data and File Structures

COURSE OBJECTIVES :

CS304.CEO 1:To understand various algorithms for generating and rendering graphical figures.

CS304.CEO 2:To get familiar with mathematics behind graphical transformations.

CS304.CEO 3:To understand various techniques applied for projections.

CS304.CEO 4:To understand various methods of clipping.

CS304.CEO 5:To understand various techniques of animation.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS304.CO.1:To apply mathematics to develop Computer graphics operations.

CS304.CO.2:To develop programs on 2D and 3D transformation and Hierarchical transformation.

CS304.CO.3:To apply various methods for projection.

CS304.CO.4:To demonstrate clipping algorithms.

CS304.CO.5:To develop animation and gaming application.

PRACTICAL	
PRACTICAL NO.01	**2 HOURS**

Develop the programs for Rasterization Algorithms like DDA, Bresenham's for line drawing..

PRACTICAL NO.02	**2 HOURS**

Develop program for circle using DDA and Bresenham's algorithm.

PRACTICAL NO.03	**2 HOURS**

Develop a program to implement Cohen-Sutherland line clipping algorithm for given window.

PRACTICAL NO.04	**2 HOURS**

Develop program to draw 2-D cube and perform the transformations on it using OpenGL.

PRACTICAL NO.05	**2 HOURS**

Develop program to draw 3-D cube and perform following transformations on it using OpenGL.
a) Scaling b)Translation c) Rotation about one axis..

PRACTICAL NO.06	**2 HOURS**

Develop a program for 2D/3D texture mapping.

PRACTICAL NO.07	**2 HOURS**

Write program to simulate any one of or similar scene-
1:Clock with pendulum .
2:National Flag hoisting.
3:Vehicle/boat locomotion.
4:Water drop falling into the water and generated waves after impact.

PRACTICAL NO.08	**2 HOURS**

Develop a program for bouncing ball using animation tool like 3D Blender, Seamless 3D,cartoona etc.

PRACTICAL NO.09	**8 HOURS**

Mini Project
1.Identify Different Graphics Objects.
2.Describe the different Graphics Primitives.
3.Make use of different Graphics primitives in mini project.
4.Apply different geometric transformation.
5.Create animation using any Design tool.
NOTE: The journal prepared by the students should be hand-written for concepts, algorithm, flowcharts etc. related to the assignments. Documents in the print form must contain the implementation code and output of the assignment.

TEXT BOOK

1. D. Hearn and M. Baker "Computer Graphics",2nd Edition, Pearson Education,2002,ISBN-7808-794-4
2. D.Hearn, Computer Graphics with OpenGL",4th Edition,ISBN-139780136053583
3. Dave Shreiner "OpenGL Programming Guide",7 th edition Addition Wesely,ISBN-13:978-032155264

REFERENCE BOOK

1. S. Harrington, Computer Graphics", 2nd Edition, McGraw-Hill Publications,1987,ISBN 0-07-100472-6
2. D. Rogers, "Procedural Elements for Computer Graphics",2nd Edition, Tata McGraw-Hill pub-lication,2001,ISBN 0-07-047371-4
3. D. Rogers, J .Adams, "Mathematical Elements for Computer Graphics", 2nd Edition, Tata McGraw-Hill publication, 2002, ISBN 0-07-048677-8.
4. James D. Foley, Andries Van Dam, "Fundamentals of Interactive Computer Graphics", Addison-Wesley

		COURSE SYLLABI **(2016 – 2020)**

<table>
<tr><td rowspan="2">MIT | Academy of Engineering
(An Autonomous Institute)
(An autonomous Institute Affiliated to SPPU)</td><td colspan="2">COURSE SYLLABI
(2016 – 2020)</td></tr>
<tr><td>SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY</td><td>W.E.F   AY: 2018 – 2019</td></tr>
<tr><td rowspan="3">THIRD YEAR BACHELOR OF TECHNOLOGY

INFORMATION TECHNOLOGY</td><td>COURSE NAME</td><td>Cryptography and System Security</td></tr>
<tr><td>COURSE CODE</td><td>IT311</td></tr>
<tr><td>COURSE CREDITS</td><td>4</td></tr>
<tr><td>RELEASED DATE   :   01/06/2018</td><td>REVISION NO</td><td>0.0</td></tr>
</table>

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
		THEORY			PRACTICAL	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA		DEMONSTRATION	
3	2	30	40	30	25	–	125

PRE-REQUISITE : IT203: Computer Network

COURSE OBJECTIVES :

IT311.CEO 1:To understand fundamentals of cryptography, authentication and emerging security standards.

IT311.CEO 2:Determine basics of network security protocols.

IT311.CEO 3:Identify the possible threats to each mechanism and ways to protect against these threats.

IT311.CEO 4:Understand cryptographic techniques that provide information and network security

COURSE OUTCOMES :

The students after completion of the course will be able to,

IT311.CO.1:Explain symmetric cryptography, asymmetric cryptography, and digital signatures.

IT311.CO.2:Implement security algorithms in computer network.

IT311.CO.3:Identify the different security technology and devices.

IT311.CO.4:Outline the requirements and mechanisms for identification and authentication.

IT311.CO.5:List the security threats, and the security services and mechanisms to counter them.

IT311.CO.6:Comprehend security services and mechanisms in the network protocol stack.

THEORY:		
UNIT 1	**Basics of Security**	**8 HOURS**
Attacks on Computer and Computer Security: Introduction, The Need for Security, Security Approaches, Principles of Security, Types of Attacks Cryptography Techniques: Introduction, Plaintext and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography. **Self-Study:** Key Range and Key Size **Further Studies:** Possible Type of Attacks		
UNIT 2	**Symmetric Key Algorithms**	**8 HOURS**
Introduction, Algorithms types and modes, Overview of Symmetric key cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA),RC5, Blowfish, Advanced Encryption Standard (AES). **Further Studies**: RC4		
UNIT 3	**Asymmetric Key Algorithms**	**8 HOURS**
Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures. **Further Studies:** Knapsack Algorithm		
UNIT 4	**Digital Signature and Key Management**	**6 HOURS**
Introduction, Digital Signature, Digital certificates, Digital Envelop, classification of security measures with digital signature, digital certificate and digital envelop, private key management, the PKIX model, Public key cryptographic standards (PKCS). **Self-Study:** Key Management **Further Studies:** XML, PKI and Security		
UNIT 5	**Security Protocols and Tools**	**6 HOURS**
Introduction to security protocols, concept behind secure socket layer, Transport layer security, Secure Hypertext Transfer Protocol, Time stamping protocol, secure electronic transaction (SET). **Self-Study:** SSL vs SET **Further Studies:** E-mail Security		
UNIT 6	**User Authentication and Kerberos**	**6 HOURS**
The Kerberos Authentication Service, provides a trusted third-party authentication to verify users' identity Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos, Key Distribution Center (KDC) , Security Handshake Pitfalls. **Self-Study:** Single Sign On (SSO) Approaches **Further Studies:** IP Security		

PRACTICAL: Perform following experiments using open source software.		
PRACTICAL NO.01		**4 HOURS**
Write a program to encrypt and decrypt the message using encryption decryption techniques.		
PRACTICAL NO.02		**4 HOURS**
Develop a program in C++/Java/Python on Extended Euclidean Algorithm .		
PRACTICAL NO.03		**6 HOURS**
Develop a program in C/C++/Java to implement RSA algorithm for key generation and cipher verification		
PRACTICAL NO.04		**4 HOURS**
Implement Diffie -Hellman key exchange algorithm using an open source language.		
PRACTICAL NO.05		**6 HOURS**
Cryptography Library (API): Write a program in C++/Java/Python to implement RSA algorithm using Libraries (API).		
PRACTICAL NO.06		**8 HOURS**
Security Tools : 1:Configure and demonstrate use of IDS tool such as snort standards. 2:Configure and demonstrate use of traffic monitoring tool such as wire shark with security perspective. 3:Configure and demonstrate use of vulnerability assessment tool such as NESSUS.		

TEXT BOOK

1. Atul Kahate, "Cryptography and Network Security", The McGraw Hill Publication Second Edition, ISBN – 13: 978-0-07-064823-4.
2. Eric Maiwald , "Network Security: A Beginners' Guide" , ISBN: 978-0-07-179571-5

REFERENCES:

1. William Stallings , "Cryptography and Network Security", Prentice Hall, Fourth Edition ISBN-13: 978-0-13- 187316-2
2. Bernard Menezes ," Network Security and Cryptography: Bernard Menezes ", CENGAGE Learning.
3. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security - Private Communication in a Public World", Pearson/PHI..
4. Stallings , "Cryptography and network Security", Third edition, PHI/Pearson.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**A.Y.** 2018 – 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Descriptive Analytics
	COURSE CODE	CS311
	COURSE CREDITS	4
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA			
3	2	30	40	30	50	-	150

PRE-REQUISITE :

1. IT101: Computer Programming
2. CS212: Database Management System

COURSE OBJECTIVES :

CS311.CEO.1:To understand the data warehouse architecture.

CS311.CEO.2:To outline the various preprocessing operations on data warehouse.

CS311.CEO.3:To apply the various operations on OLAP cubes and schema modeling.

CS311.CEO.4:To elaborate the need of Data Science.

CS311.CEO.5:To apply regression methods for a given dataset.

CS311.CEO.6:To summarize the basic concepts frequent item sets.

COURSE OUTCOMES :

The students after completion of the course will be able to

CS311.CO.1: Outline the data warehouse architecture.

CS311.CO.2: Apply the various data preprocessing techniques for making data marts for a given application.

CS311.CO.3: Apply the various operations of OLAP cube.

CS311.CO.4: Apply regression and Correlation on real datasets

CS311.CO.5: Generate frequent item sets for given datasheet

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Data Warehouse**	**6 HOURS**

App/System/Case study:

Retail-Industry Case Study

Content:

Overview, need of its components, architecture, characteristics, goals, models, knowledge discovery, challenges, importance of meta data repositories. Introduction to Business Intelligence (BI), Significance of BI

Self-Study: Data Warehouse Security Measures : User access, Data load, Data movement, Query generation

Further Reading: Advancement Data Collection Security.

UNIT 2	**Operations of Data Warehouse**	**6 HOURS**

App/System/Case study:

Retail-Industry Case Study

Content:

Data preprocessing: data cleansing, data integration, data reduction, data transformation and discretization, concept hierarchy, data quality, data warehouse design process, distributed data warehouse, real time data warehouse architecture.

Self-Study: Outlier Analysis

Further Reading: Real Time ETL

UNIT 3	**Data Warehouse Modeling**	**8 HOURS**

App/System/Case study:

Retail-Industry Case Study

Content:

Data modeling, OLAP vs OLTP, MOLAP, ROLAP, HOLAP, Dimensions and facts and types, granularity of facts, measures and categorization of measures, Data mart, OLAP cubes , Cube operations, scheme modeling (star, snowflake, star constellation schema)

Self-Study: Analyze OLAP cube with Microsoft Excel, Cross Table Cube

Further Reading: Cubing Service Security, Multidimensional Data Analysis

UNIT 4	**Introduction to Data Science and Statistical techniques.**	**6 HOURS**

App/System/Case study:

Retail-Industry Case Study

Content:

Introduction to Data Science and Data Mining, Descriptive, Predictive and Prescriptive data analysis techniques, Descriptive Statistics, Probability Distributions, Inferential Statistics through hypothesis tests.

Self -Study: Permutation Randomization Test

UNIT 5	Regression and Correlation	8 HOURS

App/System/Case study:

Real Estate Case Study

Content:

Simple, Multiple regression, Linear-Logistic Regression, Poisson Regression, Non linear regression. Correlation coefficient, ANOVA, Measuring performance of a model, Accuracy, ROC curves, precision-recall curves.

Self-Study: Regression Models using Excel 2013

Further Reading: Correlation Mining for Massive data

UNIT 6	Frequent Item-set Mining	6 HOURS

App/System/Case study:

Retail-Industry Case Study

Content:

Market Basket Analysis, Support and Confidence, Frequent Item-sets, Closed Item-sets, and Association rules, Frequent Pattern Mining

Self-Study: Applications of Frequent Item-sets Mining.

Further Reading: Multilevel Association Rules Generation

PRACTICAL : Perform following experiments using prescribed tools		
PRACTICAL NO.01		**10 HOURS**

Data Preprocessing exercise using R

Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70.

(a) What is the mean of the data? What is the median?

(b) What is the mode of the data? Comment on the data's modality (i.e., bimodal, trimodal, etc.).

(c) What is the midrange of the data?

(d) Can you find (roughly) the first quartile (Q1) and the third quartile (Q3) of the data?

(e) Give the five-number summary of the data.

(f) Show a boxplot of the data.

(g) How is a quantile- quantile plot different from a quantile plot?

(a) Use smoothing by bin means to smooth the data, using a bin depth of 3.Illustrate your steps. Comment on the effect of this technique for the given data.

(b) How might you determine outliers in the data?

(c) What other methods are there for data smoothing? Plot an equal-width histogram of width 10.

(d) Sketch examples of each of the following sampling techniques: SRSWOR, SRSWR, cluster sampling, stratified sampling. Use samples of size 5 and the strata "youth,""middle-aged," and "senior." Suppose a group of 12 sales price records has been sorted as follows: 5, 10, 11, 13, 15, 35, 50, 55, 72, 92, 204, 215 Partition them into three bins by each of the following methods:

(a) equal-frequency (equidepth) partitioning

(b) equal-width partitioning

(c) clustering

OR

Demonstration of preprocessing operations on given dataset (Retail Big Bazar, Health System, Banking System, Sales, Fast Food Industry System).Using ETL tool like Talend /Pentaho/or any proprietary tool.

Note: The above assignment is for the reference, Similar level assignment can be taken lab.

PRACTICAL NO.02		**12 HOURS**

Dimensional Modeling, Data Mart, Cube Analysis

The Leisure Hotel chain is a small chain with properties throughout Pennsylvania, Arizona, Florida, and New York. They have a central database to store and track guest reservations. In 2008, they put cafes in many of their hotels, called "Café in the Hotel." They have an order-tracking system that relays customer orders from the wait staff to the kitchen.

Leisure Hotels would like to use the data they have collected to better understand the performance of their hotels and cafes. They also have access to a database from the online review site "Hotel Complainer.com." Your task is to design two dimensional data marts using data from those three databases. You will plan the star schema for each data mart by choosing the dimensions, facts, and attributes from the data contained in those databases. The relational schemas of those databases are on the following page.

The questions to be addressed by each data mart are listed in the table below. You should include only the data fields you need in each data mart, but the data marts can contain some of the same data (i.e., the same fields can appear in both data marts). To complete the exercise, you'll need to perform the following steps:

1) Identify the main business event for each data mart. This will be the fact.Ask yourself, "What is the basic business event that generates the performance metric (revenue)?"

2) Identify the attributes associated with the fact. Ask yourself, "How is the business event quantified (measured)?"

3) Identify the dimensions and their attributes. Ask yourself, "What data characterizes the various aspects of that business event?"

4) Either sketch the star schema or make a list of the dimensions and the fact and their attributes. You can use the examples in the slides as a guide.

Following Descriptive Analysis –Cube Analysis is expected from data mart

. During which month are the most rooms rented?

- Identify the "off season" (if any) for our hotels in Arizona, Florida,Pennsylvania, and New York.

. Which hotel generates the most (non-restaurant) revenue?

. What is the average length of stay in hotels with 4.5 or more stars?

. Do smokers stay longer than non-smokers?

. For a given hotel, how many customers come from out of state?

. Which hotel restaurant generates the most revenue?

. Do the best rated hotels generate more restaurant revenue?

. What is the most frequently ordered item in the Philadelphia metropolitan area?

Note: Above case study is just for reference any other Case study with similar level can be taken in lab.

PRACTICAL NO.03		**8 HOURS**

Project on Descriptive analytics (Data –preprocessing, Dimensional modeling, Cube Analysis) using R/ Cognos /Pentaho /Talend /Power BI.

TEXT BOOK

1. Jiawei Han, MichelineKamber, Jian Pei Professor, "Data Mining: Concepts and Techniques", The Morgan Kaufmann Series in Data Management Systems, ISBN 978-9380931913

2. Rick Sherman, Business Intelligence Guidebook: From Data Integration to Analytics, The Morgan Kaufmann Series in Data Management Systems, ISBN 012411461X

REFERENCE BOOK

1. Paulraj Ponniah,Data Warehousing: Fundamentals for IT Professionals, 2nd Edition, Paperback, McGraw Hill Publishers, 2006, ISBN 978-0-07-352332-3

2. Ralph Kimball, "Data Warehouse Lifecycle Toolkit", Willey, ISBN 0471200247

3. Maria Sueli Almeida, Missao Ishikawa, Joerg Reinschmidt, Torsten Roeber, Getting Started with Data Warehouse and Business Intelligence, IBM

4. Ramesh Sharda, Dursun Delen, Efraim Turban, "Business Intelligence, Analytics and Data Science: A Managerial Perspective", Pearson Publication, 4th Edition ISBN 0134633288

5. Grolemund, Garrett "R for Data Science", O'Reilly

6. Murrey R Spiegal, Larry Stifens, Statistics, 4th edition, Schaum's Series, McGraw Higher Ed ISBN: 9780070151536, 0070151539

	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Artificial Intelligence and Neural Networks
	COURSE CODE	CS312
	COURSE CREDITS	4
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	–	150

PRE-REQUISITE:

1.CS201 – Data and File Structures

COURSE OBJECTIVES :

CS312.CEO.1:Gain a historical perspective of AI and its foundations.

CS312.CEO.2:Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation and learning.

CS312.CEO.3:Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CS312.CEO.4:Explore the current scope, potential, limitations and implications of intelligent system.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS312.CO.1:Analyze the variations in agents and environments behavior and major functions implemented in a general agent.

CS312.CO.2:Evaluate agents using search algorithms such as uninformed search, informed search or local search.

CS312.CO.3:Illustrate adversarial search mechanism and game-playing agents.

CS312.CO.4:Identify capabilities of specific knowledge representation formalisms for specific tasks.

CS312.CO.5:Apply the methodology to transfer human knowledge into an expert system.

CS312.CO.6:Explain the learning and adaptation capability of neural systems.

THEORY :		
UNIT 1	**Introduction**	**7 HOURS**

App/System/Case study: Virtual Personal Assistants, Autonomous cruise control system.

Contents:

Introduction to Artificial Intelligence, The Foundations of Artificial Intelligence, Emergence of Intelligent Agents, PEAS Representation of Agents, Rationality, Environment, Problem Formulation.

Self Study: Agent Oriented Design

Further reading: A taxonomy of autonomous agents

UNIT 2	**Search Strategies**	**7 HOURS**

App/System/Case study: GPS Navigation systems, Tile games.

Contents:

State space search, heuristic search, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Informed search Techniques- Greedy best first search, A* search.

Self Study: Genetic Algorithms

Further reading: Hill Climbing Search

UNIT 3	**Constraint Satisfaction Problem**	**7 HOURS**

App/System/Case study: SICStus Prolog

Contents:

Constraint Satisfaction Problem, Backtracking search for CSPs, Adversarial search - Games, Optimal decisions in games, Mini Max Algorithm, Alpha-Beta pruning.

Self Study: Deterministic games in practice

Further reading: Map coloring problem

UNIT 4	**Reasoning and Knowledge Representation**	**7 HOURS**

App/System/Case study: WebQR , Inquire an iPad app

Contents:

Introduction to Reasoning and Knowledge Representation, Knowledge-based reasoning-First- order Logic and theorem proving, Rules and rule-based reasoning, Knowledge representation –Production based system, Frame based system.

Self Study: Propositional Logic

Further reading: Uncertainty representation and management

UNIT 5	**Expert Systems and Learning**	**7 HOURS**

App/System/Case study: MYCIN

Contents:

Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics, Expert systems shells. Learning from Observations, General Model of Learning Agents, Inductive learning.

Self Study: Natural Language Processing

Further reading: Statistical Learning

UNIT 6	Neural Networks	7 HOURS

App/System/Case study: Architecture of Complex Pattern Recognition: ART/ART-1

Contents:

Introduction to neural networks, Perceptrons, Single layered feed forward network, Applications of ANN, Neural Networks viewed as directed graphs, Feedback from neurons to ANN.

Self Study: Multi-layered Feed- forward Networks.

Further reading: Hebb's rule

PRACTICAL:Perform 6 experiments (a or b) using python/specifted tools.		
PRACTICAL NO.01		**6 HOURS**

a) Elaborate uninformed search algorithm for any suitable real time application.

b) Develop Vacuum Cleaner Agent Application.

PRACTICAL NO.02		**6 HOURS**

a) Find the shortest path (by number of towns passed and by distance) for any particular source and destination using A* search.

b) Elaborate hill climbing algorithm.

PRACTICAL NO.03		**6 HOURS**

a) Develop 8-puzzle problem using appropriate search method.

b) Develop 4 Queens or 8 Queens Problem using backtracking.

PRACTICAL NO.04		**6 HOURS**

a) Design map coloring problem using backtracking.

b) Make use of Natural Language Toolkit to count word frequency.

PRACTICAL NO.05		**6 HOURS**

a) Develop game of tic-tac-toe using minimax algorithm.

b) Build Fact, Rule, goal for family relationships and arithmetic operations using Prolog.

PRACTICAL NO.06		**6 HOURS**

a) Design map coloring problem using backtracking.

b) Make use of Natural Language Toolkit to count word frequency.

TEXT BOOK

1. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, Pearson, ISBN-13: 978-0-13-604259-4.
2. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", Third Edition, Tata McGraw Hill, ISBN-13: 978-0-07-008770-5.
3. Simon Haykin, "Neural Networks and Learning Machines", Third Edition, Pearson, ISBN: 9789332570313.

REFERENCES

1. Nils Nilsson, "Artificial Intelligence: A New Synthesis ", Second Edition, Morgan Kaufmann Series, ISBN: 9780080948348.
2. Deepak Khemani, "A First course in Artificial Intelligence", First Edition, McGraw Hill Education, ISBN: 9781259029981.
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, ISBN:0201876868.
4. Yegna Narayanan, "Artificial Neural Networks", 8th Printing, PHI, ISBN: 9788120312531.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Project Management
	COURSE CODE	HP 301
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
1	2	15	25	10	NIL	25	75

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

HP301.CEO.1:To introduce the basic concept and scope of Project Management.

HP301.CEO.2:To teach the theory of project Initiation and its analysis with project vision.

HP301.CEO.3:To introduce the concept of risk analysis and different types of tools used in project planning.

HP301.CEO.4:To guide learners monitoring and controlling project progress.

HP301.CEO.5:To introduce the concept of System dynamics, project audit and reviews.

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP301.CO.1:Explain the concept of project management.

HP301.CO.2:Develop an ability to analyze scope, objective and vision of project initiation.

HP301.CO.3:Able to analyze risk and different tools of project planning.

HP301.CO.4:Develop an ability to measure progress of project by monitoring and controlling

HP301.CO.5:Identify the problems associated with project and reviewing the same.

THEORY		
UNIT 1	**Introduction Project Management**	**5 HOURS**
Meaning of Project Management, Classifications of projects, The Triple Constraint, The PMBOK project management process framework, Standard project team roles and project organisation (Functional, matrix, projectised), System approach, Systems development, System analysis, Project feasibility, Product life cycle, Project appraisal, Project contracting, The phases of SDLC.		
UNIT 2	**Project Initiation**	**5 HOURS**
Determining the project business reason, creating a project charter (market and technical analysis), financial analysis evaluation of project proposals, risk analysis, sensitivity analysis and social cost benefits analysis, defining scope and objectives, define a project vision.		
UNIT 3	**Project Planning**	**6 HOURS**
Planning fundamentals, identifying the project team responsibilities, project master plan, work breakdown structure, and other tools of project planning, estimating the efforts and duration of tasks, Identifying and analyzing risks, PERT,CPM,GERT,SLAM,DPM and resource allocation.		
UNIT 4	**Project monitoring and controlling**	**4 HOURS**
Executingthe project on time, Measuring project progress, Identifying corrective actions, Internal & external project control, control process, variance limit, issues in project control.		
UNIT 5	**Project Learning**	**4 HOURS**
System dynamics, Project audit, Change management, Project reviews and reporting.		

