MIT | Academy of Engineering

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune University

Curriculum for

Bachelor of Technology in

Civil Engineering

(Choice Based Credit System)

2016-2020

BoS Chairman	**Member Secretary**	**Chairman**
Dean, School of	Academic Council	Academic Council
Mechanical & Civil	Dean Academics	Director MITAOE
Engineering		

MIT Academy of Engineering

An autonomous institute affiliated to Savitribai Phule Pune University

<u>CURRICULUM FRAMEWORK- (CIVIL ENGINEERING)</u>

The B. Tech Program shall be based on the following types 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	10.96
2.	Engineering Science	4	16	9.76
3.	Program Core	5	19	11.59
4.	Discipline Core	12	48	29.27
5.	Department Elective	2	6	3.66
6.	Open Elective	4	16	9.76
7.	Humanities and Social Science	8/9	17	10.37
8.	Skill Development and Project	10/9	24	14.63
	TOTAL	**49**	**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	3	3	1	1	**12**
5.	Department Elective							1	1	**2**
6.	Open Elective					1	1	1	1	**4**
7.	Humanities & Social Science	1	1		1	1	2	1/2	2	**8/9**
8.	Skill Development & Project	1	1	1	1	1	1	2/3	1	**9/10**
	TOTAL	**6**	**6**	**6**	**6**	**6**	**7**	**5**	**6**	**49**

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			11	8					**19**
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		3	2	3	2	3	**17**
8.	Skill Development & Project	2	2	2	2	2	2	8	4	**24**
	TOTAL	**21**	**21**	**21**	**21**	**20**	**21**	**22**	**18**	**164**

CURRICULUM STRUCTURE (2016 - 2020)

MIT | Academy of Engineering (An Autonomous Institute)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	**W. E. F** : 2016-17
FIRST YEAR BACHELOR OF TECHNOLOGY	**RELEASE DATE** : 01/06/2016
DEPARTMENT OF CIVIL ENGINEERING	**REVISION NO.** : 0.0

SEMESTER: I

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P/T*	CREDIT
1.	NSC1	AS101	Mathematics – I	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 – I	1	2	2
6.	SDP1	ME102/ ME103	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	AS101	Mathematics – II	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	HP101	Language & Communication – II	1	2	2
6.	SDP2	ME103/ ME102	Design Thinking/ Experimental Tools & Techniques	--	4	2
			TOTAL	13	15	21

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

MIT | Academy of Engineering
(An Autonomous Institute)

CURRICULUM STRUCTURE (2016 - 2020)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2017-18
SECOND YEAR BACHELOR OF TECHNOLOGY	RELEASE DATE	:	01/06/2017
DEPARTMENT OF CIVIL EGG	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	AS201	Applied Mathematics	3	2	4
3.	PC3	ET201	System Engineering	3	2	4
4.	DC1	CV201	Continuum Mechanics of Solids	3	2	4
5.	DC2	CV202	Geospatial Engineering Technology	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.	PC4	IT201	Engineering Informatics	3	2	4
2.	PC5	ME201	Materials Engineering	3	2	4
3.	DC3	CV211	Building Design & Construction	3	2	4
4.	DC4	CV212	Geotechnical Engineering	3	2	4
5.	HSS3	HP201	Psychology	3	--	3
6.	SDP4	CV213	Minor Project	--	4	2
			TOTAL	15	12	21

L: Lecture, P: Practical

		CURRICULUM STRUCTURE (2016 - 2020)	

MIT | Academy of Engineering
(An Autonomous Institute)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2018-19
THIRD YEAR BACHELOR OF TECHNOLOGY	RELEASE DATE	:	01/12/2017
DEPARTMENT OF CIVIL EGG	REVISION NO.	:	0.0

SEMESTER: V

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC5	CV301	Mechanics of Fluids	3	2	4
2.	DC6	CV302	Structural Analysis	3	2	4
3.	DC7	CV303	Concrete Technology	3	2	4
4.	OE1	CV31#	Open Elective - Refer Annexure.	3	2	4
5.	HSS4	HP301	Project Management	1	2	2
6.	SDP5	CV30#	Skill Development Lab - Refer Annexure	--	4	2
TOTAL				13	14	20

SEMESTER:VI

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC8	CV321	Design of Structures	3	2	4
2.	DC9	CV322	Transportation Engineering	3	2	4
3.	DC10	CV323	Water Resources Engineering	3	2	4
4.	OE2	CV33#	Open Elective - Refer Annexure.	3	2	4
5.	HSS5	HP302	Professional Skills	--	4	2
6.	HSS6	HP303	Basics of Entrepreneurship	--	2	1
7.	SDP6	CV324	Mini Project	--	4	2
TOTAL				12	18	21

L: Lecture, P: Practical

CURRICULUM STRUCTURE (2016 - 2020)

MIT | Academy of Engineering
(An Autonomous Institute)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2019-20 (Part A)
FINAL YEAR BACHELOR OF TECHNOLOGY	RELEASE DATE	:	01/12/2018
DEPARTMENT OF CIVIL EGG	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC11	CV401	Drinking Water & Sanitary Engineering	3	2	4
2.	DE1	CV41#	Discipline Elective - Refer Annexure.	3	--	3
3.	OE3	CV42#	Open Elective - Refer Annexure.	3	2	4
4.	HSS7	HP401	Engineering Economics	2	--	2
5.	HSS9/ SDP7	HP403/ CV403	Business Strategies / Urban & Town Planning	--	2	1
6.	SDP8	CV402	Project - I	--	8	4
7.	SDP9	CV404	Summer Internship	--	--	4
TOTAL				11	14	22

SEMESTER: VIII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC12	CV431	Estimation & Costing	3	2	4
2.	DE2	CV44#	Discipline Elective - Refer Annexure	3	--	3
3.	OE4	CV45#	Open Elective - Refer Annexure	3	2	4
4.	HSS8	HP402	Sociology	2	--	2
5.	SDP10	CV432	Project - II	--	8	4
TOTAL				11	12	17

L: Lecture, P: Practical

CREDITS				
1 Lecture hour = 1 Credit 2 Lab Hours = 1 Credit 1 Tutorial Hour = 1 Credit				
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	28	29	**57**
4.	Final Year	25	23	**48**
TOTAL				**216**

Natural Science (NSC): 4 Courses

Sl. No.	Course Code	Name of Course
1.	AS101	Mathematics – 1
2.	AS104	Mathematics – 2
3.	AS102	Physics
4.	AS103	Chemistry

Engineering Science (ESC): 4 Courses

Sl. No.	Course Code	Name of Course
1.	EX101	Electrical and Electronics Engineering
2.	ME101	Engineering Graphics
3.	CV101	Applied Mechanics
4.	IT101	Computer Programming

Program Core (PC): 5 Courses

Sl. No.	Course Code	Name of Course
1.	CH201	Environmental Science
2.	AS201	Applied Mathematics
3.	ET201	System Engineering
4.	IT201	Engineering Informatics
5.	ME201	Materials Engineering

Discipline Core (DC): 12 Courses		
Sl. No.	Course Code	Name of Course
1.	CV201	Continuum Mechanics of Solids
2.	CV202	Geospatial Engineering
3.	CV211	Buildings Design and Construction
4.	CV212	Geotechnical Engineering
5.	CV301	Mechanics of Fluids
6.	CV302	Structural Analysis
7.	CV303	Concrete Technology
8.	CV321	Design of Structures
9.	CV322	Transportation Engineering
10.	CV323	Water Resources Engineering
11.	CV401	Drinking Water & Sanitary Engineering
12.	CV431	Estimation & Costing

Department Elective (DE): 2 Courses		
	Course Code	Name of Course
1.	CV411	Building Services
	CV412	Advanced Design of Structures
	CV413	Railway Engineering
	CV414	Hydro Power Engineering
2.	CV441	Foundation Engineering
	CV442	Engineering Geology

	CV443	Design of Hydraulic Structures
	CV444	Air & Noise Pollution and Control measures
	CV445	Advances in Geospatial Engineering