PRACTICALS		
PRACTICAL NO.01	**SDLC**	**2 HOURS**
Preparing for managing and developing a perfect model of SDLC for a particular given problem.		
PRACTICAL NO.02	**PERT and CPM**	**2 HOURS**
Planning a project under PERT and CPM charts		
PRACTICAL NO.03	**GERT and SLAM**	**2 HOURS**
Planning a project under GERT and SLAM charts		
PRACTICAL NO.04	**DPM**	**2 HOURS**
Solving practical problems under DPM		
PRACTICAL NO.05	**Variance Limit**	**2 HOURS**
Project monitoring under variance and controlling according to the given situations.		
PRACTICAL NO.06	**System Dynamics**	**2 HOURS**
Understanding System dynamics by solving case studies		
PRACTICAL NO.07	**Change Management**	**2 HOURS**
Solving case studies for learning how change management works.		
PRACTICAL NO.08	**Project Reviewing**	**2 HOURS**
Solving many practical problems by reviewing projects as well as some case studies.		

TEXT BOOK

1. James P. Clements and Gido, Effective Project Management Cengage India 5th Edition , ISBN: 9781111824051
2. John Nicholas, Project Management for Business and Technology: Principles and Practice, PHI-Eastern economy 3rd Edition, ISBN: 0-7506-7824-0
3. Juana Clark Craig, Project Management Lite, 2nd Edition, ISBN-13: 9781478129226
4. Harold R. Kerzner, Project Management, 11th Edition, ISBN: 978-1-118-48322-0

REFERENCE BOOK

1. Erik Larson and Clifford Gray, Project Management: The Managerial Process, McGraw Hill ISBN-10: 0-07-340334-2
2. Enzo Frigneti, The Practice of Project Management, KOGAN PAGE INDIA PRIVATE LIMITED,ISBN: 9788175545397
3. Geogary M. Horine, Project Management, QUE 4th Edition, ISBN: 9780134653914
4. Cynthia Stackpole Snyder, A User manual to The PMBOK Guide, ISBN: 9781118546604
5. Brown, James T., The Handbook of Program Management: How to Facilitate Project Success with Optimal Program Management, Second Edition. The McGraw-Hill Companies, 2014, ISBN 978-0071837859
6. Frame, J. Davidson, Managing Projects in Organizations: How to Make the Best Use of Time, Techniques, and People, 3rd edition, Jossey-Bass, 2003, ISBN 0-787-96831-5
7. Kerzner, Harold, ProjectManagement: Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 10th edition, Wiley, 2009, ISBN 0-470-27870-6
8. Meredith, R. Jack and Mantel, Jr., Samuel J., Project Management: A Managerial Approach, 7th edition, Wiley, 2008, ISBN 0-470-22621-8
9. Stackpole, Cynthia Snyder, A Project Manager's Book of Forms: A Companion to the PMBOK Guide, Wiley, 2009, ISBN 978-0470389843
10. Weiss, Joseph and Wysocki, Robert, Five-phase Project Management: A Practical Planning And Implementation Guide, Basic Books, 1992, ISBN 0-201-56316-9

	COURSE SYLLABI (2016 – 2020)

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COURSE SYLLABI (2016 – 2020)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Software Skill Development Lab
	COURSE CODE	CS305
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
–	4	–	–	–	–	75	75

AIM:
To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

COURSE OBJECTIVES :
CS305.CEO.1:To recognize the importance of and possess the skills necessary for life-long learning

CS305.CEO.2:To enhance the capacity to express programming concepts and choose among alternative ways to express things.

CS305.CEO.3:To improve the background for choosing appropriate programming languages for certain classes of programming problems.

CS305.CEO.4:To construct software solutions by evaluating alternate architectural patterns.

CS305.CEO.5:To apply integrated tool and techniques for building enterprise applications.

CS305.CEO.6:To implement application using IDLE tools.

COURSE OUTCOMES :
The students after completion of the course will be able to,

CS305.CO.1:Acquire practical knowledge within the chosen area of technology for project development.

CS305.CO.2:Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.

CS305.CO.3:Contribute as an individual or in a team in development of technical projects.

CS305.CO.4:Incorporate best practices for building applications.

CS305.CO.5:Test and validate developed prototype against the original requirements of the problem.

CS305.CO.6:Express technical ideas, strategies and methodologies in written form.

Guidelines for Laboratory Conduction :

The assignments to be framed by understanding the prerequisites, technological as- pects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, in- structor can assign one real life application in the form of a mini project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module :		
Module	**Python with Kali Linux**	**36 HOURS**

Prerequisite: Python Programming

Industry Expert: Mr. QaidJohar Jawadwala

Course Instructor: Mr. Santosh Warpe

Course Content

Kali linux, Installation, python programming, socket concept, variables, list, dictionaries, packet sniffer, IP spoofing, passive and active attacks, network attacks

Beneftts:

1. Mini Project implementation

2. Placement Opportunities

PRACTICAL List		
Practical No.01		**4 HOURS**
Write a socket program to scan host vulnerabilities.		
Practical No.02		**4 HOURS**
Write a program to scan network for host active status.		
Practical No.03		**4 HOURS**
Creating a UNIX Password Cracker with Python.		
Practical No.04		**4 HOURS**
Writing a Zip File Password Cracker with Python.		
Practical No.05		**4 HOURS**
Writing a Packet Sniffer for monitoring network traffic.		
Practical No.06		**4 HOURS**
Writing a Python code for full host TCP Port Scanner		
Practical No.07		**4 HOURS**
Writing a Python code for Jamming a Wireless Network.		
Practical No.08		**4 HOURS**
Writing a Python program for sending packets with unknown Source IP (IP Spoofing).		
Practical No.09		**4 HOURS**
Writing a Python program for performing Man-in-the-Middle attack on Network for credential Harvesting.		
Mini Project		

REFERENCE

1. TJ O'Connor," Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers", Syngress, 2012, ISBN 978-15974995761
2. Himanshu Sharma," Kali Linux - An Ethical Hacker's Cookbook", Packt Publishing Limited, 2017, ISBN 978-1787121829
3. Raphael Hertzog, Mati Aharoni," Kali Linux Revealed: Mastering the Penetration Testing Distribution", Offsec Press, 2017, ISBN 978-0997615609

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2018-19
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Software Skill Development Lab
	COURSE CODE	CS306
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME :					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
–	4	–	–	–	–	75	75

AIM:

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

COURSE OBJECTIVES :

CS306.CEO.1:To play role of Business Intelligent Analyst and Data Scientist in Data Analytics Life Cycle.

CS306.CEO.2:To acquire the skills of Analytics in R Programming.

CS306.CEO.3:To perform graphical analysis using Data Visualization tools and techniques.

CS306.CEO.4:To perform analytics for improvement of Business Process.

CS306.CEO.5:To implement application using IDLE tools..

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS306.CO1:Perform the analytics in R on real time data sets.

CS306.CO2:Analyze the real time data with graphical visualization.

CS306.CO3:Generate the different types of analytics reports.

CS306.CO4:Develop the models using analytics for BI Process.

CS306.CO5:Test and validate developed prototype against the original requirements of the problem.

CS306.CO6:Use Tableau Visualization effectively for Data Analytics..

Guidelines for Laboratory Conduction

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module: R Programming

Prerequisite: Database Management System

Industry Expert: Ms. Shobha Mourya

Course Instructor: Ms. Shobha Mourya Mr.Jayvant Devare

Course Content

Basics of R Programming: Installation, Reading and Getting Data into R, Constructing Data Objects, Data:Descriptive Statistics and Tabulation, Data: Distribution, Simple Hypothesis Testing, Introduction to Graphical Analysis, Formula Notation and Complex Statistics, Manipulating Data and Extracting Components, Regression model, Advanced Graphs, Writing your scripts in R, Introduction of data science, Visualization, Introduction to Tableau, Navigating Tableau, Advanced Data Mining With Tableau, Creating bins Visualizing distributions, Modeling.

Beneftts:

1. Dell EMC Certification (optional)
2. Placement Opportunities.

PRACTICAL List		
Practical No.01		**4 HOURS**
Installing and loading R packages, set/get working directory.		
Practical No.02		**4 HOURS**
Import datasets using readr package and explore datasets using dplyr functions.		
Practical No.03		**4 HOURS**
Creating subsets from datasets using filter conditions.		
Practical No.04		**4 HOURS**
Creating new variables using mutate.		
Practical No.05		**4 HOURS**
Analyzing factor variables using frequency and contingency table.		
Practical No.06		**4 HOURS**
Analyzing numeric variables using summary command.		
Practical No.07		**4 HOURS**
Visualization using ggplot2 package for Bivariate, Univariate and Multi-variate plots..		
Practical No.08		**4 HOURS**
Understanding ggplot layers for plotting graphs.		
Practical No.09		**4 HOURS**
Scatter plot, Histogram, Bar chart, Density Plot, Faceting and Scaling.		
Practical No.10		**4 HOURS**
Importing and exploring Titanic dataset.		
Practical No.11		**4 HOURS**
Data wrangling for Titanic case study.		
Practical No.12		**4 HOURS**
Feature engineering for Titanic case study.		
Mini Project :		**8 HOURS**
Note: Data sets should be real time data sets like heart disease, Airline, etc.		

REFERENCES

1. Mark Gardener, "Beginning R: The Statistical Programming Language", Wiley paperback edition 2013, ISBN: 978-1-118-16430-3.
2. Ohri, "R for Business Analytics", Springer, 2012, ISBN: 978-1-4614-4342-1.
3. Ashutosh Nandeshwar, "Tableau Data Visualization Codebook", Packt publishers, ISBN: 978-1-849-68-978-6.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Software Skill Development Lab
	COURSE CODE	CS307
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
--	4	--	--	--	--	75	75

AIM:

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

COURSE OBJECTIVES :

CS307.CEO.1:Plan Extraction, transformation, scraping, joining and cleaning of large data sets

CS307.CEO.2:Analyse large data sets to bring out insights to solve business problems.

CS307.CEO.3:Make use of machine learning libraries and apply established machine learning algorithms classes of programming problems.

CS307.CEO.4:Utilize Machine learning concepts in Python using problem solving approach by working on real time cases and in class programming assignments.

CS307.CEO.5:Develop code in support of Machine learning solutions in Python.

CS307.CEO.6:Evaluate and debug various learning algorithms.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS307.CO.1: Apply python to build various machine learning application.

CS307.CO.2: Interpret the fundamental issues and challenges of machine learning: data, model selection, model complexity.

CS307.CO.3: Identify the strengths and weaknesses of many popular machine learning approaches.

CS307.CO.4: Analyze the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CS307.CO.5: Design and implement various machine learning algorithms in a range of real-world applications.

Guidelines for Laboratory Conduction :

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed .The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module	Python and Machine Learning	36 HOURS

Prerequisite: Python

Course Content

Understanding Data Analytics, Importance of data in business, Data analytics ecosystem, Basis of Python programming, Basics of Python, Variables and Operators, Data types, Lists, Dictio- nary and Functions, Programming in Python, Introduction to Machine learning, python Libraries, Numpy, Scikit, Pandas, Matplotlib, Data Visualization, Supervised learning, Linear Regression, Logistic Regression, Decision Tree, Naive Bayes, K Nearest Neighbor, Random Forest, Dimension- ality Reduction, Gradient Boosting algorithms, Support Vector Machine, Unsupervised learning, Clustering techniques – K means clustering , Association Rule Learning, Natural Language Pro- cessing

Beneftts: 1.Placement Opportunities

PRACTICAL List		
Practical No.01		**4 HOURS**
Perform data processing and cleaning of dataset using Python.		
Practical No.02		**4 HOURS**
Create a machine learning model using Linear Regression (Example : Salary Prediction).		
Practical No.03		**4 HOURS**
Create a machine learning model using multiple linear regression (Example : Flight elay Data For July 2014.		
Practical No.04		**4 HOURS**
Create a machine learning model using Decision Tree (Example : Position of an Employee as per salary).		
Practical No.05		**4 HOURS**
Create a machine learning model using K Means Clustering Algorithm.		
Practical No.06		**4 HOURS**
Create a machine learning model using Market Basket analysis.		
Practical No.07		**4 HOURS**
Create a natural language processing model (Example : Customer purchasing).		
Mini Project		**8 HOURS**
Note: Data sets should be real time data sets like heart disease, Airline, etc.		

REFERENCE

1. Daniel Nedal, "Python Machine Learning from Scratch", AI Sciences paperback edition 2016, ISBN-13: 9781720649496
2. Chris Albon, "Machine Learning with Python Codebook", O'REILLY Paperback, 2018, ISBN-13: 1491989388

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Design And Analysis of Algorithm
		COURSE CODE	CS321
		COURSE CREDITS	4
RELEASED DATE : 01/06/2018		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE :

1. CS201 Data Structure & Files
2. CS211 Discrete Structure & Graph Theory

COURSE OBJECTIVES :

CS321.CEO.1:To be able to carry out the analysis of various algorithms in terms of its computational complexity.

CS321.CEO.2:To identify appropriate algorithmic design strategies to optimize the performance of a given problem.

CS321.CEO.3:To design algorithm for a specified problem.

CS321.CEO.4:To distinguish between P and NP class of problems.

COURSE OUTCOMES :

Students successfully completing the course will be able to,

CS321.CO.1: Analyze and compare complexity of different types of algorithm for different types of problems.

CS321.CO.2: Explain various problem solving strategies.

CS321.CO.3: Design efficient algorithm for a given problem using the strategies learned.

CS321.CO.4: Solve intractable problems using approximation algorithms.

THEORY		
UNIT 1	**Introduction**	**8 HOURS**
App/System/Case study: Packet switched network, Election voting system. **Contents:** Algorithm, performance analysis, Amortized analysis, Asymptotic Notation, Problem solving strategies Divide and Conquer: Basic method, Example: Binary Search, Recurrence: Substitution method, Master Theorem **Self-study:** Performance analysis of quick sort and Merge sort. **Further reading:** Strassen's Matrix multiplication algorithm.		
UNIT 2	**Greedy Method**	**6 HOURS**
App/System/Case study: Application of clipping algorithm in video games, Network Routing **Contents:** Greedy Algorithm: Basic Method, Example: Knapsack Problem, Job Sequencing with Deadline, Activity selection problem. Matroid and Greedy methods **Self-study:** Elements of greedy strategy **Further reading** Task scheduling problem as a matroid		
UNIT 3	**Dynamic Programming**	**8 HOURS**
App/System/Case study: Google Map, Google search engine **Contents:** Dynamic Programming: Basic Method, Example: 0/1 Knapsack, OBST, All pairs shortest path, Bellman Ford algorithm. **Self-study:** Elements of Dynamic programming. **Further Reading:** Coin Changing Problem.		
UNIT 4	**Backtracking and Branch**	**8 HOURS**
App/System/Case study: Parser, Crossword puzzle, Sudoku. **Contents:** Backtracking: Basic Method, Examples: Eight Queen Problem, Graph Coloring Problem. Branch and Bound: Basic Method, FIFO and LC approach, 0/1 knapsack problem (FIFO) Example: Travelling Salesperson problem **Self-study:** : 0/1 Knapsack problem with LC approach **Further Reading:** :15 puzzle problem		

UNIT 5	Complexity Theory	6 HOURS

App/System/Case study:

Airline crew scheduling

Contents:

Classifying Problems, Nondeterministic Deterministic problems, Reductions, Cook's Theorem, NP Complete problem, NP Hard problem, Approximation algorithm: vertex cover problem

Self-study: :Approximation algorithm for TSP

Further Reading: Clique Decision problem.

UNIT 6	Advanced Algorithms	6 HOURS

App/System/Case study:

Plagiarism detector, spell checker, web search engines

Contents:

Spam Filters, Intrusion Detection system, Search Engine, Plagiarism Detection, Randomized algorithm for patter matching, String matching algorithm: KMP, Boyer Moore Algorithm, Robin Karp Algorithm, Number theoretic algorithm.

Self-study: :string matching with finite automata

Further Reading: : Naïve string matching algorithm.

PRACTICAL:		
PRACTICAL NO.01		**4 HOURS**
Design and implement Binary search algorithm using Divide and Conquer method for a given input. Determine the time required to search an element.		
PRACTICAL NO.02		**4 HOURS**
Design and implement Quick Sort algorithm using Divide and Conquer method for a given input. Determine the time required to search an element.		
PRACTICAL NO.03		**4 HOURS**
Using Divide and Conquer strategy find the element in a given sorted array that appears once.		
PRACTICAL NO.04		**4 HOURS**
Design Implement Activity Selection Problem using Greedy Approach. Also calculate the Time complexity for this algorithm		
PRACTICAL NO.05		**4 HOURS**
Implement 0/I knapsack using Greedy Approach. Calculate Time complexity for this algorithm		
PRACTICAL NO.06		**4 HOURS**
Design Implement Coin changing Problem using Dynamic Programming Approach. Also calculate the Time complexity for this algorithm		
PRACTICAL NO.07		**4 HOURS**
Design and implement a solution for a problem of placing eight chess queens on an 88 chessboard so that no two queens threaten each other. Thus, a solution requires that no two queens share the same row, column, or diagonal.		
MINI PROJECT		**8 HOURS**
Student s can form a group of 3 to 4 people and they have to apply various problem solving strategies to solve their problem. Also they have to justify in which category their project come P or NP.		

TEXT BOOK

1. E. Horowitz , S. Sahni, S. Rajasekaran "Fundamentals of Computer Algorithms", 2nd Edition, Universities Press pvt Ltd 2008, ISBN 9788173716126

2. Elmasri R., Navathe S., "Fundamentals of Database Systems", 4th Edition, Pearson, Education, 2003, ISBN 8129702282

3. V. Aho , J.D. Ullman, "Design and Analysis of Computer Algorithms"1st Edition ,Pearson Education 2002, ISBN 8131702057

REFERENCE

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein", Introduction to Algorithm", 3rd Edition, PHI Learning Pvt Ltd, 2011, ISBN 978-81-203-40007-7

2. Parag H Dave, Himanshu B Dave, "Design and Analysis of Algorithms"1st Edition, Pearson Education, 2008, ISBN 81-7758-595-9

MIT	Academy of Engineering	COURSE SYLLABI
	(An autonomous Institute Affiliated to SPPU)	**(2016 – 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Compiler Design
		COURSE CODE	CS322
		COURSE CREDITS	4
RELEASED DATE : 01/06/2018		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE :

1. CS303– Theory of Computation

COURSE OBJECTIVES :

CS322.CEO.1:To learn the design principles of a Compiler.

CS322.CEO.2:To study the various parsing techniques and different levels of translation.

CS322.CEO.3:To understand how to optimize and effectively generate machine codes

CS322.CEO.4:To acquire practical programming skills necessary for constructing compiler.

COURSE OUTCOMES: :

Students successfully completing the course will be able to,

CS322.CO.1:Use different compiler construction tools.

CS322.CO.2:Design a compiler following design principles of compiler.

CS322.CO.3:Implement a compiler with various phases.

CS322.CO.4:Apply code generation and optimization techniques

CS322.CO.5:Demonstrate Flex and Bison tools to create a lexical analyzer and parser.

THEORY		
UNIT 1	**Compiler Basics**	**6 HOURS**

App/System/Case study:

Turbo C++ Compiler, GCC

Contents:

Analysis of the Source Program, the Phases of a Compiler, Cousins of the Compiler, the Grouping of Phases,Compiler-Construction Tools,Translators-Compilation and Interpretation, simple one-pass compiler- Syntax Definition, Syntax Directed Translation, Parsing, Lexical Analysis

Self-study: Symbol Table

Further reading: Abstract Stack Machines.

UNIT 2	**Lexical Analysis**	**8 HOURS**

App/System/Case study:

JavaCC (generates lexical analyzers written in Java) and JFLex (lexical analyzer generator for Java)

Contents:

Need and Role of Lexical Analyzer, Input Buffering, Language for Specifying Lexical Analyzers , Expressing Tokensby Regular Expressions , converting Regular Expression to NFA, Optimization of DFA-based pattern matchers

Self-study: Specification of Tokens, Recognition of Tokens

Further reading LEX-Design of Lexical Analyzer generator for a sample Language

UNIT 3	**Syntax Analysis**	**8 HOURS**

App/System/Case study:

Lex (Lexical Analyzer) Yacc (Parser Generator)

Contents:

Need and role of the parser, Context Free Grammars, Top Down parsing, Bottom up Parsing, Recursive Descent Parser , Predictive Parser , FIRST and FOLLOW procedures ,LL(1) Parser , Operator precedence parsers, Shift Reduce Parser , LR Parser, LR(0) item, Construction of SLR Parsing table , Introduction to LALR Parser, YACC Design of a syntax analyzer for a sample language

Self-study: Canonical LR parsing

Further Reading: Look Ahead LR parsing in detail

UNIT 4	**Translation and Type Checking**	**6 HOURS**

App/System/Case study:

Meta compilers - META II and TREE-META

Contents:

Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S Attributed Definitions, LAttributed Definitions, Top down Translation, Bottom-Up Evaluation of Inherited Attributes, recursive evaluators,Analysis of syntax directed definitions.

Self-study: :Back patching type systems

Further Reading: OLAP cubes for advanced analytical Specification of a simple type checker

UNIT 5	Code Generation And Optimization	6 HOURS

App/System/Case study:

Loop optimizations , Code generator optimizations

Contents:

Issues in the design of code generator, The target machine, Runtime Storage management , Basic Blocks and Flow Graphs , Next-use Information , A simple Code generator, DAG representation of Basic Blocks, PeepholeOptimization, Principal sources of Optimization, optimization of basic blocks, loops in flow graphs.

Self-study: :Issues in design of a code generator

Further Reading: Loop Invariant Code Motion, Strength Reduction

UNIT 6	Run Time Environments	8 HOURS

App/System/Case study:

Just-in- time Compilation

Contents:

Global Data Flow Analysis, Runtime Environments, Source language issues, Storage organization, Storageallocation, Storage Allocation strategies , Access to non-local names, Parameter Passing Symbol tables-Dynamic storage allocation.

Self-study: :Efficient data flow algorithms

Further Reading: :Parallel and Distributed Compilers

PRACTICAL:		
PRACTICAL NO.01		**4 HOURS**
Write a program in C++ to demonstrate basic syntax of LEX specifications, built in functions and Variables.		
PRACTICAL NO.02		**4 HOURS**
Design and develop Lexical Analyzer for C++ language using LEX that should recognize identifiers, digits,operators, keywords, special symbols and white spaces and also supports error handling		
PRACTICAL NO.03		**4 HOURS**
Write a program in C++ to demonstrate basic syntax of YACC specifications, built in functions and Variables.		
PRACTICAL NO.04		**4 HOURS**
Write an ambiguous CFG to recognize an infix expression and implement a parser that recognizes the infix expression using YACC. Provide the details of all conflicting entries in the parser table generated by LEX and YACC and how they have been resolved Intermediate Code Generation		
PRACTICAL NO.05		**4 HOURS**
Design sample syntax Analyzer and implement the same for C++ language using YACC tool. Syntax Analyzer should recognize syntax errors like Missing parenthesis, Missing semicolons etc.		
PRACTICAL NO.06		**8 HOURS**
Write an attributed translation grammar to recognize declarations of simple variables, "for", assignment, if, if - else statements as per syntax of C++or Pascal and generate equivalent three address code for the given input made up of constructs mentioned above using LEX and YACC. Write a code to store the identifiers from the input in a symbol table and also to record other relevant information about the identifiers. Display all records stored in the symbol table.		
PRACTICAL NO.07		**4 Hours**
Design regular expression and implement sample regular expression for c language. Design Regular Expression like (a/b)*ba(a/b)* - Implement above Regular Expression such that it should accept all the strings belong to that Regular Expression.		
PRACTICAL NO. 8		**8 Hours**
Mini Compiler for C language [Compiler Construction Project] Design and implement a compiler for the programming language having the following specifications: a. Identifier Rules b. Data Types c. Expressions d. Statements e. Loops f. Comments		

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi Jeffrey. D. Ullman,"Compilers Principles, Techniques Tools",Pearson Education,third edition, 2007,ISBN-13: 978-8173716065.
2. Cooper, K.D. and Torczon, L., "Engineering a Compiler", Morgan Kaufmann. 2004 ISBN 9780080472676
3. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press,2002 ISBN 9780521607643

REFERENCE

1.1. Dhamdhere D M, "Compiler Construction Principles and Practice", second edition, Macmillan India Ltd., New Delhi, 2001
2. PDick Grone, Henri E Bal, Ceriel J H Jacobs and Koen G Langendoen, Modern Compiler Design, John Wiley and Sons, USA, 2000. ISBN-10: 0-471-97697-0.
3. Allen I. Hollub, Compiler Design in C, PHI, 1990. ISBN: 978-0131550452
4. Andrew W. Appel, Modern Compiler Implementation in Java. Cambridge University Press, 1998 or 2002, ISBN 9780521820608
5. Thomas W. Parsons, Introduction to Compiler Construction. Computer Science Press,1992 http://lambda.uta.edu/cse5317/notes/notes.html www.cs.bilkent.edu.tr/

	COURSE SYLLABI (2016 – 2020)
MIT | Academy of Engineering (An Autonomous Institute) **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI** **(2016 – 2020)**
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F** **AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME** Computer Networks
	COURSE CODE CS323
	COURSE CREDITS 4
RELEASED DATE : 01/06/2018	**REVISION NO** 0.0

TEACHING SCHEME		EVALUATION SCHEME						
(HOURS/WEEK)		THEORY				PRESENTATION/		TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION		
3	2	30	40	30	30	20	-	150

PRE-REQUISITE: :

1. CS201 Data and File Structure.

2. CS211 Discrete Structure and Graph Theory

COURSE OBJECTIVES :

CS323.CEO.1:To comprehend the fundamental concepts of data communication and networking.

CS323.CEO.2:To identify how different coding techniques works.

CS323.CEO.3:To apply various techniques to solve real life problems.

COURSE OUTCOMES :

Students successfully completing the course will be able to,

CS323.CO:1:Comprehend signals and communications types.

CS323.CO:2:Distinguish data communication system and its components.

CS323.CO:3:Elaborate different types of network topologies and protocols.

CS323.CO:4:Demonstrate various analog and digital modulation and demodulation techniques.

CS323.CO:5:Evaluate routing protocols for different real time systems.

CS323.CO:6:Design different application/systems related to networking.

THEORY		
UNIT 1	**Networking Basics**	**6 HOURS**

App/System/Case study: E-Mail System, Real time video conferencing

Contents:

Data Communications: Components, data representation, data flow, Networks: Distributed processing, network criterion, physical structures, network models, categories of networks, Internetwork

Self Study: The Internet

Further reading: Protocol and standards

UNIT 2	**Network Models**	**6 HOURS**

App/System/Case study: Banking/Social/Educational Server

Contents:

Layered tasks: Sender, receiver and carrier, The OSI Model: Layered architecture, Peer to peer processes,encapsulation, Layers in the OSI model, TCP/IP protocol suite

Self-Study: ATM , X.25 protocol

Further Reading: IBM SNA

UNIT 3	**Physical Layer and Media**	**8 HOURS**

App/System/Case study: Telephone Network, Digital Speedometer, Multi User Network Games

Contents:

Data and Signals: Analog and Digital, Periodic Analog, Periodic   Non periodic Signals, Periodic analog signals, Transmission Impairments, Performance, Digital to Digital Conversion: Line Coding ,Line Coding Schemes, Transmission Modes: parallel and Serial Transmission, Analog Transmission: Digital to Analog conversion, Analog to Analog conversion, Multiplexing, Spread Spectrum

Self-study: Guided Media

Further Reading: Unguided Media

UNIT 4	**Data Link Layer**	**8 HOURS**

App/System/Case study: WinRAR, WinZip

Contents:

Introduction, Block Coding: Error Detection and correction, Hamming codes ,Cyclic Redundancy Check, Framing: Fixed and Variable size , Flow and Error Control, Noiseless and Noisy Channels: Simplest Protocol, Stop and Wait Protocol, Stop and Wait ARQ ,Sliding Window Protocols: GO back N ARQ, Selective Repeat ARQ, HDLC , Random Access: CSMS,CSMA/CD,CSMA/CA

Self Study: 802.3(Ethernet)

Further reading: Bluetooth (IEEE 802.15 standard)

UNIT 5	**Network Layer**	**7 HOURS**

App/System/Case study: Team viewer, Windows Remote Desktop Connection, Travelling Salesman Problem	
Contents:	
Design issues, Routing Algorithms: Distance Vector Routing, Link State Routing, Path Vector Routing, IP Protocol, IPv4 and IPv6 addressing schemes, Subnetting, NAT, CIDR, ICMP, , Routing in Internet: RIP ,OSPF, BGP	
Self Study: Multicast Routing Protocols	
Further reading: Routing in Internet	

UNIT 6	**Transport and Application Layer**	**7 HOURS**
App/System/Case study: Moodle Server, FileZilla, IP messenger, WhatsApp, Hike.		
Contents:		
Process to Process Delivery, Transmission Control Protocol (TCP), User Datagram Protocol (UDP),Domain Name System (DNS), Hypertext Transport Protocol (HTTP), Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP), Dynamic Host Configuration Protocol (DHCP)		
Self Study: Terminal Emulation (TELNET)		
Further reading: Post Office Protocol 3 (POP3)		

PRACTICAL:		
Practical No.1		**2 HOURS**
Setup a wired LAN using Layer 2 Switch and then IP switch of minimum four computers. It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility and demonstrate the PING packets captured traces using Wireshark Packet Analyzer Tool.		
Practical No.2		**2 HOURS**
Using Cisco Packet tracer to configure Switch and Router 1.Assign IP address of the switch 2.Set default gateway of the switch 3.Save configuration 4.Synchronize switch's status messages 5.Setting router name to R1 6.Set privileged mode password 7.Set privileged mode secret.		
Practical No.3		**2 HOURS**
Design and test different types of network topology using router, switch and nodes.(Packet tracer)		
Practical No.4		**2 HOURS**
Write a program to detect and correct single bit error using Hamming codes.		
Practical No.5		**2 HOURS**
Write a program to implement sliding window protocol.		
Practical No.6		**2 HOURS**
Write a program to implement simple communication between Client-Server using sockets utility and demonstrate the packets captured traces using Wireshark Packet Analyzer Tool.		
Practical No.7	**Mini Project**	**12 HOURS**
Guide Lines 1. Maximum 3 students allowed in each group. 2. Each group will work on design and Implementation. 3. Students should submit the report in soft copy and hard copy.		

TEXT BOOK

1. Behrouz A. Forouzan, "Data Communications and Networking", 4thedition, Tata McGraw-Hill Publications, 2006, ISBN 978-0-07-296775-3

REFERENCE BOOK

1. Andrew S. Tanenbaum, David J.Wetherall, "Computer Networks", 5thedition, Pearson Education India, 2013, ISBN 978-9332518742
2. Larry L. Peterson Bruce S. Davie, "Computer Networks", 5thedition, Morgan Kaufmann Publisher, 2011, ISBN 978-0123850591.
3. William Stallings, "Data and Computer Communications", 9thedition, Pearson Education India, 2013, ISBN 978-9332518865.
4. Doulas E. Comer, "Computer Networks and Internets, 6th edition, Pearson Education Limited,2015, ISBN 978-1292061177.
5. Alberto Leon-Garcia , Indra Widjaja, "Communication Networks" ,2nd edition, McGraw-Hill Education,2003, 978-0072463521.

MIT | Academy of Engineering	COURSE SYLLABI (2016 – 2020)		
(An autonomous Institute Affiliated to SPPU)			
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:**2018 – 2019	
THIRD YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY	**COURSE NAME**	Cyber Security	
	COURSE CODE	IT331	
	COURSE CREDITS	4	
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0	

TEACHING SCHEME		EVALUATION SCHEME					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50		150

PRE-REQUISITE:E :

IT311:Network Security work

COURSE OBJECTIVES :

IT331.CEO1:To gain a fundamental knowledge of what Cyber Security is and how it applies to your daily work.

IT331.CEO2:To understanding of terms commonly used in Cyber Security such as "vulnerability".

IT331.CEO3:To provide the fundamental skills and understanding needed to identify Cyber Security threats.

IT331.CEO4:To ascertain the usefulness of taught concepts of cyber forensics in their awareness.

COURSE OUTCOMES: :

IT331.CO.1:Use appropriate resources to stay abreast of the latest industry tools and techniques.

IT331.CO.2:Understand what a vulnerability is and how to address most common vulnerabilities.

IT331.CO.3:Possess a fundamental knowledge of Cyber Security.

IT331.CO.4:Outline the fundamental risk management principles as it relates to Cyber Security.

IT331.CO.5:Analyze and evaluate systems with respect to maintaining operations in the presence of risks and threats.

IT331.CO6:Apply web security principles and identify security attacks.

UNIT 1	Introduction to Cyber Crimes	10 HOURS

Introduction to Cyberspace, Definition of Cybercrime, Classification of Cybercrimes, E-mail Spoofing, Spamming, Cyberdefamation, Internet Time theft, Forgery, Web Jacking, Newsgroup spams, Industrial spying, Online frauds, Software Piracy, Computer Sabotage, E-mail Bombing, The Legal Perspective.
Self-Study: Current and Fulltime Threats
Further Reading: E-Mail and SPAM, Spoofing.

UNIT 2	Cyber Intrusions and offenses	10 HOURS

Planning an attack, Cyberbullies, Social Engineering, Cyberstalking, Botnets, Security challenges posed by mobile devices, Attacks on mobile devices,Phishing, Recognizing Phishing trip, Identity theft, Tools and methods used in cybercrime.
Further Reading: Cyber stalkers.

UNIT 3	Network and Application Security	8 HOURS

Basic concepts of Network Security, Computer Infection Program:malware, Virus, Worm, Working principle of Trojan Horse, Network Attacks, Firewalls and VPNs, Case Study: E-mail System, Database and Operating System Security basics.
Self-Study: Messaging Security
Further Reading: E-Commerce Public Key Infrastructure

UNIT 4	Web Services and Privacy	6 HOURS

Privacy on the Internet, Privacy consideration in Web Services, Privacy in Semantic Web, Privacy considerations in the Use of Context-Sensitive Technologies, Security and Privacy aspects of Service Oriented Architecture. Case Study: Shopping carts and Payment Gateways.
Self-Study:
browser/environment dependent attacks
Further Studies:
session related vulnerabilities

UNIT 5	Cyber Crimes and Cyber Security A Legal Perspective	6 HOURS

Cybercrime and the legal Landscape around the world, Necessity of Cyber laws, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Various Consequences, Digital signatures and the Indian IT Act, Amendments, Cybercrime and Punishment, Cyber law, Technology and Students.
Self-Study: Different type of attacks Interfacing with DAC
Further Studies: dealing with Ransom ware

PRACTICAL:Perform following experiments using Open source software		
Practical NO.01		**6 HOURS**
A. Study of the features of firewall in providing network security and to set B. Configure Security parameters in any one web browser C. Study of different types of vulnerabilities for hacking a websites / Web Applications		
Practical NO.02		**6 HOURS**
A. Study of different types of vulnerabilities for hacking a websites / Web Applications. B. With the help of an open source tool, hack a web site		
Practical NO.03		**6 HOURS**
A. Install Virtualbox or Wine and configure the same. B. Grab a banner with TELNET and perform the task using NETCAT C. Perform port scanning using NMAP.		
Practical NO.04		**2 HOURS**
Active and Passive fingerprinting using necessary open source tools.		
Practical NO.05		**2 HOURS**
Perform a packet sniffing for router traffic using any open source tool.		
Practical NO.06		**2 HOURS**
Analysis the security vulnerabilities of E-Mail Applications.		
Practical NO.07		**2 HOURS**
Using an security auditing tool,build reports about security configuration for a system		
Practical NO.08		**2 HOURS**
Perform an audit of Wireless router or Access Point and decrypt WEP and WPA.		

TEXT BOOK

1. CYBER SECURITY: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole, Sunit Belpure ISBN-13: 978-8126521791
2. Internet Security: A Jumpstart for Systems Administrators and IT managers by Tim Speed and Juanita Ellis ISBN: 9780080509075.
3. Web Hacking-Attacks and Defence by Stuart McClure, Saumil Shah, Shreeraj Shah ISBN-13: 978-0201761764.

REFERENCE BOOK

1. Security Architecture: Design, Deployment and Operations by Christopher King, Curtis Dalton, T.Ertem Osmanoglu ISBN-13: 978-0072133851.
2. Information Security: Principles and Practices by Mark Merkow, Jim Breithaupt ISBN: 9780133589412.
3. Information Systems Security by Nina Godbole ISBN-13: 978-8126516926.

		COURSE SYLLABI
MIT Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**		**COURSE SYLLABI** **(2016 – 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Predictive Analytics
	COURSE CODE	CS331
	COURSE CREDITS	4
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME :					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	EC E	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE : CS 311: Descriptive Analytics

COURSE OBJECTIVES :

CS331.CEO.1:To implement Various Association algorithms.

CS331.CEO.2:To summarize the supervised learning methods.

CS331.CEO.3:To understand the advanced classification techniques

CS331.CEO.4:To explain the unsupervised learning methods.

CS331.CEO.5:To explain the supervised learning methods.

CS331.CEO.6:To explain the feature engineering and ensemble learning

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS331.CO.1:Analyze various Association Algorithms..

CS331.CO.2:Apply the classification and prediction techniques.

CS331.CO.3:Use the advanced classification techniques.

CS331.CO.4:Analyze the unsupervised learning methods.

CS331.CO.5:Analyze the different clustering methods

CS331.CO.6:Apply the feature engineering and ensemble learning.

THEORY		
UNIT 1	**Association**	**6 HOURS**
App/System/Case study: Retail Industry **Contents:** The Apriori Algorithm (Greedy): Improving the Efficiency of Apriori, Mining Frequent Itemsets Using Vertical Data Format, Mining Closed Frequent, FP growth(ARM approach). **Self Study:** Multilevel Association Rules Generation. **Further Reading:** Association Mining for Sequence Data		
UNIT 2	**Classiftcation and Prediction : supervised learning methods**	**8 HOURS**
App/System/Case study: House price prediction Case **Contents:** Basic learning/mining tasks, Inferring rudimentary rules: 1R algorithm, Decision trees, Covering rules, The prediction task, Statistical (Bayesian) classification, Bayesian networks, Instance-based methods (nearest neighbor), Linear models, Rule-based classification, Navie Bay's Classification **Self Study:** Classification Assessment **Further Reading:** A fast Scalable Classifier for Data mining		
UNIT 3	**Classiftcation Techniques**	**6 HOURS**
App/System/Case study: Retail Industry **Contents:** Baysian Belief Network, KNN, Back-Propagation , SVM, Lazy Learners, Classification Techniques using Weka/R/Python **Self Study:** Linear Discriminant Analysis **Further Reading:**Kernel SVM		
UNIT 4	**Clustering -Unsupervised Machine Learning Method.**	**8 HOURS**
App/System/Case study: Grocery – shopping cart Case Study **Contents:** First conceptual clustering system: Cluster/2 , Partitioning methods: k-means, expectation maximization (EM) ,Hierarchical methods: distance-based agglomerative and divisible clustering **Self Study:** Density based Clustering **Further Reading**:Clustering Validation		
UNIT 5	**Clustering Techniques –Extended.**	**6 HOURS**
App/System/Case study: Online Shopping Case Study **Contents:** Conceptual Clustering: Cobweb , Agglomerative clustering Experiments with Weka - EM, Cobweb **Self Study:** Spectral Clustering **Further Reading**:Graph Clustering		
UNIT 6	**Feature Engineering and Ensemble Learning**	**6 HOURS**
App/System/Case study: Food Recommender Case Study **Contents:** Feature engineering and selection, Ensemble learning such as Random Forests and AdaBoost **Self Study:** Deep Learning **Further Reading:** Non Linear Featuring		

PRACTICAL NO.01	Planning store layout, promotions, and recommendations using stored transactions data	8 HOURS

Understanding grocery data, dimensions and problem statement

Understanding the transaction dataset

Calculating Support, Confidence and Lift on the Grocery data set

Applying A priory Algorithm and calculating it

Observing and inspecting the rules generated by the priory rule

Interpreting the output of the Priory Algorithm of MBA

Assignment - Preparing Travel planner using MBA

PRACTICAL NO.02	Sales/ Demand forecast using ARIMA in R	8 HOURS

Differentiating time series and noise using Moving Averages (MA) and Autoregressive (AR) processes

Combining AR and MA models to create ARMA models

Converting ARMA to ARIMA to remove trend

Using ARIMA Model to forecase next 12 months sale o Finding out trend and seasonality effect to decide between ARMA and ARIMA models o Checking stationarity assumption using Dickey Fuller Test o Identifying lags to finalize normal ARIMA/ Seasonal ARIMA model o Using ACFs and PACFs (Box Jenkins model)

Validating Model to check if residuals are normally distributed with zero mean, are uncorrelated, and have minimum variance

Forecasting next 12 months sale

PRACTICAL NO.03	Finding trains of similar characteristics (Indian Railways) - K-Means Clustering	8 HOURS

Scaling and Standardizing Indian Railways data set - Finalizing K-means Clustering

Determining/ calculating Initial Seeds for Railways data

Calculating and using Calinski Value on Railways data

Plotting Elbow chart on Railways data

Performing k-means clustering on Railways data

Finalizing clusters and inferring from the results

PRACTICAL NO.04	Random Forest Algorithm – Insurance Losses .	6 HOURS

Standardizing Losses in Insurance data

Calculating Distance in Losses of Insurance data

Growing trees using Random Forest

Plotting and using variable importance plot

Finalizing results of the Random Forest Algorithm

TEXT BOOK

1.. Jiawei Han, Micheline Kamber, Jian Pei Professor, "Data Mining: Concepts and Techniques",
The Morgan Kaufmann Series in Data Management Systems, ISBN 978-9380931913

REFERENCE BOOK

1. Grolemund, Garrett "R for Data Science", O'Reilly ISBN: 9781491910382
2. Gupta G.K., "Introduction to Data Mining with Case Studies", PHI ISBN 13: 9788120350021

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Machine Learning
	COURSE CODE	CS332
	COURSE CREDITS	4
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME :					
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	EC E	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE:

CS 201: Data and File Structure, CS 312 : Artificial Intelligence and Neural Networks

COURSE OBJECTIVES :

CS332.CEO.1: To illustrate foundation and types of machine learning.

CS332.CEO.2: To summarize modern techniques in machine learning.

CS332.CEO.3: To explain the algorithms of machine learning.

CS332.CEO.4: To explain the unsupervised learning methods

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS332.CO.1: Explain supervised unsupervised learning.

CS332.CO.2:Make use of methods and techniques of machine learning

CS332.CO.3:Apply learning methods to solve real time examples.

CS332.CO.4:Analyze the various machine learning algorithms.

CS332.CO.5:Design the ML algorithms

THEORY		
UNIT 1	**Introduction to Machine Learning**	**7 HOURS**

App/System/Case study:

Robotics,Gaming Analytics.

Contents:

Illustrate history foundation of ML, Supervised Learning , Unsupervised Learning, The Machine Learning CycleDefining the Process: Planning, Developing Testing, Reporting, Refining, Production, Data processing, Data storage, data privacy.

Self-study: stock trading

Further Reading: Medicine and Healthcare

UNIT 2	**Bayesian Networks And Baye's Theorem**	**7 HOURS**

App/System/Case study:

Medical test i.e detection of symptoms diseases

Contents:

Bayesian Networks: Introduction, illustrations: Pilots to Paperclips, A Little Graph Theory, A Little Probability Theory, Conditional Probability, Winning the Lottery, Bayes' Theorem :How Bayesian Networks Work, Maximum Likelihood Estimation, Evaluating an Estimator, The Bayes' Estimator.

Self Study: Coin flips Example

Further Reading: Naıve Baye's Classification

UNIT 3	**Classiftcation Techniques**	**6 HOURS**

App/System/Case study:

Travelling Salesman person problem, Bin picking problems (Knapsack problems)

Contents:

Decision Trees: Basics, Uses, Advantages, Limitations, Algorithm Types, Univariate Trees : classifica-tion tree, pruning, rule of extraction, Bayesian decision theory: classification utility theory, association rule

Self Study: Tree search, planning examples

Further Reading: Job-shop Scheduling example

UNIT 4	**Clustering.**	**8 HOURS**

App/System/Case study:

Face-book Like button

Contents:

Introduction, Illustrations: The Internet, Business and Retail ,Law Enforcement ,Computing, Linear and Non Linear Clustering, Clustering method : K-means clustering, hierarchical clustering, Gaussian clustering

Self Study: K-median clustering algorithm and applications

Further Reading: Earth Quake studies

UNIT 5	Association Rules	6 HOURS

App/System/Case study:

Web Usage Mining(AMAZON/FLIPCARD product association),Soft drinks and Diapers marketing
Contents:

How Association Rules Learning Works: Support, Confidence, Lift, Conviction, Defining the Process,

Market Basket Analysis: Example, Frequent Item sets, Closed Item sets, Apriori Algorithm.

Self-Study: FP-Growth.

Further Reading: Context Based Association Rules.

UNIT 6	SVM.	7 HOURS

App/System/Case study:

Amazon product recommendation

Contents: FBasics of Support Vector Machine (SVM), SVM classification: Binary and multiclass, linear classifier, Nonlinear classifier, confidence, Maximizing and minimizing to find line, SVM base Recommendation systems, Recommendation algorithms.

Self Study: Face-book friend recommendation

Further Reading: Credit Application

PRACTICAL		
PRACTICAL NO.01		**6 HOURS**

A. Design an Naïve Bayesian Classifier to determine ,if an email is spam based only on its text. OR
B. Implement Naïve Baye's classification algorithm use data set for weather forecasting with Weka Tools/Python/Java

PRACTICAL NO.02		**6 HOURS**

A. Analyze unsupervised data using K-means method with Weka tool.

OR

B. Analyze unsupervised data by using K-means clustering method in JAVA Or Python

PRACTICAL NO.03		**6 HOURS**

A. Build a face book friend recommendation system.

OR

B. Build " Whom to follow" recommendation system from Twitter data.

PRACTICAL NO.04		**6 HOURS**

A. Develop an application using association rule based Apriori algorithm use Weka tool.

OR

B. Develop an application using association rule based Apriori algorithm using Python Or Java

PRACTICAL NO.05		**6 HOURS**

To Analyze graph for hacking twitter social graph data.(Use Python/Java/any Tool)

PRACTICAL NO.06		**4 HOURS**

A .Case Study: optimization technique by attempting to break a simple letter cipher.
OR
B. Case Study : Pattern matching (Use Springer IEEE paper)

TEXT BOOK

1.. Machine Learning: Hands-On for Developers and Technical Professionals. Jason Bell Paperback: 404 pages, Publisher: Wiley (2014),Language: English,ISBN-10: 8126553375, ISBN-13: 978-8126553372

2.. Introduction to Machine Learning, 3rd Edition, Ethem Alpaydin, and Paperback: 612 pages Publisher: PHI LEARNING PVT. LTD-NEW DELHI (2015), Language: English, ISBN-10: 8120350782 ISBN-13: 978- 8120350786

3.. Data Mining: Concepts and Techniques,Jiawei Han, Micheline Kamber, Jian Pei, Hardcover: 744,Publisher: Morgan Kaufmann; 3 edition (25 July 2011), Language: English ISBN-10: 9380931913, ISBN-13: 978- 9380931913

REFERENCES:

1. Introduction to Machine Learning with Python: A Guide for Data Scientists, by Andreas Muller,Paperback: 392 pages,Publisher: Shroff/O'Reilly; First edition (2016),Language: English,ISBN-10: 9352134575,ISBN-13: 978-9352134571

2. Python Machine Learning Cookbook, Prateek Joshi,Paperback: 304 pages, Publisher: Packt Publishing Limited (23 June 2016), Language: English, ISBN-10: 1786464470 ISBN-13: 978-TMH, 2009, ISBN-13: 978-8120337312

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Professional Skills
	COURSE CODE	HP 302
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
1	2	NIL	NIL	NIL	50	25	75

PRE-REQUISITE : Basic Communication Skills

COURSE OBJECTIVES :

HP302.CEO.1:To define the importance of professional skills in students life

HP302.CEO.2:To explain them necessary, specific professional skills

HP302.CEO.3:To appraise students for placements through acquisition of professional skills

HP302.CEO.4:To support them detect their present level in respect of each professional skill and show
             direction for improvement

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP302.CO.1:Relate the importance of professional skills(L2)

HP302.CO.2:Build necessary, specific professional skills (L3)

HP302.CO.3:Analyze the environment of employ-ability (L4)

HP302.CO.4:Develop various techniques of effective team building in their professional life(L6)

PRACTICALS: (SECTION A)		
PRACTICAL NO.01	**Self Awareness**	**2 HOURS**
Concept of Johari Window, Advantages and disadvantages of every quadrant, Identifying the proportion of each quadrant in respect of self, Using the tools of Feedback & Exposure for self-development		
PRACTICAL NO.02	**Personal Interviews**	**6 HOURS**
Preparing for Interviews, Typical expected questions & suggested responses, Posture, Body language, Greetings and pleasantries, , Handling unforeseen questions		
PRACTICAL NO.03	**Group Discussion**	**4 HOURS**
Parameters of assessment, Initiating the discussion, Effective listening, Own contribution, Paraphrasing, Arguing and counter-arguing, Giving direction to the discussion		
PRACTICAL NO.04	**Team building and Motivation**	**2 HOURS**
Hallmark of effective teams, Barriers to team work, Subjugation of Individual interests for achievement of teams goal, Leading & motivating team members		
PRACTICAL NO.05	**Innovative Thinking**	**2 HOURS**
Relevance and importance of innovative thinking, Introduction to Brain Storming technique, Collective and individual Brain Storming,		
PRACTICAL NO.06	**Decision Making**	**2 HOURS**
Levels of decisions, Process of decision-making, Types of criteria, Individual and collective decision-making, Barriers in decision making, Keys to sound decision-making		
SECTION B:	**Aptitude Training.**	
.		