Open Elective (OE): 4 Courses

Construction Project Management	Sl. No.	Course Code	Name of Course
	1.	CV311	Construction Planning & Management
	2.	CV331	Operation Research
	3.	CV421	Financial Management
	4.	CV451	Statistical Methods in Construction

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	IT311	Cryptography & System Security	
5	CS311	Descriptive Analytics	
6	CS312	Artificial Intelligence & Neural Network	
Electronics			
7	EX311	Fundamentals of Robotics	
E & TC			
8	ET311	Embedded System Programming (ESP)	
9	ET312	IoT Architecture and Protocols	
IT			
10	IT311	Cryptography & System Security	
11	CS311	Descriptive Analytics	
12	CS312	Artificial Intelligence & Neural Network	
Mechanical			
13	ME311	Geometric Modeling & Design	
14	ME312	Fundamentals of Robotics	
15	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	IT331	Cyber Security
	5	CS331	Data Science-I
	6	CS332	Machine Learning
Electronics			
	7	EX331	Kinematics and Dynamics of Robotics
E & TC			
	8	ET331	Embedded Processor
	9	ET332	IoT Network & Protocols
IT			
	10	IT331	Cyber Security
	11	CS331	Data Science-I
	12	CS332	Machine Learning
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	IT421	Ethical Hacking & Cyber Laws
5	CS421	Data Science-II
6	CS422	Pattern Recognition
Electronics		
7	EX421	Robotics Vision and Control
E & TC		
8	ET421	Low-Power SoC Architecture & Applications (SoC&A)
9	ET422	Privacy and Security in IoT
IT		
10	IT421	Ethical Hacking & Cyber Laws
11	CS421	Data Science-II
12	CS422	Pattern Recognition
Mechanical		
13	ME421	Computational Fluid Dynamics
14	ME422	Robotics Vision and Control
15	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 & Information Exchange
Computer		
4	IT451	Cyber Forensics
5	CS451	Practitioner's approach for Data analytics
6	CS452	Reinforcement Learning
Electronics		
7	EX451	Intelligent and High Performance Robotics
E & TC		
8	ET451	Real-Time Embedded System (RES)
9	ET452	Energy Management for IoT Devices
IT		
10	IT451	Cyber Forensics
11	CS451	Practitioner's approach for Data analytics
12	CS452	Reinforcement Learning
Mechanical		
13	ME451	Advanced Analysis
14	ME452	Intelligent and High Performance Robotics
15	ME453	Supply Chain Management

Humanities and Social Science (HSS): 9 Courses

Sl. No.	Course Code	Name of 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): 10 Courses

Sl. No.	Course Code	Name of Course
1.	ME102	Engineering Tools and Techniques
2.	ME103	Design Thinking
3.	ET206	Prototyping
4.	CV213	Minor Project
5.	CV304	ETABS (Extended Three-Dimensional analysis of building system)
6.	CV403	Urban & Town Planning
7.	CV324	Mini Project
8.	CV402	Project - I
9.	CV404	Summer Internship
10.	CV432	Project - II

MIT Academy of Engineering

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune University

Curriculum
For
First Year
Bachelor of Technology
2016-2020

(With Effect from Academic Year: 2016-2017)

MIT | Academy of Engineering
(An Autonomous Institute)

CURRICULUM STRUCTURE
(2016 - 2020)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2016-17
FY BTECH	RELEASE DATE	:	01/06/2016
DEPARTMENT OF MECHANICAL EGG	REVISION NO.	:	0.0

SEMESTER: I

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P/T*	CREDIT
1.	NSC1	AS101	Mathematics – I	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 – I	1	2	2
6.	SDP1	ME102/ ME103	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	AS101	Mathematics – II	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	HP101	Language & Communication – II	1	2	2
6.	SDP2	ME103/ ME102	Design Thinking/ Experimental Tools & Techniques	--	4	2
			TOTAL	13	15	21

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

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		**EXAMINATION SCHEME AND MARKS**					
(HOURS/WEEK)		**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 first 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)

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 (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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 phenomena.(L3) .

AS102.CEO.4: To classify and understand the difference of classical mechanics and quantum mechanics.(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

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 (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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

		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 (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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	**Verification 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 Amplifier.**	**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.

	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** Applied Mechanics
	COURSE CODE CV101
	COURSE CREDITS 4
RELEASED DATE : 01/06/2016	**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	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	**Energy and Momentum**	**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**	Engineering Graphics
	COURSE CODE	ME101
	COURSE CREDITS	4
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	
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 modeling 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)

	COURSE SYLLABI (2016 – 2020)
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 (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/ PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA			
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 allthe 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.

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 (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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. 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

		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**	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 6 practicals 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.

<table>
<tr><td>MIT | Academy of Engineering
(An Autonomous Institute Affiliated to SPPU)</td><td colspan="3">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

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**	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 ShahinPublisher, 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, ISBN 0-471-28496-3.

Web references

1. www.designcouncil.org.uk
2. www.surveymonkey.com
3. http://en.red-dot.org

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**	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

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Second Year

Bachelor of Technology in Civil Engineering

2016-2020

(With Effect from Academic Year: 2017-2018)

CURRICULUM STRUCTURE (2016 - 2020)

MIT Academy of Engineering (An Autonomous Institute)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F : 2017-18
SECOND YEAR BACHELOR OF TECHNOLOGY	RELEASE DATE : 01/06/2017
DEPARTMENT OF CIVIL EGG	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	AS201	Applied Mathematics	3	2	4
3.	PC3	ET201	System Engineering	3	2	4
4.	DC1	CV201	Continuum Mechanics of Solids	3	2	4
5.	DC2	CV202	Geospatial Engineering Technology	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.	PC4	IT201	Engineering Informatics	3	2	4
2.	PC5	ME201	Materials Engineering	3	2	4
3.	DC3	CV211	Building Design & Construction	3	2	4
4.	DC4	CV212	Geotechnical Engineering	3	2	4
5.	HSS3	HP201	Psychology	3	--	3
6.	SDP4	CV213	Minor Project	--	4	2
TOTAL				15	12	21

MIT Academy of Engineering (An Autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF CHEMICAL ENGINEERING	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL 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	NIL	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	**Title: 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	**Title: 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	**Title: 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	**Title: 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	**Title: 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.

<table>
<tr><td rowspan="4">MIT | Academy of Engineering
(An Autonomous Institute Affiliated to SPPU)</td><td colspan="3" align="center">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

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

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2017 - 2018	
SECOND YEAR BACHELOR OF TECHNOLOGY CHEM/CIVIL/MECH ENGG	**COURSE NAME**	Applied Mathematics	
	COURSE CODE	AS201	
	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	50	-	150

PRE-REQUISITE : NIL

COURSE OBJECTIVES :

AS201.CEO.1: To find the Laplace transform of continuous time signals (functions).

AS201.CEO.2: To determine the Fourier constants and construct the Fourier series.

AS201.CEO.3: To construct the integral representation of functions using Fourier transform.

AS201.CEO.4: To solve partial differential equations viz. heat and wave equations theoretically.

AS201.CEO.5: To apply numerical methods for constructing functions and solving Differential Equations.

AS201.CEO.6: To write and execute the program on problems of Laplace, Fourier and numerical methods using MATLAB.

COURSE OUTCOMES :

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

AS201.CO.1: Analyze the output response of given linear system using Laplace Transform.

AS201.CO.2: Analyze the frequency response of the system using appropriate Fourier transform.

AS201.CO.3: Justify the selection of appropriate transform for a given system.

AS201.CO.4: Solve and examine the solution of partial differential equations by theoretical methods.

AS201.CO.5: Determine the solution of ordinary differential equations using Eulers, Runge-Kutta 4th order and the interpolation using Newtons and Lagranges interpolating methods.

AS201.CO.6: Implement Laplace Transform, Fourier transform and Numerical methods to find the solution of given problem using MATLAB.

THEORY		
UNIT 1	**Laplace Transform I**	**6 HOURS**

Introduction of Laplace Transform, Properties: First shifting, Second shifting, Change of scale, Linearity, Multiplication by t, Division by t. Laplace Transform of derivatives, integration, Unit Step function, Impulse Function and Periodic Functions.

UNIT 2	**Laplace Transform II**	**6 HOURS**

Introduction of Inverse Laplace Transform, Properties: First shifting, Second shifting, Change of scale, Linearity, Multiplication bys, Division bys. Inverse Laplace Transform of elementary functions, Derivatives, Integration. Use of partial fractions to find Inverse Laplace Transform. Solution and analysis of linear differential equation to linear system.

UNIT 3	**Fourier Series**	**6 HOURS**

Periodic functions, Fourier series, Dirichlets conditions, determination of Fourier constants, Half ranges series, Even function series, odd function series, arbitrary period functions series.

UNIT 4	**Fourier Transform**	**6 HOURS**

Introduction of Fourier Transform, Complex exponential form of Fourier series, Fourier Integral Theorem (without proof), Fourier transform and its properties, Fourier Sine Transform, Fourier Cosine Transform, and Inverse Fourier transforms, Fourier Transform of derivatives of a function, Analysis of frequency response.

UNIT 5	**Applications of Partial differential Equations**	**6 HOURS**

One dimensional Heat flow and wave equations by method of separation of variables, Solution of Partial Differential equations by Numerical method: Crank Nicolson method.

UNIT 6	**Numerical Methods**	**6 HOURS**

Interpolation: Finite Differences, Newtons and Lagranges Interpolation. Numerical solution of System of linear equations by Gauss elimination method and Ordinary differential equations by Eulers, Modified Eulers, Runge-Kutta 4th order methods.

PRACTICAL: Any 10 practicals are performed as per the requirement of a branch.		
PRACTICAL NO.01		**2 HOURS**
Introduction to MATLAB: Syntax, keywords, matrices, polynomials, loops.		
PRACTICAL NO.02		**2 HOURS**
Introduction to MATLAB: In-built functions, 2D/3D plots, creating simple programs.		
PRACTICAL NO.03		**2 HOURS**
Finding Laplace transforms of functions, solution of differential equations using Laplace transforms.		
PRACTICAL NO.04		**2 HOURS**
Finding Fourier transforms of functions, Plotting of transforms.		
PRACTICAL NO.05		**2 HOURS**
Numerical Integration: Trapezoidal, Simpsons 1/3rd and Simpsons 3/8th rule.		
PRACTICAL NO.06		**2 HOURS**
Interpolation techniques: Lagranges Interpolation.		
PRACTICAL NO.07		**2 HOURS**
Interpolation techniques: Newtons Interpolation.		
PRACTICAL NO.08		**2 HOURS**
Solution of differential equation by modified Eulers method.		
PRACTICAL NO.09		**2 HOURS**
Solution of differential equation by Runge-Kutta method.		
PRACTICAL NO.10		**2 HOURS**
Curve Fitting: Linear, Quadratic.		
PRACTICAL NO.11		**2 HOURS**
Solution of algebraic equations: Newton- Raphson method.		
PRACTICAL NO.12		**2 HOURS**
Solution of algebraic equations: Bisection method.		
PRACTICAL NO.13		**2 HOURS**
Curve Fitting: Cubic, Exponential.		

TEXT BOOK

1. Dr. B.V. Ramana, Higher Engineering Mathematics, 5 th edition, Tata McGraw Hill, 2017, ISBN: 978-0-07-063419-0
2. Ram N. Patel and Ankush Mittal, Programming in MATLAB- A Problem solving approach, Pearson Education, 2014, ISBN-978-93-325-2481-1.

REFERENCE BOOK

1. B.S. Grewal, Higher Engineering Mathematics, 44 th edition, Khanna Publications, 2018, ISBN: 978-81-933284-9-1.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10 th edition, Wiley Eastern Ltd., 2015, ISBN: 13: 9788126554232
3. Amos Gilat, MATLAB: An Introduction with Applications, 4th edition, Wiley Publication, 2003, ISBN-13: 9788126537204, 8126537205.

MIT Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF ELECTRICAL ENGINEERING	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY **CIVIL 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 MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Continuum Mechanics of Solids
		COURSE CODE	CV201
		COURSE CREDITS	4
RELEASED DATE : 1/06/2017		**REVISION NO**	0.0

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

PRE-REQUISITE: CV 101 Applied Mechanics

COURSE OBJECTIVES:

CV201.CEO.1: To analyze axially loaded bars, beams, columns and shafts subjected to torsion.

CV201.CEO.2: Learner should be able to identify most critical locations, planes and critical direct and shear stresses for various loading scenarios on different types of structures.

COURSE OUTCOMES:

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

CV201.CO.1: Enlist and explain different types of actions on a structural component. [Understand].

CV201.CO.2: Draw axial force diagrams for axially loaded members, shear force diagrams and bending moment diagrams for statically determinate beams and twisting moment diagram for statically determinate shafts. [Apply]

CV201.CO.3: Draw bending stress distribution diagram for beams and shear stress distribution diagrams for beams and shafts. [Apply].

CV201.CO.4: Calculate load corresponding to elastic instability for columns with various end conditions. [Apply]

CV201.CO.5: Calculate principal stresses and absolute maximum shear stresses at various locations of a structural component using analytical method and Mohrs circle whichever is suitable. [Analyse]

CV201.CO.6: Select particular shape of cross section to economically carry calculated bending/shear stresses under flexure/shear. [Evaluate]

THEORY COURSE CONTENT		
UNIT 1	**Linear elasticity**	**6 HOURS**
Deformation and strain, concept of the stress, constitutive matrix for isotropic matrix, strain energy, composite sections subjected to axial/flexure/temperature loading Programming: compute change in volume of a metal cube subjected to tri-axial loading		
UNIT 2	**Axially loaded bars and torsion of shafts**	**6 HOURS**
Axial force diagram, deformation of axially loaded bars, axially composite bars, composite bars subjected to temperature change, twisting moment diagram, torsion formula, angle of twist, torsion of prismatic shafts, shear stress distribution.		
UNIT 3	**Shear force diagram and bending moment diagram**	**8 HOURS**
Introduction, relations between shear force diagram and bending moment at a section, forward and reverse problems. Case studies: Observe locations of flexure and flexure-shear failures in the beams and correlate them with shear force diagram and bending moment diagram. Field studies: Shapes of beams in steel structures/ RCC structures, amount of steel and its correlation with variation of bending moment.		
UNIT 4	**Stresses in beams**	**8 HOURS**
Bending formula, bending stress distribution and shear stress distribution in a beam, economic shape of cross section of beam to maximize moment of inertia. Programming: compute bending and shear stresses at all locations in the prismatic or non-prismatic beams with various support conditions and for complex loading pattern. Reading: Reflections on following research paper, Minamino R and Tateno M, 2014, Tree Branching: Leonardo da Vincis Rule versus Biomechanical Models. PLoS ONE Volume 9, issue 4		
UNIT 5	**Columns**	**8 HOURS**
Stability of columns, Euler buckling of columns, Rankine's and Jhonson's interpretations of critical load on column, eccentric load, initially imperfect columns. Reading: Reflections on how high the trees can grow? Karl J N, 2006, Maximum plant height and the biophysical factors that limit it, Tree Physiology, Vol. 27, pp 433-440		
UNIT 6	**Principal planes and principal stresses**	**6 HOURS**
State of stress, state of pure shear, direct state of stress, analytical and graphical method of finding principal planes and principal stresses, maximum in-plane shear stress, absolute maximum shear stress. Programming: finding out critical planes and maximum shear and normal stresses in beams and shaft (under twisting) problems..		

PRACTICAL		
PRACTICAL NO.01	**Tension test on metals.**	**4 HOURS**
Tensile strength of steel (M.S And TOR Steel)		
PRACTICAL NO.02	**Bending test**	**4 HOURS**
Four point monotonic and half cyclic bending test on timber/concrete beam/steel beam Finding Laplace transforms of functions, solution of differential equations using Laplace transforms.		
PRACTICAL NO.03	**Buckling test of column.**	**4 HOURS**
Buckling tests on columns with different end conditions		
PRACTICAL NO.04	**Desk experiments**	**6 HOURS**
Stiffness of spring, and effect of various combination of springs.		
PRACTICAL NO.05	**Design Experiments**	**6 HOURS**
Design of experiment: Learners are expected to design the experiment that either demonstrates the principles studied in the course or extracts meaningful information for designing the real life structures.		