REFERENCE BOOK

1. Stephen Covey: The Seven Habits of Highly Effective People, Simon and Schuster Ltd, ISBN: 0-671-71117-2

2. Krishna Mohan, Meera Banerji, Developing Communication Skills, Birla Institute of Technology and Science, ISBN: 033392-919-5

3. Charles Kepner and Benjamin Tregoe, The Rational Manager: A systematic Approach to Problem Solving and Decision Making , Tata McGraw-Hill Publishing Company Ltd., ISBN:13:978-0070341753

4. Priyadarshini Patnaik, Group Discussion and Interview Skills , Foundation Books, 1st Ed.- 2011, ISBN No.: 9788175967847, 8175967846.

MIT | Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY	**COURSE NAME**	Basic Entrepreneurship
	COURSE CODE	HP303
	COURSE CREDITS	1
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	CA	PRACTICAL	DEMONSTRATION	
--	2	NIL	NIL	25	NIL	25	50

PRE-REQUISITE : WF Orientation Course

COURSE OBJECTIVES :

HP303.CEO.1:To understand the fit between you and your entrepreneurialambitions

HP303.CEO.2:To find a problem worthsolving

HP303.CEO.3:To identify yourcustomers

HP303.CEO.4:To develop a solution for your customers' problems and problemsolution

HP303.CEO.5:To build and demonstrate anMVP

HP303.CEO.6:To structure a business model around the problem, customer, and solution and present your Business ModelCanvas.

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP303.CO.1:Why entrepreneurship requires

HP303.CO.2:Outline the Problems Worth Solving by using various techniques like DT, JTBD

HP303.CO.3:Identify the Customer Segments and Early Adopters

HP303.CO.4:Develop the solution demo for identify problem.

HP303.CO.5:Create Business Model Canvas and Minimum Viable Product

PRACTICALS:		
PRACTICAL NO.01	**GET STARTED - Discover Yourself**	**2 HOURS**

Find your flow, Effectuation, Case Study: Tristan Walker: The extroverted introvert, Identify your entrepreneurial style.

PRACTICAL NO.02	**IDEA/PROBLEM - Identify Problems Worth Solving**	**4 HOURS**

What is a business opportunity and how to identify it. Find problems around you that are worth solving. Methods for finding and understanding problems - (Observation, Questioning, DT, Jobs to be done (JTBD) How to run problem interviews to understand the customer's worldview Introduction to Design Thinking - Process and Examples Generate ideas that are potential solutions to the problem identified - DISRUPT GOOTB: Run problem interviews with prospects Class Presentation: Present the problem you "love" Form teams

PRACTICAL NO.03	**CUSTOMER**	**6 HOURS**

Identify Your Customer Segments and Early Adopters The difference between a consumer and a customer (decision maker); Market Types, Segmentation and Targeting, Defining the personas; Understanding Early Adopters and Customer Adoption Patterns. Identify the innovators and early adopters for your startup.Craft Your Value Proposition Come up with creative solutions for the identified problems Deep dive into Gains, Pains and Jobs-To-Be-Done (using Value Proposition Canvas, or VPC) Identify the UVP of your solution using the Value Proposition section of the VPC Outcome-Driven InnovationClass Presentation: Communicating the Value Proposition- 1 min Customer Pitch

PRACTICAL NO.04	**BUSINESS MODEL**	**4 HOURS**

Get Started with Lean Canvas Basics of Lean Approach and Canvas; Types of Business Models (b2b; b2c)

PRACTICAL NO.05	**VALIDATION**	**9 HOURS**

Develop the Solution Demo Build solution (mockups) demo, How to run solution interviews, GOOTB: Run Solution interviews. Does your solution solve the problem for your customers: The problem-solution test. Sizing the Opportunity Differences between a Startup venture and a small business; Industry Analysis Understanding what is Competition and it's role, Analyze competition Case study: Blue Ocean Strategy Building an MVP Identify an MVP and build it - I; Document and validate your assumptions Build-Measure-Learn feedback loop and the MVP/Javelin Board How to do MVP Interviews GOOTB: Run MVP interviews Is there a market for your product –The product-market fit test Class Presentation: Present your MVP

PRACTICAL NO.06	**MONEY**	**5 HOURS**

Revenue Streams Basics of how companies make money. Understand income, costs, gross and net margins. Identify primary and secondary revenue streams. Pricing and Costs Value, price, and costs; Different pricing strategies. Understand product costs and operations costs; Basics of unit costing Financing Your New Venture How to finance business ideas, Various sources of funds available to an entrepreneur and pros and cons of each, What investors expect from you, Practice Pitching to Investors and Corporates.

PRACTICAL NO.07	**TEAM**	**2 HOURS**

Team Building Shared Leadership Role of a good team in a venture's success; What to look for in a team; How do you ensure there is a good fit? Defining clear roles and responsibilities. How to pitch to candidates to join your startup Explore collaboration tools and techniques - Brainstorming, Mind mapping, Kanban Board, #Slack.

PRACTICAL NO.08	**MARKETING & SALES**	**2 HOURS**

Positioning Understand the difference between product and brand and the link between them. Define the positioning statement for your product/service and how it should translate into what your customers should see about that brand in the marketplace. Channels & Strategy Building Digital Presence and leveraging Social media, Creating your company profile page, Measuring the effectiveness of selected channels, Budgeting and planning. Sales Planning Understanding why customers buy and how buying decisions are made; Listening. Sales planning, setting targets. Unique Sales Proposition (USP); Art of the sales pitch (focus on customers needs, not on product features) Follow-up and closing a sale; Asking for the sale.

PRACTICAL NO.09	**SUPPORT**	**2 HOURS**

Planning & Tracking Importance of project management to launch and track progress Understanding time management, workflow, and delegation of tasks Business Regulation Basics of business regulations of starting and operating a business; Importance of being compliant and keeping proper documentation How to find help to get started

PRACTICAL NO.10	**Capstone Project: Present Your BMC (Optional - and MVP)**	**2 HOURS**

BMC: Business Model Canvas. / MVP: Minimum Viable Product.

REFERENCES

1. Read Forbes article and do Group Discussionhttps://www.forbes.com/sites/chrismyers/2015/12/16/find-your-flow-and-success-will-follow/

2. https://necrophone.com/2014/01/20/effectuation-the-best-theory-of-entrepreneurship-you-actually-follow-whether-youve-heard-of-it-or-not/

3. Use your self awareness to find out what motivates and drives Entrepreneurial activity - Ted Talk "What is your Entrepreneurial style - EntrepreneurKnow

4. Prof. Clay Christensen"Identifying Customer Needs"https://www.youtube.com/watch?v=yVCZ-7xSsCw

5. Understand the customer problem by GOOTB":by GOOTB":https://www.youtube.com/watch?v=sEENIZgscDw

6. https://www.forbes.com/sites/danschawbel/2013/12/17/geoffrey-moore-why-crossing-the-chasm-is-still-relevant

7. Value Proposition: https://www.youtube.com/watch?v=jZN6CUieuOQ&list=PLw540Wq5kay866m6A6xI7KOwEAh7is4m

8. Value Proposition & Customer Need:https://www.youtube.com/watch?v=6FnG8pJL8yM&index=3&list=PLw540Wq5kay866m6A6xI7KOwEAh7is4m

9. https://strategyn.com/turn-customer-input-into-innovation/   CASE   STUDIES   in   ODI: https://jobs-to- be-done.com/tagged/case-study

10. TheLeanBMC https://www.youtube.com/watch?v=FjBe7UO1hc

11. Ash Maurya -Capture your BMC in 20

12. minuteshttps://www.youtube.com/watch?v=7o8uYdUaFR4&t=462s

13. Ash   Maurya   -   How   to   Prioritize   Risks   on   Your   BusinessModel https://www.youtube.com/watch?v=01z7EPXS42k

14. https://pt.slideshare.net/bmorelean/dan-lemberg-lean-pitch

15. https://startups.fb.com/en-in/categories/development/

16. Designing Experiments: https://www.youtube.com/watch?v=WiMZWCg1Hu8&t=111s

17. Customer Development Process:https://www.youtube.com/watch?v=lLEebbiYIkI

18. Beating the Competition: https://www.youtube.com/watch?v=46uP6vOj5G0

19. Q&A with Garr :https://www.youtube.com/watch?v=SmJjjOrusyI

20. Basic Accounting Lingo for Entrepreneurs:https://www.youtube.com/watch?v=Y7Pm1jEEKE

21. Vinod Khosla : How Leaders can BUILDhttps://www.youtube.com/watch?v=bRCoBgCn1Q

22. Vinod Khosla: https://www.youtube.com/watch?v=VIrNLzTs9cw

23. How   to   Pitch   the   way   VC's   think,   so   you   can   convince   co-founders : https://www.youtube.com/watch?v=fTgU7THoKCw

24. Tony Buzan:http://www.tonybuzan.com/about/mind-mapping/

25. Google : Think branding:https://www.youtube.com/watch?v=1l2CUjkg0ug

26. Th
    0   Design   rules-https://www.igorinternational.com/,   Web   design course:https://www.coursera.org/specializations/web-designStrikingly   Free   : https://www.strikingly.com/online-resume/linkedin

27. https://certification.hubspot.com/inbound-sales-certification-course

28. https://www.udemy.com/courses/business/sales/

29. https://www.accountingtools.com/articles/2017/5/17/sales-budget-sales-budget-example

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	2018 – 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Mini Project
	COURSE CODE	CS324
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
–	4	–	–	–	–	75	75

PRE-REQUISITE :

1. ET206 Prototyping,
2. CS213 Minor project.

COURSE OBJECTIVES :

CS324.CEO.1:To understand the Product Development Cycle through Mini project.

CS324.CEO.2:To undertake execute a mini Project through a group of students

CS324.CEO.3:To inculcate skills in engineering product design and development process, budgeting, Planning, testing, effective trouble-shooting practices, aesthetics and ergonomics.

CS324.CEO.4:To understand the role of professional and ethical practices, management princi-ples,Technical documentation and communication skills in engineering.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS324.CO.1:Execute an idea in a team as well as within constraints.

CS324.CO.2:Acquire knowledge of the techniques, skills and modern engineering tools necessary for engineering practices.

CS324.CO.3:Use standard engineering tools and processes for design, simulation, testing,analysis in implementation and deployment of theoretical idea into practice.

CS324.CO.4:Use standard documentation and presentation tools for a professional report and presen-tation of the work.

PREAMBLE : The main objective of this course is to understand the Product Development Cycle through mini Project, Where students will undertake execute a project through a group of students. They will plan for various activities of the project and distribute the work amongst team members. The students will learn budgeting, planning for the project, engineering skills and processes, testing and effective trouble-shooting practices, safety norms and standards, significance of aesthetics ergonomics while designing a product. This course will develop students.abilities to transmit technical information clearly and delivery of presentation based on the Mini Project. They will understand the importance of document design standards by compiling technical report on the mini Project work carried out in a team.

PRACTICAL		
Stage- 1	**Formation of group and Allocation of project adviser**	**Week 1**

. Project group formation and project advisor allocation by the department

. Project group shall consist of Minimum 02 and maximum 03 students per group (For detailed process please check Annexure-1 Mini project guidelines)

. Selection of finalized topic from approved project topics by the department.

. The project design idea shall be based on refereed papers, white papers, product, patent, application notes,industry problem, academic, institute or societal requirement, funded research, innovative thought,modification/ development in existing idea etc.

. Each student will maintain a logbook/project diary. This diary will be utilized to monitor project progress throughout

Stage- 2	**Project Review -1 Internal review by project adviser**	**Week-2,3**

. The project group will work on ,

1. Conceptualization of an Idea 2. Literature review 3. Market survey 4. Finalizing the Specifications

. Presentation of work progress to project adviser and proceed to project approval.

Stage- 3	**Project Review -2 Project Approval**	**Week-4**

. Presentation of concept to Department Review Committee (DRC) or Committee appointed by department.

. Review of concept and feasibility of project and necessary suggestions for implementation by the committee

. The project group will make corrections and continue their work.

Stage- 4	**Project Review -3 Internal review by project adviser**	**Week-5,6,7,8,9**

. The project group will work on ,

1. System Architecture and Design 2. Simulation /software development (As applicable) 3. Manufacturing of project 4. Assembly 5. Testing6. Troubleshooting.

. Presentation of work progress to project adviser and proceed to final project progress review.

Stage- 5	Project Review -4 Final Project progress review	Week-10,11

.The project group will work on ,

1. Result analysis against specifications 2. Enclosure/Aesthetic design (As applicable) 3. Technical report generation (Draft copy) 4. User's manual (As applicable) 5. Bill of material etc.

. The technical report may incorporate following points,

1) Title

2) Introduction and Concept

3) Literature Market survey

4) Theory and relevance

5) Block diagram

6) Drawings (As applicable)

7) Specifications

8) Project plan

9) Bill of material

10) Enclosure/aesthetic design (As applicable)

11) Results

12) Results analysis

13) Conclusion

14) References

. Presentation of project work, draft copy of technical report , Final presentation etc. to DRC or Committee appointed by department.

. Review of project progress and necessary suggestions by DRC or Committee appointed by department for final presentation.

. The project group will make corrections. After clearing all comments from DRC; project can be presented to final l examination.

. Project must be approved by department to appear for final examination.

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Practical- 6	Examination: Final Demonstration and presentation	Week-12

.Final examination will be divided in three parts a) Demonstration b) Presentation c) Project docu-
Mentation, For the final examination project must be demonstrated in front of examiner panel.

  For Industry sponsored projects or other installations examiner panel can visit
. All students must be physically present in front of examiner panel at the time of examination.
. Only demonstrated projects can be evaluated for presentation and documentation.
. Mini Project demonstration: Demo of project works and validation of project results to examiners
Panel
. Mini Project presentation: Presentation of overall project work form project idea to implementation
and deployment of project to examiners panel.
. Mini Project documentation: Presentation of technical documentary report to examiners panel

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Assessment :

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1.Internal Assessment:
   a. Project Review -2 Project Approval -05 Marks
   b. Project Review -3 Internal review by project adviser- -05 Marks
   c. Project Review -4 Final Project progress review- 10 Marks
2.Examination: Final Demonstration and presentation
   a. Mini Project demonstration: 20 Marks
   b. Mini Project presentation: 20 Marks
   c. Mini Project documentation: 15 Marks

MIT | Academy of Engineering

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Final Year

Bachelor of Technology in Computer Engineering

2016-2020

(With Effect from Academic Year: 2019-2020)

MIT | Academy of Engineering
(An Autonomous Institute)

CURRICULUM STRUCTURE (2016 - 2020)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F	:	2019-20
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE	:	01/12/2017
	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 12	CS401	Software Engineering, Testing and Quality Assurance.	3	2	4
2.	DE 1	CS41#	Department (Program) elective - Ref er Annexure	3	0	3
3.	OE 3	CS42#	Open Elective – Refer Annexure	3	2	4
4.	HSS 6	HP402	Sociology	2	--	2
5.	HSS7/SDP7	HP403/CS40#	Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux)	---	2	1
6.	SDP 8	CS405	Project – I	--	8	4
7.	SDP9	CS406	Summer Internship	--	--	4
			TOTAL	11	14	22

SEMESTER:VIII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 13	CS431	Human Computer Interaction	3	2	4
2.	DE 2	CS44#	Department (Program) elective - Ref er Annexure	3	0	3
3.	OE 4	CS45#	Open Elective – Refer Annexure	3	2	4
4.	HSS8	HP401	Engineering Economics	2	---	2
5.	SDP10	CS432	Project – II	---	8	4
			TOTAL	11	12	17

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Software Engineering, Testing and Quality Assurance
		COURSE CODE	CS401
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
3	2	30	40	30	30	20	150

PRE-REQUISITE : ET206: Prototyping, ET201: System Engineering

COURSE OBJECTIVES :

CS401.CEO.1:To understand the basics of testing, test planning and design and test team organization

CS401.CEO.2:To study the various types of test in the life cycle of the software product.

CS401.CEO.3:To build design concepts for system testing and execution.

CS401.CEO.4:To learn the software quality assurance ,metrics, defect prevention techniques.

CS401.CEO.5:To learn the techniques for quality assurance and applying for applications.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS401.CO.1:To understand the basics of testing, test planning and design and test team organization.

CS401.CO.2:To study the various types of test in the life cycle of the software product.

CS401.CO.3:To build design concepts for system testing and execution.

CS401.CO.4:To learn the software quality assurance, metrics, defect prevention techniques.

CS401.CO.5:To learn the techniques for quality assurance and applying for applications.

| THEORY COURSE CONTENT		
UNIT 1	**Basics Of Software Engineering**	**6 HOURS**
App/System/Case study: Learning Game Design and Software Engineering through a Game Prototyping Experience. **Content:** Process Models - Waterfall Model, Prototyping, Incremental, Spiral, RAD. Software Requirement Specification: Requirement Process, SRS Components, Requirement Specifications with Use Cases Diagram, Requirements Validation. Software Project Planning: Project Planning objectives. Software Metrics: Size, Function Point, Staffing, Project Estimation Methods – Decomposition Techniques; Empirical Estimation Models – COCOMO Model. **Self-Study:** The evolving role of software –characteristics, components and applications. **Further Reading:** Software estimation techniques.		
UNIT 2	**System Testing**	**6 HOURS**
App/System/Case study: Manual Testing (Online Marketing Software Platform) **Content:** System Testing - System Integration, Techniques-Incremental, Top Down Bottom Up Sandwich and Big Bang, Software and Hardware Integration, Hardware Design Verification Tests, Hardware and Software Compatibility Matrix Test Plan for System Integration. Built-in Testing. Functional testing - Testing a Function in Context. Boundary Value Analysis, Decision Tables. acceptance testing - Selection of Acceptance Criteria, Acceptance Test Plan, Test Execution Test. software reliability - Fault and Failure, Factors Influencing Software, Reliability Models **Self-Study:** Manual Testing Process Life Cycle. **Further Reading:**Test Case Design and Execution		
UNIT 3	**Automatic Testing**	**7 HOURS**
App/System/Case study: Journey Boosts Revenue and Reduces Costs by Implementing TEST Co Software Test Automation Solutions **Content:** Introduction to Automation, Training of Application, Test Automation Process. Introduction to Selenium: Selenium IDE Interface, Replay Scripts, Locate the elements on a Web page, Shared UI Map, Functions in Web Driver, Configuration File, Synchronizing Web Driver scripts, Dynamic UI Objects, Reporting in Selenium. **Self-Study:** Sample Naming Conventions, Coding Conventions. **Further Reading:** Continuous Integration with Jenkins.		

UNIT 4	Software Reliability Modeling	7 HOURS

App/System/Case study:

Software Reliability In Safety Critical Supervision And Control Of Nuclear Reactors

Content:

Historical Perspective and Implementation Exponential Failure Time Class of Model, Schneidewind's Model, Hyper exponential Model, Weibull and Gamma Failure Time Class of Models, Infinite Failure Category Models, Bayesian Model, Model Relationships.

Self-Study: Software Reliability Prediction in Early Phases of the Life Cycle.

Further Reading: Techniques for Prediction Analysis and Recalibration

UNIT 5	Software Quality Assurance	8 HOURS

App/System/Case study:

Successful Application of Software Reliability By Norman F. Chneidewind

Content:

Quality concepts, Software quality assurance , SQA activities; Software reviews: cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting and record keeping, review guidelines; Formal approaches to SQA; Statistical software quality assurance; software reliability: Measures of reliability and availability ,The ISO 9000 Quality standards: The ISO approach to quality assurance systems, The ISO 9001 standard, Software Configuration Management.

Self-Study: Software Quality ISO Standards

Further Reading: ISO/IEC 9126 Software engineering

PRACTICAL		
PRACTICAL NO.01		**8 HOURS**

Perform following experiments using Open source tools. Note: Following are the reference case studies, can be changed with other appropriate examples with same level.
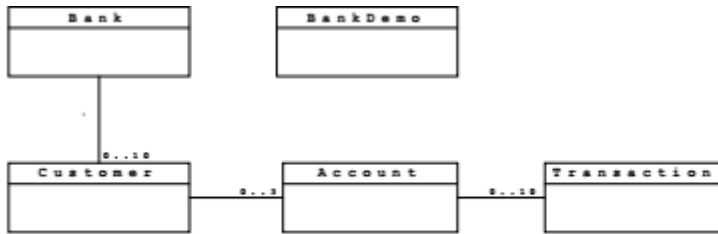
BankDemo

The BankDemo is the main class of the program. It has a main () method that will be used to test the functionality of the classes in the program.

Bank

A Bank has an array of Customers (maximum 10) and an addCustomer() method that adds a new Customer to the array.

Customer

A Customer has a name and an array of Accounts (maximum 3). Customer has an addAccount() method that adds a new Account to the array. Customer also has a printAccountsSummary() method that prints details of all of their Accounts.

Account

An Account has an accountNumber and a balance. It is possible to withdraw money from the Account using the withdraw() method and to deposit money using the deposit() method. An Account also has an array of Transactions (maximum 10). Each time a deposit or withdrawal is made, a new Transaction is created and added to the array. Note: For simplicity, only whole amounts of currency can be deposited or withdrawn.

Transaction

A Transaction has a numerical amount (negative or positive) and a description.

Exercise Steps

1. Start up a new project in Together and create the class diagram shown above. Add the specified attributes and methods to each class via the diagram.

Note 1: All attributes should be private. This means that you should supply public get. . . () methods for them.

Note 2: You will probably need to make the following Together configuration change to see the get. . . () methods you add. Go to Tools — Options — Project Level and a dialog box will appear. Expand the View Management item in the explorer view on the left and select the JavaBeans ∕ C++ Properties item. In the panel on the right, make sure Recognize Java Beans is unchecked. Click OK to return to the project.

2. In the source code for Customer add a constructor that takes a name as a parameter. The constructor should set the Customer's name attribute and also create a new array of Accounts (with the maximum size as specified above). To create arrays of objects, use code like the following: Thing[] things = new Thing[200]; where Thing is the class name, things is the name you want to give the array and 200 is the size of the array.