TEXT BOOK

1. Beer F P, J. E. Russell Johnston, John T. DeWolf, and David F. Mazurek, Mechanics of Materials, McGraw-Hill, 7th edition, 2014, ISBN : 9780073398235
2. Gere J. M. and Timoshenko S. P., Mechanics of Materials, Boston: PWS Kent Publishing, 5th edition, 1970, ISBN: 9788123908946

REFERENCE BOOK

1. Nash W. A., Strength of Materials, Schaum's Outline Series, McGraw-Hill, 1994, 3rd edition, ISBN: 9780070843660
2. R.C.Hibbeler, Mechanics of materials, Prentice Hall, 2011, 8th edition, ISBN: 9780134321233
3. Egor P. Popov, Engineering Mechanics Of Solids, Pearson , 2nd Edition, 2010, ISBN: 9788178085357

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F** | **AY:** 2017 - 2018

SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Geospatial Engineering
	COURSE CODE	CV202
	COURSE CREDITS	4
RELEASED DATE : 1/06/2017	**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	50	20	-	50	150

PRE-REQUISITE :

COURSE OBJECTIVES :

CV202.CEO.1: To introduce the students, to the theory and application of Surveying in Civil Engineering projects.

CV202.CEO.2: To facilitate understanding of the fundamentals of surveying knowledge and familiarizing them with latest surveying practices.

CV202.CEO.3: To train the students to work in the field with the knowledge acquired in the classroom through mini field projects

COURSE OUTCOMES :

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

CV202.CO.1: Apply the techniques of levelling to solve engineering problems.

CV202.CO.2: Interpret and implement the principles of trigonometry for surveying using standardized methods.

CV202.CO.3: Perform traversing and triangulation by implementing the basic principles of surveying.

CV202.CO.4: Construct different types of curves for alignment of roads and railways and lay out civil engineering structure on field.

CV202.CO.5: Record data and perform analysis by using modern surveying tools

CV202.CO.6: Analyze field data to minimize errors using mathematical models

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Surveying and measurement of elevations**	**8 HOURS**

Introduction: Principle of surveying, classification of surveys. Introduction to coordinate systems. Applications of surveying. Equipment used in surveying. Concept of temporary and permanent adjustments. Errors in measurements- sources and types. Spirit levelling- different types of levels and staffs; booking and reduction of data, methods of levelling, errors in levelling. Introduction to EDM: Study of Total Station. Distance and Coordinate Measurement, Remote Elevation Measurement. Contours- characteristics, uses, and methods of contouring, contour maps, drawing sections, contouring using software. Calculations: Computation of areas from plans, calculation of areas of a closed traverse, measurements from cross section, earth work calculations, practical problems

UNIT 2	**Measurement of Linear Distances and Directions**	**8 HOURS**

Theodolites- different types, methods of observation and booking of data, Optical methods for linear measurement- Theodolite and Total station. Concept of bearings and angles; magnetic bearings, declination, local attraction errors and adjustments; direction measurement with theodolite, horizontal angles by repetition and reiteration, vertical angles, measurement of reduced levels of inaccessible locations. Self-Study: Fundamental axes of theodolite: testing and permanent adjustments of a transit theodolite (assisted with demonstration and practical)

UNIT 3	**Traversing and Triangulation**	**8 HOURS**

Purpose and classification of traversing, traversing with a theodolite and EDM- balancing of traverses, Computation of coordinates, omitted measurements, measurement of deflection angles using transit theodolite and magnetic bearing. Triangulation- network, strength of figures, selection of stations, intervisibility, satellite stations, measurements and computations. Self-Study: Principle of plane table surveying, advantages and disadvantages

UNIT 4	**Curves and Survey Projects**	**8 HOURS**

Curve setting: Types of curves, elements of a curve, setting out a simple curve, types of vertical curves, setting out vertical curves. Engineering project surveys- requirements and specifications, various stages of survey work. Setting out of works- buildings Self-Study: Setting out of culverts

UNIT 5	**Introduction to Geographic Information System**	**8 HOURS**

Introduction to GIS Definition of GIS Evolution GIS Components of GIS, Input data, GIS data models, Creating Network Data - Origin, Destination, Stops, Barriers Closest Facility Analysis, Service Area Analysis, OD Cost matrix analysis, Shortest Path Analysis Address Geocoding Surface Analysis. Application of network data in civil engineering

UNIT 6	Adjustment computation	4 HOURS
Types of errors, propagation of errors, variance and covariance; Least squares principle and adjustment of field survey data by parametric and condition equation methods		

PRACTICAL: The following practical are to be performed		
PRACTICAL NO.01	**Mini Road Project**	**4 HOURS**
Introduction to simple and differential levelling with AutoLevel. To find the volume of excavation required for laying out a small road with at least one change in direction (differential levelling)		
PRACTICAL NO.02	**Contouring Project with Total Station/Auto level**	**2 HOURS**
To design and perform a contouring project for an area more than 1000 sq m and to draw the contour map of the region either manually or using standard software such as QGIS or ArcGIS.		
PRACTICAL NO.03	**Closed traversing**	**2 HOURS**
Comparison between the angular and linear adjustment necessary for a closed traverse performed with prismatic compass and a total station or 1 micro-optic theodolite.		
PRACTICAL NO.04	**Closed traversing with total station**	**2 HOURS**
Preparation of the plan of a populated area (such as the campus of a college) using total station		
PRACTICAL NO.05	**Reduced level**	**4 HOURS**
To determine the reduced level of inaccessible point using a 1 micro-optic theodolite (at least two cases		
PRACTICAL NO.06	**Setting out of foundation plan with total station**	**4 HOURS**
To perform preliminary survey of an area with a total station and draw a foundation plan on the same area using AutoCAD. To set out to designed foundation plan on the ground		
PRACTICAL NO.07	**Setting out of curves**	**4 HOURS**
Comparison between setting out of simple circular curves using two or more linear methods. Comparison between setting out of simple circular curves using Rankines method and two theodolite methods.		

TEXT BOOK

1. Dr. B. C. Punmia, Ashok K. Jain, ArunK.Jain, Surveying Vol. I and II, Laxmi Publication, ISBN: 81- 7008-054-1.
2. T.P.Kanetkar and S.V.Kulkarni , Surveying and Levelling Vol. I and Vol. II, PVG Publication

REFERENCE BOOK

1. Charles D Ghilani, Paul R Wolf., Elementary Surveying: An introduction to Geomatics, Prentice Hall, 14th Edition, ISBN-13: 978-0132554343/ ISBN-10: 0132554348.
2. A.M.Chandra, Plane Surveying, New Age International Publishers, ISBN 13 : 9788122419023.
3. N. N. Basak, Surveying and Levelling, Tata Mc-Graw Hill, ISBN 10: 007460399X / ISBN 13: 9780074603994.
4. Dr. K. R. Arora, Surveying Vol. I and II, Standard Book House. ISBM-13: 9788189401238
5. Subramanian,Surveying and Levelling, Oxford University Press, ISBN: 0195684249, 9780195684247.

<table>
<tr><td colspan="2">

MIT | Academy of Engineering

(An autonomous Institute Affiliated to SPPU)
</td><td colspan="3">

**COURSE SYLLABI
(2016 – 2020)**
</td></tr>
</table>

SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY		**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Prototyping	
	COURSE CODE	ET206	
	COURSE CREDITS	02	
RELEASED DATE : 01/06/2018	**REVISION NO**	1.0	

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		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 youve 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 practitioners Approach, Roger S, Pressman, 7th Edition, ISBN: 9780073375977
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
5. IS 1902:1993.Code of Practice for preservation of bamboo and cane for non-structural purposes.
6. IS 6874:1973 Methods of test for round bamboos
7. IS 7344:1974 Specification for bamboo tent bamboos.
8. IS 8242:1976 Methods of tests for split bamboos
9. IS 8295 (Part 1): 1976 Specification for bamboo chicks
10. 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 agreement/items/9485.php)
2. Kyoto Protocol(http://unfccc.int/kyoto protocol/items/2830.php)
3. Green Building Objectives & Checklist, Auroville Bamboo Centre, Pudducherry, Tamilnadu.(http://aurovillebamboocentre.org/)

SCHOOL OF COMPUTER AND ENGINEERING AND TECHNOLOGY	**W.E.F**	**AY:** 2017 - 2018	
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL 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**			**TUTORIAL/**	**PRESENTATION/**	**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**	
3	2	30	50	20	Nil	25	125

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**
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 **Case Study:**Dial up, Broadband **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 **Further Reading:**		
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 figure

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.

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 BOOK

1. Gerard Jounghyun Kim, HumanComputer 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
   978-8126544004

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		COURSE SYLLABI (2016 − 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Materials Engineering
		COURSE CODE	ME201
		COURSE CREDITS	4
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	
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, carboncarbon 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 nonmaterials 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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		W.E.F	AY: 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	COURSE NAME	Building Design and Construction	
	COURSE CODE	CV211	
	COURSE CREDITS	4	
RELEASED DATE : 1/06/2017	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	50	-	150

PRE-REQUISITE : ME101 Engineering Graphics

COURSE OBJECTIVES :

CV211.CEO.1: To know the various building bye laws.

CV211.CEO.2: To know the different rules and regulation for development of any area

CV211.CEO.3: To know the different types of doors and windows.

CV211.CEO.4: To know the various properties and types of different materials.

COURSE OUTCOMES :

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

CV211.CO.1: Explain various components of residential/commercial buildings and basic building materials used for their construction

CV211.CO.2: Explain various forms of floors, roofs, doors, windows, arches, lintels and masonry construction

CV211.CO.3: Implement relevant bye laws in functional design of buildings in a prescribed locality in India.

CV211.CO.4: Select suitable types of material and masonry for construction of various types of buildings

CV211.CO.5: Functionally design a single/multi-storied residential/commercial building

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Building and Architectural Planning**	**6 HOURS**
Definition and different types of buildings. Components of buildings. Types of structure. Types of foundation, Principles of Architectural Planning and Design. Types of drawings. Conventions as per IS 962.		
UNIT 2	**Building Bye Laws**	**6 HOURS**
Necessity of bye laws. Different rules and regulation according to NBC and IS. Types of areas and area calculations, Rules for ventilation, lighting, drainage, sanitation, Salient features of a Green Building		
UNIT 3	**Legal Aspects**	**6 HOURS**
Different permissions and certificates required before starting of building construction, during building construction and after completion of building construction, permissions and procedure for land acquisitions		
UNIT 4	**Building Materials and Formwork**	**6 HOURS**
Introduction and types of basic building materials (self-study), Formwork: Timber, Aluminum, Mivan and Plastic, Scaffolding: materials, types and procedure		
UNIT 5	**Masonry Construction**	**6 HOURS**
Brick masonry: types of bonds, construction procedure and supervision, Stones masonry: procedure for UCR and CR masonry(self-study), Block masonry: Hollow, solid, CLC, Siporex, cavity wall construction, Pointing and Painting Purpose, types and procedure		
UNIT 6	**Doors, Windows, Arches and Lintels**	**6 HOURS**
Doors and Windows: Types, materials used, purposes, Arches and Lintels: principle of arch action, types of arches, method of arch construction, necessity and types of lintels		
UNIT 7	**Floors and Roofs**	**6 HOURS**
Functional requirements of flooring material, varieties of floor finishes and their suitability, Roofing materials. Roof construction: types and their suitability, Staircase: types, casting procedure, design.		

PRACTICAL/ PROJECT: Project should be performed individually		
PROJECT NO.01	**Prepare a brochure of residential building**	**18 HOURS**
Draw development plan of a residential multistoried building having built up area more than 100 sq.m by using computer software (AutoCAD) and prepare brochure containing following drawings Lay out plan Detailed Plan. Elevation. Section. Foundation plan		
PRACTICAL NO.01	**Drawing of Commercial or Public building**	**6 HOURS**
Draw line plans of two different commercial or public building with scale 1:50 or 1:100 (hand sketch)		
PRACTICAL NO.02	**Site Visit**	**4 HOURS**
Site visit and technical report on the visit (Minimum Two). (Visit should contain Stage of visit, related sketches of components-C/S-Dimensions, Materials used, site plan sketch and detailed report etc.)		

TEXT BOOK

1. Punmia B.C., Building Construction, Laxmi Publications Delhi, sixth edition, 2009, ISBN: 81-7008-053-3
2. Shaha M.G., Kale C.M., Principles of Building Drawing, Macmillan Publishers India Limited, Fourth edition, 2010, ISBN-0333925467
3. Duggal S. K., "Building Materials", New Age International Limited, First Edition, 2003, ISBN -81222414354

REFERENCE BOOK

1. Shah, kale and Patki, " Building Drawings with an Integrated Approach to Build Environment", Tata McGraw Hill Publications, Fifth edition, 2015, ISBN- 0071077871
2. Rangwala, "Civil Engineering Drawing", Charotar Publications, First Edition, 2017, ISBN - 9789385039300
3. Rangwala, "Building Construction", Charotar Publications, 33rd Edition, 2017, ISBN - 978-93-85039-04-1

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Geotechnical Engineering
	COURSE CODE	CV212
	COURSE CREDITS	4
RELEASED DATE : 1/06/2017	**REVISION NO**	0.0

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

PRE-REQUISITE: CV 101 Applied Mechanics

COURSE OBJECTIVES:

CV212.CEO.1: To describe the basics of soil and its importance in Civil Engineering

CV212.CEO.2: To establish an understanding of the fundamental concepts of mechanics for soil

CV212.CEO.3: To provide students with exposure to the systematic methods for solving geotechnical engineering related problems

CV212.CEO.4: To build the necessary theoretical background for further related courses..

COURSE OUTCOMES:

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

CV212.CO.1: grade engineering properties of soil based on index.

CV212.CO.2: determine engineering properties of soil by performing relevant experiments.

CV212.CO.3: explain seepage and flow net.

CV212.CO.4: apply basic soil mechanics principle to calculate various stresses induced in soil.

CV212.CO.5: choose suitable method for improvement in soil characteristics.

CV212.CO.6: evaluate bearing capacity of different types of soils.

THEORY COURSE CONTENT		
UNIT 1	**Introduction and Site Investigation**	**8 HOURS**

Introduction to Geotechnical Engineering, Introduction to soil. Self-Study: Three phase soil system, properties of soil and their significance. Soil structure and classification systems. (Study of working model on soil structure) Purpose and planning of subsurface exploration. Methods of Investigation, Demo- SPT, DCPT, SCPT

UNIT 2	**Permeability and Seepage**	**8 HOURS**

Basics of permeability of soils. Laboratory and field tests for determination of permeability. Seepage and Seepage Pressure, hydraulic gradient, Laplace equation, Flow Net, Demonstration: Construction of model for flow net though earthen body

UNIT 3	**Compaction and Consolidation**	**8 HOURS**

Basics of compaction, Field compaction methods and compaction equipments. (Site Visits). Introduction to consolidation, spring analogy, Terzaghis consolidation theory, Lab methods

UNIT 4	**Stresses in Soil**	**6 HOURS**

Boussinesqs theory, Pressure bulb and Westergaards theory, Contact Pressure distribution. Earth Pressure-, Rankines theory, Coulombs Wedge theory.

UNIT 5	**Shear Strength of Soil**	**6 HOURS**

Shear strength- an Engineering Property. Mohr-Coulomb failure theory. The effective stress principle- Total stress, effective stress and neutral stress / pore water pressure

UNIT 6	**Bearing Capacity of Soil and Foundation**	**6 HOURS**

Basic of bearing capacity of soil, bearing capacity analysis: list of methods and field tests, types of shear failure, Settlement and its types, its causes and remedial measures. Types of Foundation, case studies on failure of foundations.