3. In the source code for Account add a constructor that takes an account Number as a parameter. The constructor should set the Customer's account Number attribute, set the balance to zero and create a new array of Transactions (with the maximum size as specified above)

PRACTICAL NO.02		**8 HOURS**

Measure software cost and effort for a realistic project using COCOMO II tool.(Build small project and identify the cost of it)

PRACTICAL NO.03		**6 HOURS**

Test a program using manual testing :

1. Login a specific web page.

2. Update 10 student records into table into Excel file.

3. Total number of objects present / available on the page

4. Select the number of students who have scored more than 60 in any one subject (or all subjects).

5. To get the number of list items in a list /combo box and count number of check boxes on the page checked and unchecked count.

PRACTICAL NO.04		**8 HOURS**

Automate some Open Source CRM Software — Vtiger CRM and install locally and try automating few tests and Identify software quality by considering following test cases.
1. Data Quality and Conversion in CRM
2. Functionality of CRM
3. Reporting and Integration
4. Regression and User Acceptance Testing

TEXT BOOK

1. Roger Pressman, "Software Engineering: A Practitioner's Approach", McGraw-Hill Education; 8 edition ISBN 13: 9789339212087.
2. Srinivasan Desikan, "Software Testing Principals and practices", Pearson Publication ISBN-13 978-8-17-758295-6.

REFERENCE BOOK

1. Software Testing And Quality Assurance-Theory and Practice, Kshirasagar Nak, Priyadarshi Tripathy, John Wiley & Sons Inc,2008
2. Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement, Jeff Tian, John Wiley & Sons, Inc., Hoboken, New Jersey. 2005.
3. Software Quality Assurance - From Theory to Implementation, Daniel Galin, Pearson Education Ltd UK, 2004
4. Software Quality Assurance, Milind Limaye, TMH, New Delhi, 2011.
5. The Art of Software Testing, by Glenford J. Myers , Corey Sandler, Tom Badgett, 3rd Edition, Wiley; 3rd edition, ISBN-13: 978-1118031964.
6. Selenium Testing Tools Cookbook - Second Edition, Unmesh Gundecha , Publisher: Packt Publishing, ISBN:13 -9781784392512

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Operating System Design
		COURSE CODE	CS411
		COURSE CREDITS	3
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	-	30	40	30	-	-	100

PRE-REQUISITE : CS301: Operating System

COURSE OBJECTIVES :

CS411.CEO.1:To explain the system concepts and kernel data structures.

CS411.CEO.2:To recall the system calls in files and internal data structures used by Unix

CS411.CEO.3:To learn the processes and inter process communication in Unix system

CS411.CEO.4:To identify memory management policies of Unix operating system

CS411.CEO.5:To analyze the design techniques with toy operating system

CS411.CEO.6:To model toy operating system

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS411.CO.1:Demonstrate the design and structure of Unix operating system

CS411.CO.2:Develop short system utilities and applications using system calls

CS411.CO.3:Choose the system calls to manipulate the process context and control its execution

CS411.CO.4:Compare memory management policies.

CS411.CO.5:Develop a toy operating system

THEORY COURSE CONTENT		
UNIT 1	**Introduction To Kernel**	**6 HOURS**

App/System/Case study: Reading and writing Disk Blocks

Content:

History, System structure, OS services, Architecture of UNIX OS, Introduction to system concepts, Kernel Data Structures, The Buffer Cache- Buffer Headers, structure of buffer pool.

Self Study: Scenarios of retrieval of buffer

Further Reading: Efficiency of Unix Buffer Cache

UNIT 2	**Internal Representation Of Files**	**8 HOURS**

App/System/Case study: Case study on the System calls for the file system

Content:

Inodes, Structure of regular file, Directories, Inode assignment to new file, Allocation of disk blocks

Self Study: System calls in windows

Further Reading: Reading & Writing disk blocks

UNIT 3	**The Structure Of Processes**	**6 HOURS**

App/System/Case study: Setting and retrieving kernel time, retrieving process execution time.

Content:

Process states & transitions , Layout of system memory, context of process, saving the context of process, process creation, signals, process termination , awaiting process termination, user ID of a process, the shell, system boot & init process, process scheduling

Self Study: Process states

Further Reading: System calls for time

UNIT 4	Memory Management Policies & I-O Sub System	8 HOURS

App/System/Case study: Study of device drivers

Content:

Swapping: Allocation of swap space, Swapping processes out, Fork swap, Expansion swap, Swapping processes in, Demand Paging, I/O subsystem: Driver Interfaces, Disk drivers, Streams.

Self Study: Virtual memory in Unix

Further Reading: Page replacement algorithms

UNIT 5	Inter-process Communication	6 HOURS

App/System/Case study: Different forms of Inter process communication.

Content:

Process tracing, System V IPC, Network Communications, Sockets, Multiprocessor Systems : Problem of multiprocessor systems, solution with master & slave processors.

Self Study: Multiprocessor scheduling

Further Reading: Semaphore method that allows all processors to execute in kernel mode

UNIT 6	Design Techniques	8 HOURS

App/System/Case study: Case study on Toy Operating System.

Content:

Design Process, Design Problems, Two Level Implementations, Interface Design, Connection in Protocols, Interactive and Programming Interfaces, Decomposition Patterns.

Self Study: Design considerations for Distributed operating systems

Further Reading: Transparent distributed model without stub processors

TEXT BOOK

1. Maurice J. Bach, "The Design of the Unix Operating System", First Edition, Pearson Education, 2010
2. Charles Crowley, "Operating Systems: A Design-Oriented Approach", McGraw-Hill, ISBN13: 9780256151510

REFERENCE BOOK

1. Sumitabha Das, "Unix Concepts & Applications", Fourth Edition ,Tata McGraw Hill, ISBN:0- 07- 063546-3
2. Stephen Prata, "Advanced Unix –A Programmer's Guide" ,BPB,ISBN: 81-7029-107-0
3. Bruce Molay, "Understanding Unix/Linux Programming" Prentice Hall, ISBN 0130083968

	COURSE SYLLABI
MIT **Academy of Engineering** (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020

FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Wireless and Mobile Networks
	COURSE CODE	CS412
	COURSE CREDITS	3
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	-	30	40	30	-	-	100

PRE-REQUISITE : CS323 : Computer Networks

COURSE OBJECTIVES :

CS412.CEO.1:To build an understanding of wireless network.

CS412.CEO.2:To understand architecture and types of Wireless Networks.

CS412.CEO.3:To identify design issues of Wireless Network.

CS412.CEO.4:To know the challenges of Wireless Network.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS412.CO.1:Determine issues and challenges in Wireless Network.

CS412.CO.2:Categories different types of wireless networks.

CS412.CO.3:Determine issues and challenges of Mobile Ad-Hoc Networks

CS412.CO.4:Assessing the features of Mobile Ad-Hoc Networks.

CS412.CO.5:Design and implement Wireless Sensor Network.

CS412.CO.6:Apply different security algorithms in wireless sensor network.

THEORY COURSE CONTENT		
UNIT 1	**Basics Of Wireless Networks**	**7 HOURS**

App/System/Case study: Smart phones, Wi-Fi, Hotspot, MANET, VANET, Wireless Mouse and Keyboard etc.

Content:

Wireless Network Architecture, Classification, Wireless Switching Technology, Wireless Communication Problems with examples, Wireless Network Reference Model, Wireless Networking Issues, Wireless Networking Standards.

Self Study: Evolution of Wireless Networking.

Further Reading: Trends in Wireless Networking.

UNIT 2	**Types Of Wireless Networks**	**7 HOURS**

App/System/Case study: Bluetooth, SHARE it, Internet Service Providers, WLAN in Inventory control, Publicly Shared Data Networks Provided by ISP, Privately Owned Networks.

Content:

Introduction, Properties, Network Architecture, Network Components, Protocols, Technologies and Applications of following wireless networks

1) Wireless Body Area Network (WBAN)

2) Wireless Personal Area Network (WPAN)

3) Wireless Local Area Network (WLAN / Wi-Fi)

4) Wireless Metropolitan Area Network (WMAN / Wi-Max)

5) Wireless Wide Area Network (WWAN)

Self Study: IEEE Standards for WBAN, WPAN, WLAN, WMAN and WWAN.

Further Reading: 1) A review on Wireless Body Area Network for Medical Applications. 2) Wireless Personal Area Networks Architecture and protocols for Multimedia Applications

UNIT 3	**Basics Of Mobile Ad-Hoc Networks**	**7 HOURS**

App/System/Case study: Military Communication, Virtual Classrooms, Multi user Games etc.

Content: Wireless ad-hoc Network: Introduction, Features, Advantages, Applications, Ad-Hoc Mobility Models (Indoor and outdoor) MANET: Historical Development, Basics, Features, Challenges, Deployment Issues, Technologies, Applications, Protocols and their classification. MAC Protocols: Design issues, goals and classification, Contention based protocols- with reservation, scheduling algorithms, IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

Self Study: DUCHA – Dual Channel MAC Protocol.

Further Reading: Attacks and Challenges in MANET.

UNIT 4	**Routing Protocols And Transport Layer Protocol In MANET**	**7 HOURS**

App/System/Case study: Use of MANET in Military.

Content:

Routing Protocols: Design issues, goals and classification, Proactive, reactive and hybrid routing, Uni cast routing algorithms, Multi-cast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, Transport layer: Issues in designing, Transport layer classification, Ad-Hoc transport protocols.

Self Study: QoS aware routing.

Further Reading: ZRP – Zonal Routing Protocol, DYMO – Dynamic MANET on Demand.

UNIT 5	**Wireless Sensor Network**	**7 HOURS**

App/System/Case study: Military, Health Care, Disaster Management, Home Control, Industrial Automation etc.

Content:

Introduction, Network Architecture, Sensing and Communication Ranges, Design Issues, Challenges, Energy Consumption, Clustering of Sensors, Protocols and their Classification, Applications.

Self Study: Routing in Wireless Sensor.

Further Reading: Operating Systems for Wireless Sensor Network.

UNIT 6	**Security In Wireless Network**	**7 HOURS**

App/System/Case study: Attack in Wireless Networks.

Content:

Wireless LAN Security, Wireless Application Protocol (WAP) Overview, Wireless Transport Layer Security, WAP End-to-End Security.

Self Study: Wireless Datagram Protocol (WDM), Wireless Transaction Protocol (WTP)

Further Reading: Extensible Authentication Protocol (EAP)

TEXT BOOK

1. Dr. Sunil kumar S. Manvi, Mahabaleshwar S. Kakkasageri, "Wireless and Mobile Networks Concepts and Protocols", Wiley India Pvt. Ltd., 2010, ISBN: 978-81-265-2069-5.
2. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007.
3. Charles E. Perkins, Ad hoc Networking, Addison – Wesley,2000
4. KazemSohraby, Daniel Minoli, TaiebZanati, "Wireless Sensor Network Technology, Protocols and Applications", John & Wiley Sons INC., 2007, ISBN 978-0-471-74300-2. [Freely available on internet]
5. William Stallings, "Cryptography and Network Security – Principles and Practice", Fifth Edition, PEARSON Publication.

REFERENCE BOOK

1. Carlos de Morais Cordeiro, Dharma Prakash Agrawal, "AD HOC SENSOR NETWORKS", World Scientific Publishing Co. Pte. Ltd., 2006, ISBN : 13: 978-81-7596-792-2.
2. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile ad hoc networking, Wiley-IEEE press, 2004.
3. Mohammad Ilyas, " The handbook of adhoc wireless networks", CRC press, 2002
4. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobilead hoc networking, Wiley-IEEE press, 2004.
5. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.

MIT **Academy of Engineering** (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY **INFORMATION TECHNOLOGY**	**COURSE NAME**	Information Retrieval
	COURSE CODE	IT413
	COURSE CREDITS	3
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS						
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL	
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
3	-	30	40	30	-	-	100	

PRE-REQUISITE :

1. CS201 Data and File Structure
2. CS321 Design and Analysis of Algorithms

COURSE OBJECTIVES :

IT413.CEO.1:Learn the information retrieval methods and models.

IT413.CEO.2:Be familiar with web search engine.

IT413.CEO.3:To Understand theoretical base behind standard IR models

IT413.CEO.4:Be exposed to evaluation analysis of IR models.

IT413.CEO.5:Introduce to modern IR methods.

COURSE OUTCOMES :

The students after completion of the course will be able to,

IT413.CO.1:Understand the process of representing, retrieving and analyzing IR models and advanced IR models.

IT413.CO.2:Understand structure of web and working of crawlers

IT413.CO.3:Develop IR models form standard IR models.

IT413.CO.4:Develop the standard methods for web indexing and evaluation

IT413.CO.5:To analyze optimization techniques various algorithms used in web search.

THEORY		
UNIT 1	**Introduction to Information Retrieval**	**6 HOURS**

App/System/Case study: logistic issues

Content:

Introduction: Information Retrieval, History of IR, Issues. Architecture of a Search Engine: Architecture, Basic Building Blocks, Components of building blocks: Text Acquisition, Text Transformation, Index Creation, User Interaction, Ranking, Evaluation

Self Study: An example information retrieval problem

Further Reading: The role of artificial intelligence (AI) in IR

UNIT 2	**Web Crawlers**	**6 HOURS**

App/System/Case study: Web Crawlers

Content:

Deciding What to Search, Web structure , Crawling the Web, Web Search Architectures , Crawling Documents and Email, Document Feeds, The Conversion Problem, Storing the Documents, Meta Crawlers, Focused Crawling, Detecting Duplicates, Removing Noise

Self Study: Google Bot, Bing Bot

Further Reading: Open Source Web Crawlers

UNIT 3	**Retrieval Models**	**8 HOURS**

App/System/Case study: Similarity Based IR Models

Content:

Processing Text: From Words to Terms, Text Statistics, Document Parsing, Document Structure and Markup, Boolean Model, Vector Space Model, Probabilistic Model.

Self Study: Alternative Models

Further Reading: learning-to-rank.

UNIT 4	Indexing & Retrieval Evaluation	6 HOURS

App/System/Case study: Basic Indexing- Map Reduce

Content:

Indexing: Inverted Indexes, Compression, Index Construction, Retrieval Evaluation: Why Evaluate?, The Evaluation Corpus, Logging, Effectiveness Metrics, Efficiency Metrics, Training, Testing, and Statistics

Self Study: Query Processing

Further Reading: Query Interfaces

UNIT 5	Web-Search Optimization	6 HOURS

App/System/Case study: Google Search Engines

Content:

Web Search: History of Web, Indexing, Link Analysis (HITS, PageRank), Relevance Scoring and ranking for Web, Search Engine Optimization, On page Optimization, Off page optimization

Self Study: Personalized search, Handling "invisible" Web

Further Reading: Summarization, Question Answering, Reporting.

UNIT 6	Advanced Information Retrieval	8 HOURS

App/System/Case study: Information Retrieval of Images

Content:

Multimedia Information Retrieval, Parallel and Distributed IR, Meta-Ranking, Searching with Communities, Filtering and Recommending, Web data mining, Structure Revisited

Self Study: Economic, ethical, legal and political issues

Further Reading: Categorization algorithms

TEXT BOOK

1. W. Bruce Croft, Donald Metzler, Trevor Strohman, "Search Engines Information Retrieval in Practice" Ⓢ W.B. Croft, D. Metzler, T. Strohman, 2015, Electronic Copy Freely Available
2. C. Manning, P. Raghavan, and H. Schütze, "Introduction to Information Retrieval" Cambridge University Press, 2008 ISBN – 978-1107666399.

REFERENCE BOOK

1. Ricardo Baeza -Yates and Berthier Ribeiro – Neto, "Modern Information Retrieval: The Concepts and Technology behind Search" 2nd Edition, ACM Press Books 2011 ISBN - 978-0136072249.
2. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, "Information Retrieval: Implementing and Evaluating Search Engines", The MIT Press, 2010 ISBN - 978-0262528870.
3. Ophir Frieder "Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series", 2nd Edition, Springer, 2004 ISBN - 978-1402030031.

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY		**COURSE NAME**	Ethical Hacking and Cyber Laws
		COURSE CODE	IT421
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE :
IT321: Cyber Security

COURSE OBJECTIVES :

IT421.CEO.1:Understand Various types of footprinting, footprinting tools, and countermeasures

IT421.CEO.2:AnalyzeNetwork scanning techniques and scanning countermeasures.

IT421.CEO.3:Enumeration techniques and enumeration countermeasures.

IT421.CEO.4:Working of viruses, virus analysis, computer worms, malwareanalysis procedure, and countermeasures.

COURSE OUTCOMES: :

The students after completion of the course will be able to

IT421.CEO.1:Identify and analyse the stages an ethical hacker requires to take in order to compromise a target system.

IT421.CEO.2:Identify tools and techniques to carry out a penetration testing.

IT421.CEO.3:Critically evaluate security techniques used to protect system and user data.

IT421.CEO.4:Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system.

IT421.CEO.5:Classify different types of webserver attacks, attack methodology, and countermeasures.

IT421.CEO.6:Understand Wireless Encryption, wireless hacking methodology, wirelesshacking tools, and wi-fi security tools

THEORY		
UNIT 1	**Introduction to Ethical Hacking**	**6 HOURS**
Introduction, Legal and Illegal part in Hacking, Network Hacking, Network Vulnerability, Route Protocol Hacking,Firewall Scanning, Application Proxy Vulnerabilities		
UNIT 2	**Foot printing and Social Engineering**	**6 HOURS**
Footprinting Concepts, Internet Footprinting,Different types of scanning, Using DNS Zone transfers, Introduction to Social Engineering		
UNIT 3	**Web and Password Hacking**	**9 HOURS**
Web Server Hacking, Web Application Hacking, Hacking a web platform, Cracking a password, E-mail Hacking,SSL Fraud, Internet relay chat Hacking		
UNIT 4	**Software Hacking**	**9 HOURS**
Remote Control Insecurities, Virtual Network computing, Terminal Server and Citrix, Session Hijacking, Trojans,Secure Shell (SSH) Attacks, Subverting the system environment		
UNIT 5	**Attacking the Web**	**6 HOURS**
Web Authentication threats, Bypassing Authentication, Attacking the Web Authorization, Attacking ACLs, Attacking Tokens, Case Studies		
UNIT 6	**Cyber Crimes and Cyber Laws**	**6 HOURS**
Introduction to IT laws Cyber Crimes – Internet, Hacking, Cracking, Viruses, Virus Attacks, Pornography,Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits, and Cyber Security		

PRACTICAL:Perform following experiments using Open source software.		
PRACTICAL NO.01		**6 HOURS**
Setting up The Lab, Installing Kali 2018 As a Virtual Machine Installing Metasploitable As a Virtual Machine		

PRACTICAL NO.02		**6 HOURS**
Network Penetration Testing Connecting a Wireless Adapter To Kali		

PRACTICAL NO.03		**6 HOURS**
Network Penetration Testing - Pre Connection Attacks: Packet Sniffing Basics Using Airodump-ng, Creating a Fake Access Point (Honeypot) – Practical		

PRACTICAL NO.04		**4 HOURS**
Kali linux Information gathering practical: Server Location Finder- Recon-ng		

PRACTICAL NO.05		**4 HOURS**
Kali linux vulnerability analysis practical: Golimero Practicalm lynis practical, nikto practical		

TEXT BOOK:

1. An Unofficial guide to ethical Hacking, 2nd edition, by Ankit Fadia, Macmillan publishers, ISBN 1403-92964-5
2. Hacking Web Applications Exposed, Second Edition by Joel Scambray, Mike Shema, Caleb Sima, TATA McGraw hill edition, ISBN 0-07-061980-8
3. Hacking Exposed, 4th Edition by Stuart McClure, Joel Scambray, George Kurtz, TATA McGraw hill edition,ISBN 0-07-059696-4

REFERENCE

1. CEH Certified Ethical Hacker All-in-One Exam Guide 1st Edition, byMatt WalkerISBN-13: 978-0071772297
2. "Gray Hat Hacking: The Ethical Hackers Handbook, 3rd Edition" by Allen Harper and Shon Harris
3. "The Unrevealed Secrets of Hacking and Cracking – Hack Before You Get Cracked" by Prateek-Shukla and NavneetMehra
4. "How to Unblock Everything on the Internet" by AnkitFadia
5. Ethical Hacking and Network Defence by Michale Simpson, Cengage Learning, ISBN 978-81-315-0748-3

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Big Data Analytics Framework
	COURSE CODE	CS421
	COURSE CREDITS	4
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/ PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA			
3	2	30	40	30	-	25	125

PRE-REQUISITE : 1. CS331. Predictive Analytics

COURSE OBJECTIVES :

CS421.CEO.1:To optimize business decisions and create competitive advantage with Big Data analytics

CS421.CEO.2:To introduce Java concepts required for developing map reduce programs

CS421.CEO.3:To derive business benefit from unstructured data

CS421.CEO.4:To impart the architectural concepts of Hadoop and introducing map reduce paradigm

CS421.CEO.5:To introduce programming tools PIG HIVE in Hadoop echo system

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COURSE OUTCOMES :

The students after completion of the course will be able to,

CS421.CO.1:Prepare for data summarization, query, and analysis.

CS421.CO.2:Apply data modeling techniques to large data sets.

CS421.CO.3:Create applications for Big Data analytics.

CS421.CO.4:Build a complete business data analytic solution

THEORY COURSE CONTENT		
UNIT 1	**Introduction To Big Data And Hadoop**	**6 HOURS**

App/System/Case Study:

Library Management Case Study

Contents:

Types of Digital Data, Introduction to Big Data, Big Data Analytics, , Apache Hadoop Features , Hadoop Echo System, Hadoop 2.x core components , Analysing Data with Hadoop, Hadoop Streaming

Self-study: Security of Hadoop

Further Reading: Hadoop Security Architecture

UNIT 2	**HDFS(Hadoop Distributed File System)**	**8 HOURS**

App/System/Case Study:

Library Case Study

Contents:

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

Self-study: Performance Evaluation in HDFS

Further reading: HDFS architecture in cloud computing

UNIT 3	**Map Reduce Framework**	**6 HOURS**

App/System/Case Study:

Library Case Study

Contents:

Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features. MapReduce Use Cases. Input Splits, Relation between Input Splits and HDFS Blocks Combiner Partitioner

Self-study: Map reduce for desktop Grid Computing

Further reading: Map reduce in Cloud Computing

UNIT 4	Hadoop Eco System – Pig	8 HOURS

App/System/Case Study:
Library Case Study
Contents:
Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, User Defined Functions, Data Processing operators, Pig Data Types , Shell and Utility Commands Pig Latin : Relational Operators, File Loaders, Group Operator, COGROUP Operator, Joins and COGROUP Union, Diagnostic Operators, Specialized joins in Pig , Built In Functions (Eval Function, Load and Store Functions, Math function, String Function, Date Function, Pig UDF, Piggybank, Parameter Substitution (PIG macros and Pig Parameter substitution) Aviation use case in PIG, Pig Demo on Healthcare Data set
Self-study: Data Analysis using Pig
Further reading: Crime Data Analysis using Pig

UNIT 5	Hive and HBase	6 HOURS

App/System/Case Study:
Library Case Study
Contents:
Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : Introduction to NoSQL Databases and HBase ,HBasics, Concepts, Clients, Example, Hbase Versus RDBMS, HBase Data Model, HBase Shell, HBase Client API
Self-study: Difference in Pig and Hive
Further reading: MapR Hadoop Hive

UNIT 6	Spark Framework and Scala	6 HOURS

App/System/Case Study:
Library Case Study
Contents:
Introduction, components of spark, Resilient distributed databases(RDD), Spark core programming concepts, compilation and execution of spark program. Introduction to Scala ,bAsic Programming Constructs of Scala , Running the Average Friends by Age Example, Filtering RDD's, and the Minimum Temperature by Location Example, Running the Minimum Temperature Example, and Modifying it for Maximum , Counting Word Occurrences using Flatmap() , Improving the Word Count Script with Regular Expressions, Sorting the Word Count Results
Self-study: Hadoop Mapreduce Vs Apache Spark
Further reading: Mobile big data analysis using Apache Spark

PRACTICAL	

PRACTICAL NO.01		8 HOURS

Install the Hadoop Distribution of Cloudera (http://www.cloudera.com/hadoop/) in Pseudo-Distributed Mode or use the VMWare Image provided by Cloudera to familiarize yourself with Hadoop, especially with the distributed file system HDFS and the implementation of MapReduce programs in Java. For the following tasks use the file 'twain.txt' as input which contains a collection of the works of Mark Twain. You will find the file on the course website.

a) Implement a MapReduce program that outputs all words of the input in a sorted order. Your program should not distinguish between upper and lower case and duplicates should be preserved. Example: From {To be or not to be} into {be be not or to to}

b) Extend your program from part (a) such that every word occurs only once in the output together with the corresponding frequency of the word. Your program should not distinguish between upper and lower case. Example: From To be or not to be to (be,2) (not,1) (or,1) (to,2)

c) Extend your word count implementation from part (b) with an additional Combiner. Therefore you should familiarize yourself with the function of a Combiner and think about how to usefully integrate a Combiner into your implementation. Characterize advantages and disadvantages of a Combiner.

d) Implement a MapReduce program that computes the inverted index for the given input, i.e. for every word in the input it should output a list of (byte) offsets. The offset should be the byte offset of the row that contains the word. However, typical stop words should not be part of the index. Stop words are frequently occuring words like 'and' that do not have a substantial relevance. You can find a list of typical english stop words in the file 'english.stop.txt' from the course website.