PRACTICAL/ PROJECT: Project should be performed in a group of 5 students		
PROJECT NO.01	**Preparation of Soil mass**	**14 HOURS**

Prepare a sub grade of 1m X 1m X 0.15m with well graded locally available soil having dry density of 1.85 gm/cc. Also find for atterberg's limits and coefficient of permeability. Objective:

1) Find water content, Sp. Gravity, and Bulk Density of Borrow soil

2) Calculate dry density and required quantity of borrow soil .

3) Find and fix the gradation of soil

4) Find required W.C. to compact soil embankment at given dry density

5) Compact embankment at site

Page 45 of 49 Note: All tests must follow relevant I.S. codes OR Prepare trapezoidal shape hearting of an earthen dam of given dimension using well graded locally available soil having dry density of 1.85 gm/cc. Also check for atterberg's limits and coefficient of permeability. Objective:

1) Find water content, Sp. Gravity and Bulk Density of Borrow soil

2) Calculate dry density and required quantity of borrow soi

3) Find and fix the gradation of soil

4) Find required W.C. to compact hearting at given dry density

5) Compact embankment at site

Note: All tests must follow relevant I.S. codes

PRACTICAL NO.01	**Shear strength of the soil**	**2 HOURS**
To find the unconfined compressive strength of cohesive soil		
PRACTICAL NO.02	**Shear strength of the soil**	**2 HOURS**
To find the shear strength parameters of the soil by direct shear test		
PRACTICAL NO.03	**Shear strength of the soil**	**2 HOURS**
To find the shear strength parameters of the soil by direct shear test		
PRACTICAL NO.04	**Shear strength of the soil**	**2 HOURS**
Demo of Tri-axial Shear test apparatus		
PRACTICAL NO.05	**Consolidation of soil**	**2 HOURS**
To find the consolidation test on soil using oedometer		

TEXT BOOK

1. Gopal Ranjan and A. S. Rao, Basic and Applied Soil Mechanics, G. K. Publications Pvt. Ltd, Dec. 2006, ISBN: 978-81-224-1223-9

2. V. N. S. Murthy, Soil Mechanics and Foundation Engineering, B. S. Publications, Dec 2009, ISBN 0 324 06680 5.

3. B. C. Punmia, Soil Mechanics and Foundation Engineering, Laxmi Publishing Co, Dec. 2005, ISBN: 81-7008-081-9

4. Dr. K.R. Arora, "Soil Mechanics and Foundation Engineering", (8th Edition) 2015, Standard Publishers, ISBN:81-8014-112-8

REFERENCE BOOK

1. Joseph E Bowles, Engineering Properties of Soils and Their Measurements, McGraw Hill Publications, 1992, ISBN: 0070067783, 9780070067783.

2. Palanikumar. M, Soil Mechanics, PHI Learning Private Limited, 2013, ISBN: 978-81203-4838-7

3. R. F. Craig "Craigs Soil Mechanics", E and FN Spon an imprint of Chapman and Hall, 2012, ISBN: 0-415-32702-4, 0-415-32703-2.

4. Venkatramaiah, C. "Geotechnical Engineering", 3rd Edition, New Age International Publishers, New Delhi, 2006, ISBN-10: 8122417930

SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2017 - 2018
SECOND YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Psychology
	COURSE CODE	HP201
	COURSE CREDITS	2
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	
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.

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Minor Project
	COURSE CODE	ME213
	COURSE CREDITS	4
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

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

PRE-REQUISITE : Design Thinking, Engineering Tools & Techniques, Prototyping

COURSE OBJECTIVES :

ME213.CEO.1: To identify and define a problem to be solved.

ME213.CEO.2: To develop a design for the solution of the problem using engineering tools available.

ME213.CEO.3: To prepare prototype/working model for solving the problem

ME213.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,

ME213.CO1: Define the problem to be solved.

ME213.CO2: Apply knowledge of various engineering tools to develop the solution to the problem.

ME213.CO3: Critically analyze the options available to solve the problem and select the one identified most effective.

ME213.CO4: Justify the selection of the method to solve the problem is-a-vis other options considered.

ME213.CO5: :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.

6. Define the actual problem

7. Enumerate various approaches and solutions to solve the problem

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

9. Develop prototype or model for its testing before implementation

10. 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

TIMELINE

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

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Third Year

Bachelor of Technology in Civil Engineering

2016-2020

(With Effect from Academic Year: 2018-2019)

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2018-19
T Y B TECH	RELEASE DATE	:	01/12/2017
DEPARTMENT OF CIVIL EGG	REVISION NO.	:	0.0

SEMESTER: V

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC5	CV301	Mechanics of Fluids	3	2	4
2.	DC6	CV302	Structural Analysis	3	2	4
3.	DC7	CV303	Concrete Technology	3	2	4
4.	OE1	CV31#	Open Elective - Refer Annexure.	3	2	4
5.	HSS4	HP301	Project Management	1	2	2
6.	SDP5	CV30#	Skill Development Lab - Refer Annexure	--	4	2
TOTAL				13	14	20

SEMESTER:VI

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC8	CV321	Design of Structures	3	2	4
2.	DC9	CV322	Transportation Engineering	3	2	4
3.	DC10	CV323	Water Resources Engineering	3	2	4
4.	OE2	CV33#	Open Elective - Refer Annexure.	3	2	4
5.	HSS5	HP302	Professional Skills	--	4	2
6.	HSS6	HP303	Basics of Entrepreneurship	--	2	1
7.	SDP6	CV324	Mini Project	--	4	2
TOTAL				12	18	21

L: Lecture, P: Practical

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Mechanics of Fluids
	COURSE CODE	CV301
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS						
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/		TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
3	2	30	40	30	50	-		150

PRE-REQUISITE: CV101: Applied Mechanics, AS101: Applied Mathematics

---

COURSE OBJECTIVES:

CV301.CEO.1: To have knowledge of fluid behavior at rest and in motion

CV301.CEO.2: To have familiarity to fundamentals of open channel flow.

CV301.CEO.3: To apply conservation equations to pipe flow and open channel flow problems..

CV301.CEO.4: To apply concepts of dimensional analysis and model studies for design of hydraulic structures

---

COURSE OUTCOMES:

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

CV301.CO.1: Explain the properties and behavior of the fluid at rest and in motion, visualize the fluid flows.

CV301.CO.2: Apply the principles of statics to find the hydrostatic force in various fluid problems

CV301.CO.3: Apply equations of motion to various flow conditions and compute discharge of the flows

CV301.CO.4: Analyze complex flow patterns using model studies.

CV301.CO.5: Analyze laminar and turbulent flows in a pipeline and design simple pipe networks.

CV301.CO.6: Explain the terms of the open channel flow equations and to solve open channel flow problems using appropriate equations

THEORY COURSE CONTENT		
UNIT 1	**Properties of Fluids and Fluid Statics**	**6 HOURS**

Properties of Fluids: Physical properties of fluids: density, specific weight, specific volume, relative density, viscosity, vapor pressure, compressibility, surface tension, capillarity, buoyancy, stability of floating and submerged objects

Pressure and Fluid Statics: Fluid Pressure, Introduction to fluid statics, Pressure Measuring Devices, Hydrostatic forces on submerged plane and curved surfaces

UNIT 2	**Fundamentals of Fluid Flow and Equations of Motion**	**6 HOURS**

Fundamentals of Fluid Flow: Parameters of Fluid Flow, Flow visualization methods, Types of Fluid Flow, Potential, Stream function, Rotationality, Vorticity and Circulation, Conservation of Mass and Equations of Continuity

Equations of Motion: Forces acting on fluid mass in motion, Eulers equation of motion along a streamline, Navier stokes equation, Bernoullis Equation and conservation of Energy, Hydraulic Grade line and Total Energy line, Kinetic Energy Correction Factor, Linear Momentum Equation, Momentum Correction Factor. Partial differential solutions to fluid flow equations. Computational Fluid Dynamics

UNIT 3	**Applications of Bernoullis Equation and Model Studies**	**6 HOURS**

Applications of Bernoulli Equation: Venturimeter, Orificemeter and Pitot Tube Self-Study: Introduction to Flow through Orifices and Mouthpieces, Notches and Weirs Dimensional Analysis and Model studies: Dimensions of Physical Quantities, Dimensional homogeneity, Dimensional analysis using Buckinghams Pi theorem, Dimensionless Parameters, Similitude, Model Laws Self-Study: Introduction to Flow through Orifices and Mouthpieces, Notches and Weirs

UNIT 4	**Flow Through Pipes**	**6 HOURS**

Laminar Flow through pipes: Navier flow simplifications for laminar flow, Characteristics of Laminar flow through circular pipes, Reynolds Experiment, Stokes law, Resistance to Flow in Smooth and Rough Pipes, Darcy's law, Energy losses in pipe flow, Flow through simple compound, parallel, branched pipes and siphons. Boundary layer and modelling of boundary layer.

Turbulent Flow through pipes: Characteristics of Turbulent Flow through Pipes, Boussinesqs theory, Prandtls mixing length theory, Velocity distribution in turbulent flow, Velocity distribution for smooth and rough boundaries, Average Velocity Concepts.

UNIT 5	**Introduction to Open Channel Flow and Uniform Flow**	**6 HOURS**

Introduction to Open Channel Flow: Classification of Channels and Channel Flows, Froude Number, Continuity and Energy Equations for Open Channel flows

Depth-Energy Relationships in Open Cannels: Specific Force, specific Energy, Critical flow computations Based on Specific force and energy criteria, Hydraulic jump

Uniform flow in Open channels: Characteristics and establishment of uniform flow, Chezy's and Manning's formulae, Normal Depth, Conveyance, Section factor, Hydraulic Exponent, Uniform flow computations and Most efficient channel sections

UNIT 6	Gradually and rapidly varied flows in open channels	6 HOURS

Gradually Varied Flow in Open channels: Assumptions and Differential equations of GVF, Classification of Bed slopes, GVF profiles, GVF computations

Rapidly Varied Flow in Open Channels: Phenomenon of Hydraulic Jump and energy Dissipation, Conjugate Depths, Classification of Hydraulic Jump, Practical Uses of Hydraulic Jump

PRACTICAL		
Practical No. 1	**Measurement of Fluid Properties**	**2 HOURS**
To study and carry out the measurement of different properties of fluid.		
Practical No. 2	**Study of Pressure Measuring Devices**	**2 HOURS**
To study different pressure measuring devices.		
Practical No. 3	**Stability of floating Bodies**	**2 HOURS**
To study and Calculate the metacentric height of a floating body		
Practical No. 4	**Verification of Bernoullis Equation and Introduction to CFD with Python**	**2 HOURS**
To verify experimentally the validity of Bernoullis equation for fluid flow		
Practical No. 5	**Calibration of flow measuring devices**	**2 HOURS**
To determine the coefficient of orificemeter / venturimeter and calibrate it.		
Practical No. 6	**Study of laminar flow using Reynolds apparatus / Hele-shaw apparatus**	**2 HOURS**
To study of Laminar Flow using Reynolds/Heleshaw apparatus.		
Practical No. 7	**Study of Laminar and Turbulent flows through pipes**	**2 HOURS**
To study friction factor for laminar and turbulent flow through pipe.		
Practical No. 8	**Study of Uniform flow formulae in Open Channels**	**2 HOURS**
To study uniform flow formula for open channel using Mannings formula.		
Practical No. 9	**Velocity distribution in Open Channel Flows**	**2 HOURS**
To determine the velocity distribution for given flow of water in open channel flow using pitot tube		
Practical No. 10	**Study of Hydraulic Jump as Energy Dissipater**	**2 HOURS**
To determine the percentage dissipation of energy (relative loss) due to hydraulic jump both experimentally and analytically.		

TEXT BOOK

1. Modi, P.N. and S.M. Seth, Hydraulics and Fluid Mechanics including Fluid Machines, Standard Book House, Delhi, Nineteenth edition, 2009, ISBN 13: 9788189401269
2. Subramanya K, Flow in Open Channels, Tata McGraw-Hill Education, Fourth edition, 2015, ISBN-13: 978-9332901339

REFERENCE BOOK

1. Franck M White, Fluid Mechanics in SI Units, Tata McGraw Hill Publication, eighth edition, 2017, ISBN-13: 978-9385965494
2. Subramanya. K., Fluid Mechanics and Hydraulic Machines, Problems and Solutions, Tata McGraw Hill Publishing Company, first edition, 2010, ISBN-10: 0070699801, ISBN-13: 978-0070699809
3. Ranga Raju K G, Flow through Open Channels, Tata McGraw Hill Publication, first edition, 2001, ISBN-10: 007460497X, ISBN-13: 978-0074604977
4. Ven te Chow, Open Channel Hydraulics Tata McGraw Hill, 2009, ISBN-13: 9781932846188.
5. Bansal R K, A test book of Fluid mechanics and Hydraulic Machines, Laxmi Publications, Ninth edition, 2017, ISBN: 9788131808153

MIT **Academy of Engineering** (An autonomous Institute Affiliated to SPPU)	**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Structural Analysis
	COURSE CODE	CV302
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	-	30	40	30	50	-	150

PRE-REQUISITE : CV101 Applied Mechanics , CV 201 Continuum Mechanics of Solids

---

COURSE OBJECTIVES :

CV302.CEO.1: To understand the process of structural analysis

CV302.CEO.2: To apply geometric and energy methods to determinate structures

CV302.CEO.3: To apply force methods of analysis for indeterminate structures.

CV302.CEO.4: To apply displacement methods of analysis for indeterminate structures.

CV302.CEO.5: To introduce plastic analysis for steel structures

---

COURSE OUTCOMES :

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

CV302.CO.1: Determine internal forces in structure and sketch deflected shapes.

CV302.CO.2: Determine displacements of determinate structures.

CV302.CO.3: Analyse indeterminate structures by force methods.

CV302.CO.4: Analyse indeterminate structures by displacements methods.

CV302.CO.5: Estimate the collapse load for indeterminate structures

THEORY COURSE CONTENT		
UNIT 1	**Introduction**	**6 HOURS**
Types of structures and loads. The process of analysis and design of structures. Stability of structures. Degree of static and kinematic indeterminacy. Symmetry of loads and supports. Concept of Axial force, shear force, bending moment diagrams. Deflection diagrams and elastic curves.		
UNIT 2	**Geometrical and Energy methods**	**8 HOURS**
Displacements of Statically Determinate Structures by Macaulays Method. Principles of virtual work, Strain energy, Castiglianos theorems. Principle of superposition, Bettis theorem, Maxwells reciprocal theorem.		
UNIT 3	**Force Methods**	**8 HOURS**
Basic Concepts of the Force Method. Formulation of compatibility equations, Flexibility coefficients, Forming the Flexibility Matrix, Analysis for Temperature and lack of fit.		
UNIT 4	**Displacement Methods**	**8 HOURS**
Basic Concepts of the displacement method, Slope deflection equations, Stiffness coefficients, Formulation of equilibrium equations, forming stiffness matrix, Direct stiffness method, effect of settlement of supports.		
UNIT 5	**Plastic Methods**	**8 HOURS**
Concept, assumptions, shape factor, collapse load, load factor, plastic modulus of section, plastic moment of resistance, computation of collapse load for fixed beam, continuous beam and plane frame subjected to various load cases.		

TUTORIAL: Computer programming/ software analysis based on		
PRACTICAL NO.01	**Moment area method**	**4 HOURS**
Moment area method of calculating slope and deflections		
PRACTICAL NO.02	**Conjugate Beam Method**	**4 HOURS**
Conjugate beam method of calculating slope and deflections		
PRACTICAL NO.03	**Moment Distribution Method (MDM)**	**4 HOURS**
Moment distribution method for analysis of beams / frames		
PRACTICAL NO.04	**Flexibility / Stiffness matrix**	**4 HOURS**
Flexibility/stiffness matrix method for analysis of indeterminate structure		
PRACTICAL NO.05	**Influence line diagrams**	**2 HOURS**
Influence line diagrams for analysis of beams subjected to moving loads.		
PRACTICAL NO.06	**Approximate methods**	**2 HOURS**
Analysis of multistoried building frame by portal/substitute frame method.		
PRACTICAL NO.07	**Computerized analysis**	**4 HOURS**
Analysis of industrial shed by any software package.		