PRACTICAL NO.02		8 HOURS

Pig Exercise: Using the census data (path), compute the number of records for each state.

PRACTICAL NO.03		6 HOURS

HIVE DDL AND DML

Description

We will be creating several hive tables using different file formats, delimiters and partitioning strategy.

Also we will be loading data into these hive tables

Data Location

HDFS – /public/retail_db

Local – /data/retail_db

To get data types visit mysql database retail_db using user retail_dba

Problem Statement- Make sure you have 2 databases with your OS User name and then stage and final as suffix

Example: ujjwal_stage, ujjwal_final

ujjwal_stage – Create external tables in ujjwal_stage pointing to HDFS location /public/retail_db

ujjwal_stage – Make sure at least one table point to different location and use load command to load data from local file system into the hive table

ujjwal_final – Create all 6 tables in hive as managed tables, delimiter is vertical line. Also use gzip compression while storing the data.

Also create 2 additional tables for orders and order_items where both tables are bucketed by order_id.

Create another table for orders where data is partitioned by order_month.

PRACTICAL NO.04		**6 HOURS**

Apache Spark Programming Exercise :Twitter Analysis using Spark

- Find all the tweets by user
- Find how many tweets each user has
- Find all the persons mentioned on tweets
- Count how many times each person is mentioned
- Find the 10 most mentioned persons
- Find all the hashtags mentioned on a tweet
- Count how many times each hashtag is mentioned
- Find the 10 most popular Hashtags

TEXT BOOK

1. Big Data, Black Book(covers Hadoop 2, Mapreduce, Hive, Yarn, Pig, R And Data Visualization), Black Book, Dreamtech Publication.

REFERENCE BOOK

1. Tom White, "Hadoop: The Definitive Guide", O'reilly Publication.
2. Alan Gates, "Programming Pig: Dataflow Scripting with Hadoop", O'reilly Publication.
3. Stefano Baghino, Andrea Bessi, Bertrand Bossy, "Scala and Spark for Big Data Analytics", Packt Publishing.
4. Bill Chambers, "Spark: The Definitive Guide: Big Data Processing Made Simple", O'reilly Publication.

MIT	Academy of Engineering	COURSE SYLLABI
(An autonomous Institute Affiliated to SPPU)		**(2019 – 2023)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Deep Learning
		COURSE CODE	CS422
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS						
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL	
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
3	2	30	40	30	-	50	150	

PRE-REQUISITE : CS 312 Artificial Intelligence and Neural Network, CS 332 Machine Learning .

COURSE OBJECTIVES :

CS422.CEO.1:To present the mathematical, statistical and computational challenges of building stable representations for high-dimensional data, such as images, text and data.

CS422.CEO.2:To learn the fundamentals of deep learning, and the main research activities in this field.

CS422.CEO.3:To learn implementation, training, and validation of neural network.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS422.CO.1:Illustrate the fundamentals of deep learning neural network.

CS422.CO.2:Identify various strategies for deep neural network model.

CS422.CO.3:Classify different data set using convolutional neural network.

CS422.CO.4:Examine the sequence modelling using different algorithms.

CS422.CO.5:Interpret deep learning concepts in real time applications.

CS422.CO.6:Explain the working of deep reinforcement learning model

THEORY COURSE CONTENT		
UNIT 1	**Introduction**	**8 HOURS**
App/System/Case study: Classification of Dogs. **Content:** Linear Algebra, Probability and Information Theory, Numerical Computation, Machine Learning Basics, Basics of Deep learning, Trends in deep learning, Deep learning vs Machine learning.		
UNIT 2	**Designing & Optimizing Deep Neural Network Model**	**6 HOURS**
App/System/Case study: House Prediction **Content:** Distribution of data set, Error Analysis, Bias and Variance, Data Augmentation Modern Deep Networks, Regularization for Deep Learning, Optimization for Training Deep Models, Deep Feed forward Networks		
UNIT 3	**Convolutional Neural Network**	**8 HOURS**
App/System/Case study: Cancer Detection. **Content:** Introduction to CNNs, CNN architecture Variability models, Properties of CNN representation, Co-variance / invariance, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications.		
UNIT 4	**Sequence Modelling**	**8 HOURS**
App/System/Case study: Speech Recognition **Content:** Introduction to Dynamical systems: RNNs, Unfolded RNNs, Recurrent Neural network, Bidirectional RNNs, Encoder Decoder Sequence to sequence architecture, Basics of Recursive neural network and Long Short-Term Memory Network(LSTM), RNN applications.		
UNIT 5	**Deep Learning applications**	**6 HOURS**
App/System/Case study: Generate Faces, Text summarization, classification of images and Activity detection. **Contents:** Image Processing, Natural Language Processing, Speech Recognition, Video Analytics Self Study: Healthcare Application		
UNIT 6	**Deep Reinforcement Learning**	**6 HOURS**
App/System/Case study: Quad copter to Fly, Game and Robotics **Content:** Introduction to Deep Reinforcement Learning, Domain Selection for Reinforcement Learning, State-Action Pairs Complex Probability Distributions of Reward, Neural Networks and Deep Reinforcement Learning, Hierarchical RL, Multi-agent RL, Relational RL.		

PRACTICAL:Perform following experiments using Open source tools		
PRACTICAL NO.1		**4 HOURS**
Implement back propagation algorithm to train a neural network in Python.(Gradient Descent)		
PRACTICAL NO.2		**6 HOURS**
Implement and train a deep convolutional neural network in Tensorflow.		
PRACTICAL NO.3		**6 HOURS**
Implement simple audio recognition using RNN(tensorflow)		
PRACTICAL NO.4		**6 HOURS**
Keras and Tensorflow–Implement Applications of deep Learning to NLP		
PRACTICAL NO.5		**6 HOURS**
Keras and Tensorflow - Implement Applications of Deep Learning with Computer Vision		
MINI PROJECT		**10 HOURS**
The Course Mini Project work will be started in Semester VII. The work of the mini projects will be starting at beginning of term in alignment with laboratory assignments. It may be done by a groups of 3 students. However if project is done in groups, each student will be given a responsibility for a distinct module and the progress of individual modules is independent of others and performance of individual modules will be tracked periodically. The final evaluation will be done at the end of term through presentation, project demonstration and report.		

TEXT BOOK

1. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." An MIT Press book in preparation. (2015).

2. Bengio, Yoshua. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009): 1127.

REFERENCE BOOK

1. Sutskever, Ilya, OriolVinyals, and Quoc V. Le. "Sequence to sequence learning with neural networks." Advances in neural information processing systems. 2014.

2. Kalchbrenner, Nal, EdwardGrefenstette, and Phil Blunsom. "A convolutional neural network for modelling sentences." ACL(2014).

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES		**W.E.F**	**AY:** 2019 - 2020
FOURTH YEAR BACHELOR OF TECHNOLOGY **All Branches**		**COURSE NAME**	Sociology
		COURSE CODE	HP402
		COURSE CREDITS	2
RELEASED DATE : 01/06/2019		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
1	NIL	NIL	50	20	NIL	NIL	70

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

HP402.CEO.1:The course focuses on the society in India with an attempt to acquaint students with sociology as a social science and the distinctiveness as a social science.

HP402.CEO.2:It displays the relevance and significance of sociology in understanding the society and in attempting to solve its problems.

HP402.CEO.3:Many of the Sociological Changes are an answer to the age-old social norms and practices giving rise to a solution which is critical to social issues and problems.

HP402.CEO.4:The course sensitizes students to the emerging social issues and enables them to acquire sociological understanding of these issues with an ability to answer the problems.

HP402.CEO.5:Projects in Sociology are tools that facilitate the construction of knowledge in imparting the right attitude towards social issues .

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP402.CO.1:Get acquainted to sociology as a social science.

HP402.CO.2:Explain the significance of sociology in solving problems.

HP402.CO.3:Derive solutions to critical social issues.

HP402.CO.4:Change their attitude towards social issues.

THEORY		
UNIT 1	**Introduction to Sociology**	**6 HOURS**

The nature of Sociology, meaning of Sociology: Origin, Definition, Scope, Culture, meaning, components, beliefs, values, norms, technology, diversity, towards a global culture.

UNIT 2	**Sociolization**	**5 HOURS**

Socialization, Agents of Socialization, Heredity and Environment, Group, Social structure, Status and role, family, school, peer group, media, adult socialization, resocialization, Role of Social moments, Illustrations: Women, Tribal & Dalit Movements .

 Further Reading:

UNIT 3	**Nature and factors of Social Change**	**5 HOURS**

Change: Meaning. Nature and factors of Social Change: Biological Factors. Demographic Factors, Technological Factors, Economic Factors Cultural Factors, Info-tech factors, Meaning of Gender sensitization, Discrimination, violence and Abuse.

 Further Reading:

UNIT 4	**Visions of Social Change in India**	**4 HOURS**

 Idea of development planning and mixed economy, Constitution, law and social change, Education and **social change.**

 Further Reading:

UNIT 5	**Works and Economic Life**	**4 HOURS**

Social organization of work in different types of society- slave society, feudal society, industrial /capitalist society. Formal and informal organization of work. Labour and society.

Further Reading:

UNIT 6	**Introduction to Applied sociology**	**4 HOURS**

The use of Sociology: Introduction to applied Sociology-Sociology and social problems, Ecology and Environment: Pollution, Global warming and Greenhouse effect. Impact of Industrialization and Urbanization on Environment.

REFERENCE BOOKS

1. T.B. Bottomore, Sociology: A Guide to Problems and Literature, Blackie and Sons Publishers, 1978, ISBN:978-0043000267
2. Sociology: A guide to problems and literature. Bombay: George Allen and Unwin (India): Harlambos, M.1998. ISBN: 978-0043000267
3. Sociology: Themes and perspectives. New Delhi Oxford University Press.: Inkeles, Alex, 1987
4. What is Sociology, Madras: Macmillan, India: Johnson, Harry M. 1995.
5. Sociology: A Systematic Introduction. New Delhi, Allied Publishers. ISBN: 978-8170231370 .

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2019 - 2020
FOURTH YEAR BACHELOR OF TECHNOLOGY All Branches	**COURSE NAME**	Bussiness Strategies
	COURSE CODE	HP403
	COURSE CREDITS	1
RELEASED DATE : 01/06/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/ PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	MSE	ESE	CA			
NIL	2	NIL	NIL	25	NIL	25	50

PRE-REQUISITE : HP303 : Basics of Entrepreneurship

COURSE OBJECTIVES :

HP403.CEO.1:To understand the importance of growth and to be able to chart a path towards growth.

HP403.CEO.2:To revisit your business model

HP403.CEO.3:To give a growth orientation your customer acquisition, operations, revenue and sales strategy

HP403.CEO.4:To list and comply with the requirements relating to regulatory compliance

HP403.CEO.5:To be able to effectively pitch your venture to potential stakeholders .

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP403.CO.1:Rephrase business model and Identify additional customer segments

HP403.CO.2:Identify channels and strategy for budgeting and planning.

HP403.CO.3:Make use of Legal aspect, Mentors, Advisors, and Experts in startups

HP403.CO.4:Analyze the growing revenues, sales planning, strengthening sales, improving margins

HP403.CO.5:Estimate customer lifetime value, competitor and peer's financial models for venture growth

HP403.CO.6:Formulate the all procedure for new venture ; Product market fit and A Pitch Deck

PRACTICALS:		
PRACTICAL NO.01	**Orientation to Growth**	**3 HOURS**

Getting Ready for Growth

Why growth stage is different compared to startup phase, Why Product-Market fit is not enough, Case study, To assess readiness for growth, To chart a growth path .

PRACTICAL NO.02	**Customers**	**3 HOURS**

Expanding Customer Base

Revisit your business model and develop few variants (more business model types). Identify additional customer segments that your solution can address. Evaluate business models for the new customer segments. Relook at the Problem Statement (can you expand the scope and scalability of your business by repositioning your problem statement?) Explore additional ways to monetize.

PRACTICAL NO.03	**Traction**	**12 HOURS**

Scaling

How to gain traction beyond early customers. Defining traction (in quantifiable terms) and identifying the most important metrics to measure traction. Calculate cost of new customer acquisition. Estimate your customer lifetime value (LTV). Identifying waste in your operations and focusing your team on what is important for traction.

Channels and Strategies

The Bulls eye framework, Identify Channels using Bulls Eye Framework, Measuring the effectiveness of selected channels, Budgeting and planning.

PRACTICAL NO.04	**Money**	**20 HOURS**

Growing Revenues. Stabilizing key revenue streams. Developing additional revenue streams (licensing, franchising). Exploring new channels and partnerships. Sales Planning. Understanding why customers buy and how buying decisions are made; Listening skills. Sales planning, setting targets. Unique Sales Proposition (USP); Art of the sales pitch (focus on customers needs, not on product features) Follow-up and closing a sale; Asking for the sale. Strengthening Sales. Building a professional sales team. Sales compensation and incentives. Sales planning, setting targets Improving Margins. Testing price elasticity.

Optimizing costs and operational expenses. Advanced concepts of unit costing. Financial Modeling. Financial modeling of your venture's growth. Analyzing competitor and peer's financial models.

PRACTICAL NO.05	**Support**	**5 HOURS**

Legal Overview of legal issues and their impact on entrepreneurs. Importance of getting professional help (legal and accounting). Importance of being compliant and keeping proper documentation. Patents and Intellectual property. Trademarks. Mentors, Advisors, and Experts. The importance of a Mentor and how to find one. Role of business advisors and experts for specific targets in your growth plan.

PRACTICAL NO.06	**Capstone Project: Pitch Your Venture**	**2 HOURS**

REFERENCE BOOKS

1. Zero to One: Note on Start Ups, or How to Build the Future, Peter Thiel and Blake Masters, Virgin Books,ISBN: 9780753555194
2. 2.Tools of Titans: The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Per-
3. formers, Timothy Ferriss, Random House,ISBN: 9781785041273.
4. 3.Disrupted: My Misadventure in the Start-Up Bubble, Dan Lyons, Penguin Publishers, ISBN:
5. 9781786491022
5. Grit: The Power of Passion and Perseverance, Angela Duckworth, Vermilion Publishing,ISBN: 9781785040207
6. Big Magic: Creative Living 4BEyond Fear, Elizabeth Gillbert, Penguin Publishers,ISBN: 9781408886182
7. Pivot: The Only Move That Matters Is Your Next One, Jernny Blake, Random House,ISBN: 9780241975466
8. Financial Management; Text and Problems, 7th Ed., A Khan and P. K. Jain, TataMacGraw Hill, ISBN: 9789353162184
9. Financial Management; Theory and Practice, 4th Ed., Prasanna Chandra, TataMacGraw Hill, ISBN: 9789339222574
10. Kites in a Hurricane: Startups from Cradle to Fame, Rishi Kapal, SAGE Publishing, ISBN: 9789352807895
11. Wadhwani Foundation Advanced Course in Entrepreneurship

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Software Skill Development Lab
	COURSE CODE	CS402
	COURSE CREDITS	2
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
--	4	--	--	--	--	75	75

AIM:

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

COURSE OBJECTIVES :

CS402.CEO.1: Plan Extraction, transformation, scraping, joining and cleaning of large data sets

CS402.CEO.2: Analyse large data sets to bring out insights to solve business problems.

CS402.CEO.3: Make use of machine learning libraries and apply established machine learning algorithms classes of programming problems.

CS402.CEO.4: Utilize Machine learning concepts in Python using problem solving approach by working on real time cases and in class programming assignments.

CS402.CEO.5: Develop code in support of Machine learning solutions in Python.

CS402.CEO.6: Evaluate and debug various learning algorithms.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS402.CO.1: Apply python to build various machine learning application.

CS402.CO.2: Interpret the fundamental issues and challenges of machine learning: data, model selection, model complexity.

CS402.CO.3: Identify the strengths and weaknesses of many popular machine learning approaches.

CS402.CO.4: Analyze the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CS402.CO.5: Design and implement various machine learning algorithms in a range of real-world applications.

Guidelines for Laboratory Conduction :

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed .The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module	Python and Machine Learning	36 HOURS
Prerequisite: Python		

Course Content

Understanding Data Analytics, Importance of data in business, Data analytics ecosystem, Basis of Python programming, Basics of Python, Variables and Operators, Data types, Lists, Dictio- nary and Functions, Programming in Python, Introduction to Machine learning, python Libraries, Numpy, Scikit, Pandas, Matplotlib, Data Visualization, Supervised learning, Linear Regression, Logistic Regression, Decision Tree, Naive Bayes, K Nearest Neighbor, Random Forest, Dimension- ality Reduction, Gradient Boosting algorithms, Support Vector Machine, Unsupervised learning, Clustering techniques – K means clustering , Association Rule Learning, Natural Language Pro- cessing

Beneftts: 1.Placement Opportunities

PRACTICAL List		
Practical No.01		**4 HOURS**
Perform data processing and cleaning of dataset using Python.		
Practical No.02		**4 HOURS**
Create a machine learning model using Linear Regression (Example : Salary Prediction).		
Practical No.03		**4 HOURS**
Create a machine learning model using multiple linear regression (Example : Flight elay Data For July 2014.		
Practical No.04		**4 HOURS**
Create a machine learning model using Decision Tree (Example : Position of an Employee as per salary).		
Practical No.05		**4 HOURS**
Create a machine learning model using K Means Clustering Algorithm.		
Practical No.06		**4 HOURS**
Create a machine learning model using Market Basket analysis.		
Practical No.07		**4 HOURS**
Create a natural language processing model (Example : Customer purchasing). m		

Mini Project		**8 HOURS**
Note: Data sets should be real time data sets like heart disease, Airline, etc.		

REFERENCE

1. Daniel Nedal, "Python Machine Learning from Scratch", AI Sciences paperback edition 2016, ISBN-13: 9781720649496
2. Chris Albon, "Machine Learning with Python Codebook", O'REILLY Paperback, 2018, ISBN-13: 1491989388

	COURSE SYLLABI (2016 – 2020)
MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	AY: 2019-20

FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Advanced Software Skill Development Lab
	COURSE CODE	CS403
	COURSE CREDITS	2
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME :						
		THEORY				PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION	
–	4	–	–	–	–	75	75

AIM:

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges.

COURSE OBJECTIVES :

CS403.CEO.1:To play role of Business Intelligent Analyst and Data Scientist in Data Analytics Life Cycle.

CS403.CEO.2:To acquire the skills of Analytics in R Programming.

CS403.CEO.3:To perform graphical analysis using Data Visualization tools and techniques.

CS403.CEO.4:To perform analytics for improvement of Business Process.

CS403.CEO.5:To implement application using IDLE tools..

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS403.CO1:Perform the analytics in R on real time data sets.

CS403.CO2:Analyze the real time data with graphical visualization.

CS403.CO3:Generate the different types of analytics reports.

CS403.CO4:Develop the models using analytics for BI Process.

CS403.CO5:Test and validate developed prototype against the original requirements of the problem.

CS403.CO6:Use Tableau Visualization effectively for Data Analytics..

Guidelines for Laboratory Conduction

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module: R Programming

Prerequisite: Database Management System
Industry Expert: Ms. Shobha Mourya
Course Instructor: Ms. Shobha Mourya Mr.Jayvant Devare
Course Content
Basics of R Programming: Installation, Reading and Getting Data into R, Constructing Data Objects, Data: Descriptive Statistics and Tabulation, Data: Distribution, Simple Hypothesis Testing, Introduction to Graphical Analysis, Formula Notation and Complex Statistics, Manipulating Data and Extracting Components, Regression model, Advanced Graphs, Writing your scripts in R, Introduction of data science, Visualization, Introduction to Tableau, Navigating Tableau, Advanced Data Mining With Tableau, Creating bins Visualizing distributions, Modeling.
Beneftts:
1. Dell EMC Certification (optional)
2. Placement Opportunities.

PRACTICAL List		
Practical No.01		**4 HOURS**
Installing and loading R packages, set/get working directory.		
Practical No.02		**4 HOURS**
Import datasets using readr package and explore datasets using dplyr functions.		
Practical No.03		**4 HOURS**
Creating subsets from datasets using filter conditions.		
Practical No.04		**4 HOURS**
Creating new variables using mutate.		
Practical No.05		**4 HOURS**
Analyzing factor variables using frequency and contingency table.		
Practical No.06		**4 HOURS**
Analyzing numeric variables using summary command.		
Practical No.07		**4 HOURS**
Visualization using ggplot2 package for Bivariate, Univariate and Multi-variate plots..		
Practical No.08		**4 HOURS**
Understanding ggplot layers for plotting graphs.		
Practical No.09		**4 HOURS**
Scatter plot, Histogram, Bar chart, Density Plot, Faceting and Scaling.		
Practical No.10		**4 HOURS**
Importing and exploring Titanic dataset.		
Practical No.11		**4 HOURS**
Data wrangling for Titanic case study.		
Practical No.12		**4 HOURS**
Feature engineering for Titanic case study.		
Mini Project :		**8 HOURS**
Note: Data sets should be real time data sets like heart disease, Airline, etc.		

REFERENCES

1. Mark Gardener, "Beginning R: The Statistical Programming Language", Wiley paperback edition 2013, ISBN: 978-1-118-16430-3.
2. Ohri, "R for Business Analytics", Springer, 2012, ISBN: 978-1-4614-4342-1.
3. Ashutosh Nandeshwar, "Tableau Data Visualization Codebook", Packt publishers, ISBN : 978-1-849-68-978-6.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**		
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019-20	
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Advanced Software Skill Development Lab	
	COURSE CODE	CS404	
	COURSE CREDITS	2	
RELEASED DATE : 01/01/2019	**REVISION NO**	1.0	

TEACHING SCHEME		**EVALUATION SCHEME :**						
		THEORY				PRESENTATION/	TOTAL	
LECTURE	PRACTICAL	ICE	ECE	IA	PRACTICAL	DEMONSTRATION		
–	4	–	–	–	–	75	75	

AIM:

To provide technical skills, for sharpening the students to enable them to meet the techno-socio-economic challenges

COURSE OBJECTIVES :

CS404.CEO.1:To play role of Web developer.

CS404.CEO.2:To acquire the skills of Advanced Java.

CS404.CEO.3:To implement application using IDLE tools.

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS404.CO1:Identify advance concepts of java programming Servlet and JSP.

CS404.CO2:Design and develop platform independent applications using a variety of component based frameworks

CS404.CO3:Able to implement the concepts of Hibernate EJB for building enterprise applications.

Guidelines for Laboratory Conduction

The assignments to be framed by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. All problem statements or the assignments are based on real world problems/applications. In addition to these, instructor can assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to respective branch beyond the scope of syllabus. Team of 3 to 4 students may work on mini-project. During the assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation and software engineering approach followed. The supplementary and relevant questions may be asked at the time of evaluation to test the student's for advanced learning, understanding, effective and efficient implementation and demonstration skills.

Module	Advanced JAVA	36 HOURS

Prerequisite: CPP

Industry Expert: Mr. TusharKute

Course Instructor: Mr. TusharKute

Course Content

Basics of Servlets: ServletRequest, Servlet Collaboration, ServletConfig, ServletContext, Attribute, Session Tracking, Event and Listener, Filter, ServletInputStream and ServletOutputStream, Annotation Servlet

Basics of JSP: Scripting elements, Implicit Objects, Directive Elements, Exception Handling, Action Elements, Expression Language, MVC in JSP, JSTL, Custom tags, JavaMail API,

Java Server Faces2.0 Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Convertor Tag, JSF Validation Tag, JSF Event Handling and Database Access, JSF Libraries: PrimeFaces

Basics of Struts2: Core Components, Struts 2 Architecture, Struts2 Action, Struts2 Configuration, Interceptors, Struts 2 Validation, Hibernate with Struts2, Spring with Struts2

Introduction to JavaEE : Introduction to EJB3, Developing Session Beans, Using Dependency Injection, JMS, Message Driven Beans, Persistence Introduction to JPA

Beneftts:

1. Placement Opportunities.

2. Project

PRACTICAL List		
Practical No.01		**4 HOURS**
Write a program using Servlet to display Visitor Count.		
Practical No.02		**4 HOURS**
Write a program for authentication, which validate the login-id and password by the servlet code.		
Practical No.03		**4 HOURS**
Write a program to read data send by the client (HTML page) using servlet.		
Practical No.04		**4 HOURS**
Write a program to read data send by a client (HTML page) using JSP		
Practical No.05		**4 HOURS**
Create an Enterprise application using Session Bean (Stateless) which convert the amount from Dollar to Rupees.		
Practical No.06		**4 HOURS**
Write a Entity bean to find a student record in student data base using primary key property.		
Practical No.07		**4 HOURS**
Write program to demonstrate Java Server Faces		
Practical No.08		**4 HOURS**
Write program to demonstrate Java Server Faces – event handling		
Practical No.09		**4 HOURS**
Write program to demonstrate EJB2		
Practical No.10		**4 HOURS**
Write program to demonstrate Struts2 and Spring		
Practical No.11		**4 HOURS**
Write a program to query record based on primary key using Hibernate.		
Practical No.12		**4 HOURS**
Write a program using Hibernate to develop classes and Hibernate configuration to persist an EventManager application. The classes in EventManager are		
Mini Project :		**8 HOURS**
Note: Mini Project Group of 2-3 students		

REFERENCES

1. Kogent Learning Solutions,"JAVA Server Programming JAVA EE7",DreamTech paperback edition 2014, ISBN: 978-1-118-16430-3.
2. Hans Bergsten, "Java Server Pages", Oreilly, 2012, ISBN: 978-1565927469.
3. Kahy Sierra, Bert Bates, "Head First EJB", Oreilly, Paperback 2017, ISBN : 978-8173665264

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Major Project - I
	COURSE CODE	CS405
	COURSE CREDITS	4
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TERMWORK	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA		DEMONSTRATION	
-	8	–	–	–	100	50	150

PRE-REQUISITE :

1. CS213 : Minor Project
2. CS324 : Mini Project

COURSE   OBJECTIVES :

CS405.CEO.1:To implement the idea/ real time industrial problem/ current application from engi-
neering domain

CS405.CEO.2:To evaluate an alternative approaches and justify the use of selected tools and methods

CS405.CEO.3:To inculcate skills in engineering product design and development process, budgeting,
Planning, testing, effective trouble-shooting practices.

CS405.CEO.4:To understand the roles and responsibility, accountability and learn team work ethics

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS405.CO1:Solve real life problems by applying the knowledge and problem solving ability.

CS405.CO2:Analyze alternative approaches, find feasible solution and apply most appropriate one.

CS405.CO3:Use standard engineering tools and processes for analysis, design, simulation, testing,
Implementation and deployment of idea into practice.

CS405.CO4:Participate effectively in multidisciplinary and heterogeneous teams exhibiting team work,
inter-personal Relationship, conflict management and leadership quality.

PREAMBLE:
objective of this Major Project-I course is to understand the Product Development through team work. The students will able to shoulder the roles and responsibility and activity distribution amongst them. The students will learn designing, budgeting, planning, engineering skills and processes, testing and effective trouble-shooting practices, safety norms and standards while developing the application/ product. The students will deliver a presentation on the advancement in Technology pertaining to the selected project topic and able to understand importance of document design and professional ethics.

GUIDELINES:
Project work stage –I is an integral part of Project work. In this, the student shall complete the partial work of project, consist of problem statement, literature survey, Project specification and planning. The students expected to complete the project at least up to the design phase. As a part of project phase-I, candidate shall appear for two reviews and delivered the presentation on the advancement of selected project topic. The student shall submit the duly certified project report in standard format for satisfactory completion of work by the concern Advisor and Dean of the School.
The examinee will be assessed by panel of examiner of which one is necessarily as a external examiner. The assessment will be broadly based on work undergone, content delivery, presentation skills, documentation, question answer and report.
Preparation of the Literature survey paper and communicating and publishing in relevant publishing agency agency is recommended. Bonus 10 marks will be awarded.
Follow the guideline and formats as mentioned in guideline document Annexure-I.)

TIMELINE
1. Formation of Project Group: 2 Weeks (1st ,2nd week)
2. Presentation of Project Review -1- Finalizing title with feasibility study and approval: 2 Weeks (3rd, 4th week)
3. Presentation of Project Review -2 Analysis and Design of Project: 2 weeks (7th, 8th week)
4. Preparation of Project Progress Report – I (week 9th and 10th)
5. Project Phase-I Evaluation by external examiner (End Semester by 12th, 13th week)

ASSESSMENT
1. Internal Assessment (TW)
a. Project Review -1 Project Approval -30 Marks
b. Project Review -2 Analysis and Design- -30 Marks
c. Project Review -3 Project progress Report-I and Presentation - 40 Marks
d. Paper publication/IPR -10 marks (Bonus)
2. Examination: Final Demonstration and presentation
a. Project presentation: 15 Marks
b. Project design / execution / demonstration : 20 Marks
c. Project Report preparation and documentation: 15 Marks

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Human Computer Interactions
	COURSE CODE	CS431
	COURSE CREDITS	4
RELEASED DATE : 1/1/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	–	50	100

PRE-REQUISITE :

1.IT201 Engineering Informatics

2.CS301 Operating System

COURSE OBJECTIVES :

CS431.CEO.1:To apply the foundations of Human Computer Interaction.

CS431.CEO.2:To Understand the design technologies for individuals and persons with disabilities.

CS431.CEO.3:To apply the guidelines for user interface.

COURSE OUTCOMES :

The students after completion of the course will be able to

CS431.CO.1:Design effective dialog for HCI.

CS431.CO.2:Design effective HCI for individuals and persons with disabilities.

CS431.CO.3:Understand the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.

CS431.CO.4:Develop meaningful user interface.

THEORY COURSE CONTENT		
UNIT 1	**Foundation of HCI**	**8 HOURS**

App/System/Case study:

Automatic syringe: setting the dose to 1372. The effect of one key slip before and after user involvement

Content: Why Human Computer Interaction, What is HCI,Design focus:Human input output channels, Skill acquisition, Design Focus: Machine I/O Channels and Skill acquisition, limitations of interactive performance, models of interactions

Self-Study: Psychology and the design of Interactive systems

UNIT 2	**Framework and HCI**	**8 HOURS**

App/System/Case study:

ATM machine

Content:

Ergonomics, Interaction Styles, Interactivity, Context of Interaction, HCI Paradigm: Time sharing, video display unit, programming tool kits, Personal computing, The metaphor, sensor based and context aware interfaces

Self-Study: Ubiquitous Computing

Further Reading: Agent based Interfaces

UNIT 3	**Design Process**	**8 HOURS**

App/System/Case study:

Product prototype development

Content:

What is Design, Process of Design, User focus, Scenarios, Navigation Design, Screen design and layout, HCI in software process: interactive systems and SDLC, Design rules: golden rules and Heuristics, HCI pattern

Self-Study: Interactive design and Prototyping

Further Reading: Design rationale

UNIT 4	Evaluation and Support	8 HOURS

App/System/Case study:

application development for users with disabilities

Content:

Implementation Support, UI management system, Evaluation Techniques: Goals, evaluation through experts, model based evaluation, user participation in evaluation, universal design: design principles, multimodal interactions: sound, touch, handwriting, gesture,

Self-Study: Heuristic evaluation

Further Reading: User support

UNIT 5	Models and Theories	8 HOURS

App/System/Case study:

Mobile User Interfaces

Content:

Cognitive model: model theory, linguistic models, Physical and device models, Communication and

Collaborative models: face to face model, Text based model

Self-Study: Computer Mediated Communication

Further Reading: Modeling Rich Interactions

PRACTICAL:: Perform following experiments using Open source tools

Note: Following are the reference case studies, can be changed with other appropriate examples with same level.

PRACTICAL NO.1	Mini Project	22 Hrs
	1. Students need to work on user requirements, UI requirements	**04**
	2. Work on ergonomics and context interaction	**04**
	3. Development of prototype	**10**
	4. Evaluation of all sort of interfaces used in the project	**04**

TEXT BOOK

1. Alan Dix, Janet Finlay" Human Computer Interaction" 3rd Edition, Pearson publication, ISBN 0130461091

REFERENCE BOOK

1. Kent Norman, JurekKirakowski "Handbook of Human Computer Interaction" Wiley Publication, ISBN 9781118976135
2. Helen Sharp, Jenifer Preece" Interaction Design beyond Human Computer Interaction" 5th Edition, ISBN 978-1119547259

MIT **Academy of Engineering** (An autonomous Institute Affiliated to SPPU)		**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Distributed System
		COURSE CODE	CS 441
		COURSE CREDITS	3
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		**EVALUATION SCHEME**						
(HOURS/WEEK)		**THEORY**				**PRESENTATION/**		**TOTAL**
LECTURE	**PRACTICAL**	**ICE**	**ECE**	**IA**	**PRACTICAL**	**DEMONSTRATION**		
3		30	40	30			-	100

PRE-REQUISITE: :
1. CS301- Operating System
2. CS323-Computer Network

COURSE OBJECTIVES :

CS441.CEO.1:To Understand design issues of distributed system.

CS441.CEO.2:To Analyze algorithm for communication, security and synchronization in distributed system.

CS441.CEO.3:To Provide an exposure to commercial distributed applications / tools / technologies.

COURSE OUTCOMES :

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

CS441.CO1:Classify distributed system models and architectures.

CS441.CO2:Explain design issues of distributed system.

CS441.CO3:Design distributed applications using distributed communication models.

CS441.CO4:Analyze different algorithms for concurrency and synchronization of distributed system.

CS441.CO5:Analyze the performance of distributed system based on fault tolerance, security, scalability.

THEORY		
UNIT 1	**Introduction of Distributed System**	**5 HOURS**

Application/ Case Study/ System: Distributed Reddening in Gaming, Online Gaming
Contents:
Distributed System Definition, Goals, Types, System Architecture, Trends in Distributed Systems
Self-Study: Amoeba
Further Reading: CODA

UNIT 2	**Communication**	**6 HOURS**

Application/ Case Study/ System: SunRPC
Contents:
MPI, Message Oriented Communication, Stream Oriented Communication, Multicast Communication
Self-Study: JavaRMI
Further Reading: IBM's Web sphere Message Passing

UNIT 3	**Synchronization**	**8 HOURS**

Application/ Case Study/ System: Distributed Camera System
Contents:
Clock Synchronization-Physical Clock, Clock Synchronization Logical Clock- lamport, Vector, Mutual Exclusion, Election Algorithm, Consensus and Agreement Algorithm
Self-Study: Trace Synchronization
Further Reading: Paxos

UNIT 4	**Consistency Replication**	**8 HOURS**

Application/ Case Study/ System: Amazon's Dynamo
Contents:
Need of Replication, Replication as scaling techniques, Data centre consistency model, Client centre consistency model, Consistency Protocol
Self-Study: Replica Management
Further Reading: View Stamped Replication.

UNIT 5	Fault Tolerance	**7 HOURS**

Application/ Case Study/ System: Fault tolerance in RAFT, Zookeeper
Contents:
Faulty System, Failure Models, Failure Techniques, Reliable Client Server Communication, Reliable Group Communication, Distributed Communication, Recovery.
Self-Study: Fault Tolerance in Spark
Further Reading: Handling Byzantine Failure

UNIT 6	Distributed System Security	6 HOURS

Application/ Case Study/ System: Kerberos

Contents:

Design issue of Distributed System, Secure Channels, Access Control, Firewall, Secure Mobile Code, DOS

Self-Study: Secure Management , JINI

Further Reading: Security in Block Chain

TEXT BOOK

1. Andrew.S.Tanenbaum, Maarten Van Steen, Distributed Systems –Principles and Paradigms, Third Edition, Prentice Hall -2016. ISBN-9788120322158.
2. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Designs, Fifth Edition, Addison Wesley, 2012.ISBN- 9780132143011.

REFERENCES:

1. Mukesh Singal, Advanced Concepts in operating System, Mcgraw Hill, ISBN-9780070472686.
2. Pradeep K. Sinha," Distributed Operating Systems: Concepts and Design", Prentice Hall India Learning Private Limited , ISBN-978-8120313804.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Ubiquitous Computing
	COURSE CODE	CS442
	COURSE CREDITS	3
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	—	30	40	30	–	–	100

PRE-REQUISITE : Human Computer Interaction

COURSE OBJECTIVES :

CS442.CEO.1:To introduce pervasive computing abilities

CS442.CEO.2:To introduce tools and techniques used while solving problems using pervasive computing.

CS442.CEO.3:To study the different application of pervasive computing

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS442.CO.1: Present a survey on pervasive computing building blocks.

CS442.CO.2: Create presentations using pervasive computing techniques and devices.

CS442.CO.3 Demonstrate small applications of pervasive computing

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Ubiquitous Computing**	**7 HOURS**

App/System/Case study:

Energy, Healthcare

Content: Definition, Advantage, Application and Scope., Mobile Computing, Pervasive Computing, Wearable Computing, Modeling the Key Ubiquitous/Pervasive Computing Properties, Mobile Adaptive Computing

Self-Study: Mobility Management and Caching

UNIT 2	**Ubiquitous Computing Devices**	**7 HOURS**

App/System/Case study:

Healthcare System

Content:

Smart Environment: Users, Mobiles, Cards and Device Networks, Smart Devices: Application and Requirements, Device Technology and Connectivity.

Self-Study: HCI Application

UNIT 3	**Human Computer Interaction**	**6 HOURS**

App/System/Case study:

Case study on Intensive Care Unit in Hospital

Content:

HCI, User Interface and Interaction for four hand-held widely used devices, Hidden UI via basic smart devices, Hidden UI via wearable and Implanted devices, user models

Self-Study: Human centered design

UNIT 4	Wearable Computing	7 HOURS

Content:

Glass and Augmented Reality, Eye-Tracking, Digital Pen and Paper Mobile social networking crowd sensing, Event based social network

UNIT 5	Security in Ubiquitous Computing	6 HOURS

Content:

Energy constraints, Security and Privacy in Pervasive Networks, Experimental Comparison of Collaborative Defense Strategies for Network Security.

UNIT 6	Challenges and Outlook	4 HOURS

Content:

Overview of challenges, smart devices, Smart Interaction, Smart physical environment device interaction, Smart human-device interaction, Human Intelligence versus machine intelligence, social issues. Case Study- Wearable Computing/ Cyber Physical System.

TEXT BOOK

1. Ubiquitous Computing Fundamentals, John Krumm, CRC Press, 2010
2. Stefan Poslad, Ubiquitous Computing, Smart devices, environment and interaction, Wiley.
3. Frank Adelstein, Sandeep Gupta, Golden Richard III, Loren Schwiebert, Fundamentals of Mobile and Pervasive Computing, Tata McGraw Hills

REFERENCE BOOK

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtor, Thomas Schaeck, Pervasive Computing, Pearson, Eighteenth Impression, 2014.
2. BoS Content: Books, Course Notes, Digital contents, Blogs developed by the BoS for bridging the gaps in the syllabus

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	**COURSE NAME**	Cloud And Virtualization
	COURSE CODE	CS443
	COURSE CREDITS	3
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME		EVALUATION SCHEME :					
		THEORY			PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA			
3	–	30	40	30	–	-	100

PRE-REQUISITE :

1. CS323: Computer Networks
2. CS301: Operating System

COURSE OBJECTIVES :

CS443.CEO.1:To understand cloud computing concepts

CS443.CEO.2:To study various platforms for cloud computing

CS443.CEO.3:To explore the applications based on cloud computing

COURSE OUTCOMES :

The students after completion of the course will be able:

CS443.CO.1:To analyze as a service concept

CS443.CO.2:To use and examine different cloud computing services

CS443.CO.3:To describe importance of virtualization along with their technologies.

THEORY		
UNIT 1	**Fundamentals of Cloud Computing**	**8 HOURS**

App/System/Case study:
Amazon Web Services
Content:
Distinguishing Cloud Types, Deployment Models, Service Models, Scalability, Virtualization, Software as a service (SaaS): understanding multitenant nature, service oriented architecture, Platform as a service (PaaS): Benefits and disadvantages, Infrastructure as a service (IaaS): Improving Performance Through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages of IaaS Solutions, Server Types Within an IaaS Solution
Self Study: Types of Cloud
Further Reading: Services provided by AWS.

UNIT 2	**Data Storage in Cloud**	**8 HOURS**

App/System/Case study:
Dropbox
Content:
Examining the Evolution of Network Storage, Understanding Cloud-Based Data Storage, Advantages and Disadvantages of Cloud-Based Data Storage, Getting Past the Fear of Cloud-Based Data, Cloud-Based Backup Systems, Understanding File Systems, Industry-Specific Cloud-Based Data Storage, Cloud-Based Database Solutions, Cloud-Based Block Storage.
Self Study: Amazon S3.
Further Reading: Object and File Storage.

UNIT 3	**Collaboration in the cloud**	**6 HOURS**

App/System/Case study:
Google Drive
Content: Collaborating in the Clouds: Questions to Ask About Collaborative Tools, Web-Based Collaboration Began with Web Mail, Instant Messaging, File Sharing, Editing Shared Files Within the Cloud, Collaborating via Web Logs (Blogs), Collaborative Meetings in the Cloud, Virtual Presentations and Lectures, Using Social Media for Collaboration, Using Cloud-Based Calendar Management, Using Streaming Video Content to Collaborate.
Self Study: Netflix
Further Reading: AWS Workdocs

UNIT 4	**Virtualization in Cloud**	**6 HOURS**

App/System/Case study:
Virtualbox
Content:
Understanding Virtualization, The History of Virtualization, Leveraging Blade Servers, Server Virtualization, Desktop Virtualization, Desktop Solutions on Demand, Virtual Networks, Data Storage Virtualization, Not All Applications Are Well Suited for Virtualization, Why Virtualize.
Self Study: VMWare Workstation or Player.
Further Reading: KVM.

UNIT 5	Cloud security fundamentals	6 HOURS

App/System/Case study:

CloudMapper

Content:

General Security Advantages of Cloud-Based Solutions, Introducing Business Continuity and Disaster Recovery: Understanding Data Storage Wiping, Understanding Distributed Denial-of-Service (DDoS) Attacks, Packet Sniffing, Man-in-the-Middle Attack, Monitoring Device Screens, Malicious Employees, Hypervisor Attack, Guest-Hopping Attack, SQL-Injection Attack, Physical Security.

Self Study: Snort

Further Reading: Cloud Security Products

UNIT 6	Service Oriented Architecture in Cloud Computing	6 HOURS

App/System/Case study:

RPC or SOAP

Content:

Understanding Service-Oriented Architecture, Web Services Are Not Web Pages, Many Companies Provide Web Services, Discovering Web Services, Understanding Web Service Performance, Web Service and Reuse, Scaling Web Services, Web Services and Loose Coupling, Treating a Web Service as a Black Box, Web Service Interoperability, Web Service Description Language, Governing Web Services.

Self Study: REST

Further Reading: Python Boto3

TEXT BOOK

1. Jamsa K, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Publishers [ISBN: 9380853777]
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 052176095X]
3. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach [ISBN: 0071626948]
4. Siani, Yee, George, Privacy and Security for Cloud Computing [ISBN: 9781447141891]
5. Adrian Mouat, Docker Security, O'Reilly [ISBN: 9781492042297]

REFERENCE BOOK

1. Greg Schulz 2011, Cloud and Virtual Data Storage Networking, Auerbach Publications [ISBN: 978-1439851739]
2. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance [ISBN: 0596802765]
3. Ronald L. Krutz, Russell Dean Vines, Cloud Security [ISBN: 0470589876]

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY		**COURSE NAME**	Digital Forensics
		COURSE CODE	IT451
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**- REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	ICE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	–	50	150

PRE-REQUISITE :

1.IT421: Cyber Security

COURSE OBJECTIVES :

IT451.CEO.1:To understand the importance of maintaining the integrity of digital evidence.

IT451.CEO.2:To encourage students to think beyond the available forensics solutions to cater new solutions.

IT451.CEO.3:To understand basics of forensic data acquisition and analysis using computer and network-based applications and utilities

IT451.CEO.4:To ascertain the usefulness of taught concepts of cyber forensics in their awareness.

COURSE OUTCOMES :

The students after completion of the course will be able to

IT451.CO.1:Illustrate the fundamentals of computer forensics and Information awareness.

IT451.CO.2:Classify the attributes of data recovery in file systems and storage media.

IT451.CO.3:Outline the techniques of cyber forensics and intelligence.

IT451.CO.4:Simplify the test cases in cyber forensics

IT451.CO.5:Analyze the digital evidence of different media.

IT451.CO.6:List the common type of digital evidence.

THEORY COURSE CONTENT		
UNIT 1	**Overview of Computer Forensics Technology**	**8 HOURS**

App/System/Case study:

Case study on cyber forensics

Content: Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources, Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists, Types of Computer Forensics Technology, Types of Computer Forensics Systems

Further Reading: Agent based Interfaces

UNIT 2	**Computer Forensics Evidence and Capture**	**9 HOURS**

App/System/Case study:

Case study on cyber crime

Content:

Data Recovery :Data Recovery Defined, Data Backup and Recovery, The Role of Backup in Data Recovery, The Data-Recovery Solution, Hiding and Recovering Hidden Data, Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody,

Further Reading: Reconstructing the Attack

UNIT 3	**Cyber Forensics Investigation**	**8 HOURS**

App/System/Case study:

Case study on cyber forensic investigation

Content:

Introduction to Cyber Forensic Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers, Recovering deleted evidences, Password Cracking

Further Reading: Recovering deleted evidences

UNIT 4	**Foundation of Digital Forensics**	**8 HOURS**

App/System/Case study:

Case study on cyber forensic investigation in Digital Evidence

Content:

Digital Evidence is Everywhere, Overview of Digital Forensics: Acquisition, Preservation, Analysis, Presentation, Digital forensics : Sub disciplines: Incident response, cell phone forensics, media device forensics, social media forensics, digital video and photo forensics, digital camera forensics, digital audio forensics, foundation of digital forensics and Best Practices, Overview of Digital Forensics Tools, difference between computer experts and digital forensic experts

Further Reading: Digital forensics and Best Practices

UNIT 5	**Digital Evidence**	**9 HOURS**

App/System/Case study:

Case study on cyber forensic investigation in Video and Audio

Content:

Discovery of Video, Audio, Social Media Evidence Common types of Digital Evidence: Hash Values The verification standard, Deleted Data, Internet History, Cellular System Evidence and Call Details Records, Email Evidence, Social Media, Cell Phone, Video and Photo Evidence

Further Reading: Cellular System Evidence and Call Details Records

PRACTICAL		
PRACTICAL NO 1		**28 HOURS**

1) Introduction to Digital Forensics Forensics Tools The Sleuth Kit Installation (4 HOURS)

2) Disk and File Analysis (4 HOURS)

3) Computer Forensics Incidence Investigation Process (4 HOURS)

4) Digital Acquisition and Analysis tool (4 HOURS)

5) Digital Evidence Protocol (4 HOURS)

6) Mini Project (8 HOURS)

TEXT BOOK

1. Computer Forensics computer crime scenes investigation , John Vacca, CHARLES RIVER ME-DIA, INC, Second Edition, ISBN: 1-58450-389-0, ISBN-13: 978-1-58450-389-7
2. Digital Forensics for legal Professionals by Larry E Daniel, Elsevier, ISBN-978-1-59749-643-8
3. Digital Forensics with Open Source Tools. Cory Altheide and Harlan Carvey, ISBN:978-1-59749-586-8, Elsevier publication, April 2011

REFERENCE BOOK

1. Computer Forensics and Cyber Crime: An Introduction (3rdEdition)by Marjie T. Britz, 2013.
2. Network Forensics: Tracking Hackers Through Cyberspace, Sherri Davidoff, Jonathan am Pren-

3. Computer Forensics: Hard Disk and Operating Systems, EC Council, September 17, 2009
4. Computer Forensics Investigation Procedures and response, EC-Council Press, 2010

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Practitioner's Approach to Data analytics
		COURSE CODE	CS451
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			PRACTICAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE : CS421 : Big Data Analytics

COURSE OBJECTIVES :

CS451.CEO.1:To explain basic concepts of scala

CS451.CEO.2:To understand spark programming

CS451.CEO.3:To understand spark data frames

CS451.CEO.4:To implement data analytics with spark

CS451.CEO.5:To build an application using data bricks and streaming with spark

CS451.CEO.6:To understand the computation in big data analytics

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS451.CO.1:Apply the basic concepts of scala

CS451.CO.2:Implement spark programming

CS451.CO.3:Apply spark data frames

CS451.CO.4:Build an application using data analytics with spark

CS451.CO.5:Build an application using data bricks and streaming with spark

CS451.CO.6:Analyze the computation in big data analytics

THEORY :		
UNIT 1	**Introduction to Scala**	**8 HOURS**

Basic Concepts, Scala operators, Collections, Lists, Arrays, sets, maps, Flow Control, Loops, functions in Scala

Self Study: Introduction to class and object in Scala

Further Reading: Examples of class in scala

UNIT 2	**Spark Programming**	**6 HOURS**

Introduction to Deleted File Recovery, Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, PUse Broadcast Variables ,Accumulators , Item-Based Collaborative Filtering in Spark, cache(), and persist(),Cluster Manager Self Study: Advanced Spark Programming-greserve and safely handle original media, Document a "Chain of Custody", Complete time line analysis of computer files based on file creation, file modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK) etc, Use computer forensics software tools to cross validate findings in computer evidence related cases.

Further Reading: Example on advanced Spark Programming

UNIT 3	**Spark Data Frames**	**6 HOURS**

Introduction to Spark Data Frames, Data Frames Overview, Spark Data Frame Operations, Group By and Aggregate Functions, Missing data, Date and Timestamps Self Study: Graph Frame

Further Reading: Apache Spark Graph Frames

UNIT 4	**Data Analytics with Spark**	**6 HOURS**

Introduction to Linear Regression, Introduction to Regression Section, Linear Regression, Documentation Example, Alternate Linear Regression Data CSV File, Classification Documentation Example, Clustering with Spark

Self Study: Advanced Data Analytics

Further Reading: Fast Data Analytics with Spark

UNIT 5	**Data Bricks and Streaming with Spark**	**6 HOURS**

Online Shopping Case Study

Content: Data bricks Overview, Introduction to Spark Recommendation Systems, Spark Recommender System Implementation, Spark Streaming, Structured Streaming

Self Study: Advanced Spark Streaming with Spark

Further Reading: Aggregations, Joins, Checkpoints

UNIT 6	**Computations in Big Data Analytics**	**8 HOURS**

Food Recommender Case Study

Bayesian approach to big data, block chain and policy, Search and optimization for big data, Parallel, accelerated, and distributed big data analytics, Value, and performance of big data analytics, Applications of BDA in cybercrime, e-commerce, e-health . Improving forecasting models using big data analytics, Security and privacy in big data era.

Self Study: Security and Privacy Challenges in Big Data Analytics

Further Reading: Security and Privacy Challenges in distributed Big Data Analytics

PRACTICAL :		
PRACTICAL NO.01		**8 HOURS**
Find the ranking based on social media data using Spark's RDD basics		
PRACTICAL NO.02		**8 HOURS**
Find most popular movie from the tweeter using recommendation system		
PRACTICAL NO.03		**8 HOURS**
Visit social network data, load it into a DataFrame and analyze it with actual SQL queries		
PRACTICAL NO.04		**6 HOURS**
Set up a Twitter Developer Account, and Stream Tweets		

TEXT BOOK

1. Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering.
2. Big Data Analytics with BigR.
3. Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
4. Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015
5. Computer Forensics and Cyber Crime: An Introduction (3rdEdition)byMarjie T. Britz, 2013.

REFERENCE BOOK

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
4. AnandRajaraman and Jefrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley sons, 2012.
6. Glen J. Myat, "Making Sense of Data", John Wiley Sons, 2007
7. Pete Warden, "Big Data Glossary", O'Reily, 2011.
8. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012

		COURSE SYLLABI
MIT | Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**		**(2016 – 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Pattern Recognition
		COURSE CODE	CS452
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE :

1. CS 312: Artificial Intelligence and Neural Networks.
2. CS 332: Machine Learning and its applications.
3. CS 422: Deep Learning.

COURSE OBJECTIVES :

CS452.CEO.1:To study the fundamental and advance algorithms for pattern recognition.

CS452.CEO.2:To understand the various classification technique.

CS452.CEO.3:To learn the various structural pattern recognition and feature extraction techniques

COURSE OUTCOMES :

The students after completion of the course will be able to,

CS452.CO.1:Interpret various advance algorithms for pattern recognition.

CS452.CO.2:Analyze the clustering concepts and algorithms.

CS452.CO.3:Apply structural pattern recognition and feature extraction techniques.

CS452.CO.4:Analyze the approach of the unsupervised learning in neural pattern recognition system.

THEORY		
UNIT 1	**INTRODUCTION**	**8 HOURS**

App/System/Case study:

Dog and cat classification

Content: Definition, applications, commercial machines, machine perception, examples: salmon, sea bass Problem Analysis: processing, feature extraction, classification, decision boundaries. Pattern Recognition Systems and Design cycle: Clustering and Classification, Data collection, Modeling, training.

Self -Study: Estimation/ Evaluation.

Further Reading: Special Purpose Systems.

UNIT 2	**Pattern Recognition Models**	**6 HOURS**

App/System/Case study:

Dice toss problems, Predicting the price of house

Contents:

Linear Model for Regression: Linear Basis function model, Bayesian decision theory, Bayesian model comparison and evidence approximation. Linear Model for Classification: Discriminate function, probabilistic generative models and discriminative models, Laplace approximation, Bayesian Logistic Regression. Graphical Model: Bayesian networks, conditional independence, Inferences. Mixture Model and EM: K-means clustering mixture of Gaussian.

-Study: Example of Gaussian clustering.

Further Reading: Alternative view of EM.

UNIT 3	**Kernel And Sampling Methods**	**6 HOURS**

App/System/Case study:

Junk mail filtering, Internet searching

Contents:

Kernel Method: Dual representation, Constructing Kernels, Radial Basis Function Networksand Gaussian Process. Sampling Method: Basic Sampling Algorithms, Markov Chain Monte Carlo, Gibbs Sampling, Slice Sampling.

Self-study: Hybrid Monte Carlo Algorithm.

Further Reading: Estimating the partition function.

UNIT 4	**Applications Using Deep Neural Network**	**8 HOURS**

App/System/Case study:

Character Recognition, Image compression, Stock Market Prediction.

Contents:

Introduction ,Neuron Physiology, Artificial Neurons, Feed-forward Neural Network, Vector and Matrix Notation ,Recurrent Neural Network, Elman Back propagation Neural Network, Hopfield Network, FFN Function, Network Training, Error Back propagation, Hessian Matrix, regularization in Neural Network,

Self- Study: Bayesian Neural Network.

Further Reading: Mixture Density Network.

UNIT 5	Digital Image Processing	8 HOURS

App/System/Case study: Face Recognition, Character Recognition.

Contents: Introduction Image Processing, Image as 2D signal and image enhancement techniques, filter design, Hidden Markov models for sequential pattern classification: Discrete hidden Markov models, Continuous density hidden Markov models, Dimension reduction methods: Fisher discriminant analysis, Principal component analysis.

Self- Study: HMM for Statistical pattern recognition.

Further Reading: HMM for Statistical pattern recognition.

UNIT 6	Recent Advances	8 HOURS

App/System/Case study:

Cancer diagnosis, junk mail filtering and internet searching.

Contents: Neural network structures for Pattern Recognition ,Neural network based Pattern associator, Unsupervised learning in neural Pattern Recognition ,Self-organizing, networks Fuzzy logic -Fuzzy pattern classifiers ,

Self -Study: Pattern classification using Genetic Algorithms

PRACTICAL:		
PRACTICAL NO.01		**4 HOURS**
Using R-language for pattern recognition 1. R tutorial 2. Using k-NN classifier for classification of selected UCI data sets.		
PRACTICAL NO.02		**4 HOURS**
Clustering -Application of various clustering schemes for clustering of UCI datasets: agglomerative clustering, kmeans, DBSCAN		
PRACTICAL NO.03		**4 HOURS**
1. Give perceptron for recognizing digits 0-9. Use Python/Matlab/Java/any Tool) OR 2. Implement back propagation (BP) on feed forward neural n/w (FFNN).		
PRACTICAL NO.04		**4 HOURS**
A. Implementation of cancer diagnosis system. (Use Python/Matlab/Java/any Tool) OR B. Design the search engine using pattern recognition technique.		
PRACTICAL NO.05		**6 HOURS**
Apply the Support vector machine for classification on a dataset obtained from UCI ML repository. For Example: Fruits Classification or Soil Classification or Leaf Disease Classification		
PRACTICAL NO.06		**2 HOURS**
A .Case Study: Finger Print recognition OR B. Case Study : Voice recognition ,Iris Recognition		

TEXT BOOK

1. C.M.Bishop, "Pattern Recognition and Machine Learning, Springer, 2006, ISBN 978-81-322-0906-5.
2. N.P Padhy, Artificial Intelligence and Intelligent System , Oxford University press ,2005, ISBN 13: 978-0-19- 567154-4.
3. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, ISBN: 0-471-05669-3.

REFERENCE BOOK

1. S.Theodoridis and K.Koutroumbas,"Pattern Recognition", Academic Press, 4th Ed 2009, ISBN 978-15-974- 9272-0.
2. C.M Bishops, "Neural Networks for Pattern Recognition", Citation 23831,Oxford University Press ,1995 .

	COURSE SYLLABI **(2016 – 2020)**	
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2019 - 2020
FOURTH YEAR BACHELOR OF TECHNOLOGY **All Branches**	**COURSE NAME**	Engineering Economics
	COURSE CODE	HP401
	COURSE CREDITS	2
RELEASED DATE : 01/06/2019	**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**						
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**	
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**		
1	NIL	NIL	50	20	NIL	NIL	70	

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

HP401.CEO.1:To enable the students to understand the basic concepts of Economics

HP401.CEO.2:To impart knowledge, with respect to practical applications of Economics .

COURSE OUTCOMES :

The students after completion of the course will be able to,

HP401.CO.1:The students would have understood the basic concepts of Economics.

HP401.CO.2:The students would have acquired knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions

HP401.CO.3:The course is designed to improve critical thinking, problem solving skills by using economic models and theories and predict economic relationships

HP401.CO.4:Students entering any profession in the workforce today must be able to utilize these basic economic principles. The course expected to develop critical understanding of current topics in economics and able to formulate their own opinions on economic issues

THEORY		
UNIT 1	**Introduction to Economics**	**6 HOURS**
Economic Issues and Concepts; How Economist Work ; Theory of Demand & Supply; Meaning, Determinants, Law of Demand and Supply, Equilibrium between Demand & Supply; Elasticity of demand, price elasticity, income elasticity, cross elasticity.		
UNIT 2	**Micro Economics**	**6 HOURS**
Revenue Concepts; Cost Concepts, Short run & Long run cost Concepts and curves, opportunity cost. Break even analysis; meaning, explanation, numerical. Markets; meaning, types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Competition , Oligopoly). **Further Reading:**		
UNIT 3	**Macro Economy**	**5 HOURS**
National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP,NDP, Personal income, disposal income. Inflation; meaning, types, causes, measures to control. **Further Reading:**		
UNIT 4	**Indian Economy**	**5 HOURS**
Characteristics of an Indian Economy; Human Development Index(HDI); Concepts of Foreign Trade, Goods and Services Tax(GST); Micro Small and Medium Enterprise(MSME) ; Foreign Direct Investment(FDI);Unemployment: meaning, types, causes, remedies. **Further Reading:**		
UNIT 5	**Introduction to Banking & Money Market**	**6 HOURS**
Banking; meaning, types, functions, Commercial Banks- Instruments in Operation of an Account, Central Bank- RBI; its functions, Concepts- CRR, Bank Rate, Repo Rate, Reverse Repo rate, SLR; Introduction to Money and Capital Market , Introduction to Fiscal policy- meaning and tools. **Further Reading:**		

REFERENCE BOOKS

1. R.Paneerselvam :Engineering Economics, , PHI publication ISBN : 978-81-203-5172-1
2. Robbins S.P. and Decenzo David A :Fundamentals of Management: Essential Concepts and Applications, Pearson Education, ISBN-13: 9780133499919
3. N Gregory Mankiw :   Economics: Principles of Economics, Cengage Learning ISBN-10: 1305585127
4. L.M. Prasad: Principles and Practices of Management ISBN-10: 9351610500; ISBN-13: 978-9351610502
5. Tripathy and Reddy :Principles of Management ISBN, 1259050572, 9781259050572
6. Dr. K. K. Dewett & M. H. Navalur, S. Chand :Modern Economic Theory ISBN, : 9788121924634 .

MIT	Academy of Engineering	COURSE SYLLABI	
(An autonomous Institute Affiliated to SPPU)		**(2016 – 2020)**	
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING		**COURSE NAME**	Major Project - II
		COURSE CODE	CS432
		COURSE CREDITS	4
RELEASED DATE : 01/01/2019		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			PRACTICAL/	PRESENTATION/	TOTAL
LECTURE		MSE	ESE	IA	TERMWORK	DEMONSTRATION	
-	8	–	–	–	100	50	150

PRE-REQUISITE : CS405 Major Project – I

COURSE OBJECTIVES :

CS432.CEO.1:To follow the standard guideline to meet the objective for development of Project.

CS432.CEO.2:To test rigorously before deployment of Systems

CS432.CEO.3:To Verify and Validate the work Undertaken

CS432.CEO.4:To Consolidate the work and preparation of final report

COURSE OUTCOMES :

The students after completion of the course will be able to:

CS432.CO1:Show the evidence of independent evaluation.

CS432.CO2:Critically analyzed the result and their implementation methodology.

CS432.CO3:Validate the results with standard tools and techniques.

CS432.CO4:Understand the importance of documentation and report writing.

PREAMBLE:

objective of this Major Project-II to implement the full and final project and the report. After The remaining project work which consist of selection of approach / methodology / tools and techniques, Designing, installation, results and performance evaluation. Also includes the comparative analysis and validation of result. Should prepare the Project report as per format for satisfactory completion of work certified by concern project advisor and dean. .

It is desirable to prepare and publish the conference or journal paper or IPR and publish with peer reviewed publishing agency. 10 marks will be awarded.:

Follow the guideline and formats as mentioned in guideline document.(Annexure-II):

GUIDELINE

In Project Work Stage-II, the student shall complete the remaining project work which consists of Selection of Methodology, Tools and Technology, Installations, Design, Implementations, testing, Results, performance analysis if applicable (discussions using data tables per parameter considered for the improvement with existing/known algorithms/systems) and comparative analysis and validation of results and conclusions. The student shall prepare and submit the report of Project work in standard format for satisfactory completion of the work that is the duly certified by the concerned advisor and Dean of the school.

It is desirable to prepare and publish the conference or journal paper or IPR and publish with peer reviewed publishing agency. 10 marks will be awarded.

Follow the guideline and formats as mentioned in guideline document.(Annexure-II)

TIMELINE

1. Presentation of Project Review- 3 Project Progress Monitoring DRC review – (Week 5th)

2. Presentation of Project Review – 4 Project Progress Monitoring and Report Preparation –(Week-8th)

3. Internal Examination/ Project Expo: Project-2 Demonstration and presentation- (Week 10th)

4. External Examination: Project-2 Demonstration and Presentation- (End semester-Week 12th or 13th)

ASSESSMENT

1. Internal Assessment

a. Project Review -3 Progress Monitoring - 30 Marks

b. Project Review -4 Progress Monitoring and Report Preparation -30 Marks

c. Project Expo/ Examination- Evaluation Presentation and Demonstration- 30 Marks

d. Paper publication/presentation/IPR -10 Marks

2. Examination: Final Demonstration and presentation a. Project presentation: 15 Marks

b. Project design / execution / demonstration : 20 Marks

c. Project Report preparation and documentation: 15 Marks

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune University

Curriculum for

Final Year

Bachelor of Technology in

Computer Engineering

(Amendments for Semester Long Internship)

2016-2020

(With Effect from Academic Year: 2019-2020)

1. ELIGIBILITY:

I.   No live backlogs
II.   CGPA of 8.50 and above
III.   If Recruiter/s (MNCs) have asked for semester long internship to the selected student/s (before joining the organization after his / her graduation), then in special case recruited students can apply for the same. (Only criteria-I should be satisfied by the student)

Only students satisfying the above criteria can be permitted for semester-long internship in any MNCs / R&D laboratories such as DRDO, NCL, NEERI, CDAC and Institutions like IITs/ NITs / International institutes of repute.

2. DEADLINES:

For the current batch, the applications must be submitted by 30, November 2019 by all students desired to go for the semester long internship.

3. APPLICATION PROCEDURE:

The student must submit a proposal of the semester-long internship including details of the organization along with the details of the project in brief, copy of their CV and copies of mark sheet to the respective school Corporate Relations (CR) coordinator. The application must be as per the format given below.

Application for Internship Program

Sr. No.	Particulars	
1	Name of the applicant (in bold letters)	
2	Gender	
3	School	
4	Date of Birth & Age (as on date)	
5	Roll Number & PRN	
6	Address for correspondence with mobile / telephone number and email-id	
7	Name & address of the Institute / Industry	
8	Core Domain of Institute / Industry	

9	Contact details Supervisor / HR Mobile / Telephone number and email-id	
10	Period of internship	24-26 weeks
11	Details of the Project proposed	

Signatures

Student	School Internship Coordinator
Approved by:	
No. of credits proposed	6 / 10
Dean – School of _____ Engineering	MIT AOE Seal
Date:	

4. RULES & CONDITIONS:

I. Sponsored project should be along the same track of the minor (Open Elective) chosen by the student. (desirable)

II. Semester long internship is applicable only in the 8th semester.

The distribution of credits for the VIII semester is as follows

DC	Department Core	4 Credits
DE	Department Elective	3 Credits
OE	Open Elective	4 Credits

HSS Humanities & Social science2 Credits

SDP Skill development and Project4 Credits

III. For a student who is going for a semester long internship, 10 credits (OE, HSS and SDP) will be awarded if OE is part of the internship otherwise 6 credits will be awarded.

IV. The equivalence courses for the DC, DE and OE must be floated by the Schools.

V. The credits of DC, DE and OE should be earned through MOOC courses.

VI. If a student is not able to successfully earn the credits of the DC / DE / OE within the stipulated time, they will not be eligible for the graduation in the same academic year.

5.1 ASSESSMENT METHOD FOR SEMESTER LONG INTERNSHIP:

Credits for the semester-long internship need to be earned by the students by the following assessment in front of the panel.

i) The Panel for the evaluation should be 3 members (if 3 credits) or 4 members (if 5 credits). The composition of the team would be as follows.

  i. Dean, Respective School ii.   CR Coordinator / Project Coordinator / Project Guide iii.   Project Guide (Industry)

          iv.   The domain expert (In case of 5 credits, as per the minor specialization)

ii) Presentation I at the end of 45th day and presentation II at the end of 90th day from the start of the project combined to a total weightage of 5 credits *(3 credits if OE is exempted).* Itcan be possible to do through Skype, if acceptable to the panel. **In Grade card it will be mentioned as SLIP – Project Design.**

iii) Presentation at the end of the Internship Work and Final Internship Report after the completion of the Internship Work combined for a total weightage of 5 credits *(3 credits if OE is exempted)* and should be as per the template).**In Grade card it will be mentioned as SLIP – Project Implementation.**

5.2 ASSESSMENT METHOD FOR OTHER COURSES RUN THROUGH INSTITUTE LMS:

Credits for the courses run through Go-Webinar will be assessed using the following methods.

    I.   There will be SIX assignments (one per unit) to be submitted through the moodle. This will have a weightage of 30% of the total score. This contributes to the IA for the course.

    II. There will be SIX quizzes (one per unit) to be conducted through moodle. This will have a weightage of 30% of the total score. This contributes to the ISE for the course.

    III. One FINAL presentation to be done at the end and evaluated by a team of THREE members including the Course Champion, Instructor and any other nominated member by the respective School Dean. This will have a weightage of 40% of the total score. This contributed for the ESE of the course.

**CURRICULUM STRUCTURE
(2016 - 2020)**

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F	:	2019-20
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE	:	01/06/2019
	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 12	CS401	Software Engineering, Testing and Quality Assurance.	3	2	4
2.	DE 1	CS41#	Department (Program) elective - Ref er Annexure	3	0	3
3.	OE 3	CS42#	Open Elective – Refer Annexure	3	2	4
4.	HSS 6	HP402	Sociology	2	--	2
5.	HSS7/S DP7	HP403/CS 40#	Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux)	---	2	1
6.	SDP 8	CS405	Project – I	--	8	4
7.	SDP9	CS406	Summer Internship	--	--	4
			TOTAL	11	14	22

SEMESTER: VIII (SLIP not inline with the Open elective)

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC 13	CS431	Human Computer Interaction @	4	-	4
2.	DE2	CS44#	Department Elective	3	-	3
3.	OE4	CS45#	Open Elective @	4	-	4
4.	SEMESTER LONG INTERNSHIP – Project Design			-	6	3
5.	SEMESTER LONG INTERNSHIP – Project Implementation			-	6	3
TOTAL				11	12	17

CURRICULUM STRUCTURE
(2016 - 2020)

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY	W.E.F :	2019-20
FINAL YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING	RELEASE DATE :	01/06/2019
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3.	OE 3	CS42#	Open Elective – Refer Annexure	3	2	4
4.	HSS 6	HP402	Sociology	2	--	2
5.	HSS7/SDP7	HP403/CS40#	Business Strategies/ Advance skill development lab(Adv. Java/R Programming/Python with kali Linux)	---	2	1
6.	SDP 8	CS405	Project – I	--	8	4
7.	SDP9	CS406	Summer Internship	--	--	4
			TOTAL	11	14	22

SEMESTER: VIII (SLIP inline with the Open elective)

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC13	CS431	Human Computer Interactions @	4	-	4
2.	DE2	CS44#	Department Elective	3	-	3
4.			SEMESTER LONG INTERNSHIP – Project Design	-	10	5
5.			SEMESTER LONG INTERNSHIP – Project Implementation	-	10	5
			TOTAL	7	20	17

@ - Courses run through institute LMS.

DEPARTMENT ELECTIVE ON MOOCS PLATFORM			
SR. NO.	COURSE DETAILS	MOOC DETAILS	NO. OF WEEKS
1.	Distributed system (IIT)	NPTEL	8
2.	Introduction to industry 4.0 and industrial IOT (IIT)	NPTEL	12
3.	Virtual Reality Engineering (IIT)	NPTEL	12