TEXT BOOK

1. Devdas Menon, Structural Analysis, Narosa Publishing House, 2008, ISBN: 978-81-7319750-5
2. Devdas Menon, Advanced Structural Analysis, Narosa Publishing House, 2009, ISBN: 978-81-7319-939-4
3. T.S. Thandavamoorthy, Structural Analysis, Oxford Higher Edu., 2011, ISBN-10: 0198069189

REFERENCE BOOK

1. Amin Ghali, Adam M Neville and Tom G Brown, Structural Analysis: A Unified Classical and Matrix Approach, Sixth Edition, 2007, Chapman and Hall, ISBN: 978-04-1577-433-8
2. R.C.Hibbeler, Structural Analysis, Pearson Education; 9th Edition, 2017, ISBN-10: 9332586144

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Concrete Technology
		COURSE CODE	CV303
		COURSE CREDITS	4
RELEASED DATE : 1/06/2018		**REVISION NO**	0.0

TEACHING SCHEME		**EXAMINATION SCHEME AND MARKS**						
(HOURS/WEEK)		**THEORY**			**TUTORIAL/**	**PRESENTATION/**		**TOTAL**
LECTURE	**PRACTICAL**	**MSE**	**ESE**	**IA**	**PRACTICAL**	**DEMONSTRATION**		
3	2	30	40	30	50	-		150

PRE-REQUISITE : CV 211 Building Design and Construction

COURSE OBJECTIVES :

CV303.CEO.1: To understand fundamental knowledge of concrete, its properties, its behaviour under various conditions.

CV303.CEO.2: To design mix of regular and special types of concrete

CV303.CEO.3: To understand special techniques of concreting and machineries used for concreting work

COURSE OUTCOMES :

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

CV303.CO.1: Explain different types concrete ingredients with their properties.

CV303.CO.2: Identify properties of concrete using various IS tests

CV303.CO.3: Produce a concrete with specific mix

CV303.CO.4: Explain special types of concrete techniques.

CV303.CO.5: Illustrate different concrete related equipments .

CV303.CO.6: Analyze various reasons for failure of concrete.

THEORY COURSE CONTENT		
UNIT 1	**Introduction and General Ingredient of Concrete**	**6 HOURS**

Cement: Different types of cement, Important properties and applications, Manufacturing of Portland cement, Chemical composition of Portland cement, Hydration of cement, Setting of cement, Physical and chemical test for cement as per IS:4031.

Aggregate: Classification- Fine aggregate, coarse aggregate, Mechanical and Physical properties, Deleterious Materials, Soundness, Alkali aggregate reaction, Grading of Aggregates, Tests on aggregate, Artificial and Recycled aggregate.

Water: Mixing Water, Curing water, Tests on water.

Fly Ash: Classification of fly ash, properties of fly ash, tests on fly ash.

Admixtures: functions, classification, types: mineral and chemical, IS: specifications (9103 and 456), Accelerators, Retarder, water reducing agents, Plasticizers, Water proofing compounds.

UNIT 2	**Properties of Fresh and Hardened Concrete**	**6 HOURS**

Fresh Concrete: Workability: Factors affecting workability, measurement of workability, cohesion and segregation, bleeding, Mixing, Transporting, Placing, and Compaction of concrete Curing Methods of concrete, Influence of temperature, Maturity rule, Steam curing.

Hardened concrete: strength of concrete, factors affecting strength, micro-cracking and stressstrain relationship, other strength properties, relation between tensile and compression strength, impact strength, abrasion resistance, elasticity and creep, shrinkage and swelling .

UNIT 3	**Concrete Mix Design**	**6 HOURS**

Concrete mix design: Concepts of Mix Design, Factors for proportioning of concrete. Factors to be considered, Statistical quality control, Laboratory trial mixes and guidelines to improve mix, methods of Mix Design- IS and DOE. Demonstration and application of concrete mix design software

UNIT 4	**Special Concreting Techniques**	**8 HOURS**

Ready mixed concrete, under water concreting, roller compacted concrete Cold weather concreting, hot weather concreting, Light weight concrete, Polymer concrete, Fibre reinforced concrete, High performance concrete, Pumped concrete, self-compacting concrete, Ferrocrete.

UNIT 5	**Introduction to Concrete Related Equipments**	**6 HOURS**

Batching plants: hauling, pumps,

Types of concrete mixers: Tilting, Non-tilting and Reversible drum mixer,

Types of vibrators .

UNIT 6	**Case studies**	**4 HOURS**

Case studies of failure of concretes/new age concrete technology

PRACTICAL		
Project No. 1	**Design of concrete mix of M25/M30/M35/M40 grade**	**12 HOURS**
Prepare a concrete mix of M25/M30/M35/M40 grade and performed tests on concrete fresh and harden concrete.		
Project No.02	**Design of concrete mix of M25/M30/M35/M40 grade using fly ash and admixtures**	**10 HOURS**
Prepare a concrete mix of M25/M30/M35/M40 grade using fly ash and admixtures and performed tests on concrete		
Project No.03	**Evaluate strength of old concrete by NDT tests**	**4HOURS**
Evaluate strength of old concrete by using following NDT tests 1. Rebound Hammer Test 2. Carbonation Test		
PRACTICAL NO.04	**Site Visit**	**2 HOURS**
1. Site visit to R.M.C. plant 2. Site visit to any concreting work		

TEXT BOOK

1. Gambhir A.L., Concrete technology, Tata McGraw hill Publication, sixth edition, 2009, ISBN: 978-1259062551
2. Santhlujmar A.R., Concrete technology, Oxford University Press, Fourth edition, 2010, ISBN: 978-0195671537

REFERENCE BOOK

1. Shetty M. S., Concrete Technology, S. Chand Publications, eleventh edition, 2015, ISBN13: 978-8121900034
2. Neville A. M., Brooks J.J., "Concrete Technology", Pearson Publications, fifth edition, 2012, ISBN: 978-0273732198

MIT Academy of Engineering (An autonomouse Institute Affilated to SPPU)	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Construction Planning and Management
	COURSE CODE	CV311
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE : CV 211 - Building Design and Construction

COURSE OBJECTIVES :

CV311.CEO.1: To understand basic concepts and novel technologies in project management and project planning.

CV311.CEO.2: To acquire skills for planning, scheduling, controlling, forecasting, budgeting various construction projects.

CV311.CEO.3: To take part in practical training in the planning and scheduling of construction projects.

COURSE OUTCOMES :

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

CV311.CO.1: Explain various project managerial and planning concepts

CV311.CO.2: Explain different methods for project scheduling and controlling.

CV311.CO.3: Analyze project budget with different prospects.

CV311.CO.4: Illustrate various concepts and methods for quality and safety management

CV311.CO.5: Functionally design a schedule for a residential building.

THEORY COURSE CONTENT		
UNIT 1	**Project Management and Planning**	**4 HOURS**
Basic concepts of project management, Management theories, Project Planning Methods, Work study, Method study, Construction Project Life Cycle		
UNIT 2	**Project Scheduling**	**8 HOURS**
Basics of project scheduling, Work Breakdown Structure, Line of balance, Network Analysis, Tool for Optimizing Provider Schedules, Graphical Evaluation and Review Technique.		
UNIT 3	**Project Controlling**	**8 HOURS**
Crashing, Resource allocation		
UNIT 4	**Introduction to project budget**	**6 HOURS**
Budget Forecasting, financial accounting, cash flows, budget updates		
UNIT 5	**Quality and safety management**	**6 HOURS**
Quality and safety concerns, Total Quality Control, Quality Control by statistical methods, Personal protective equipment, Occupational Safety and Health Administration (OSHA) guidelines		
UNIT 6	**Inventory Management**	**6 HOURS**
Application of ABC and Economic Order Quantity analysis in inventory control, Use of Indices in materials/ inventory models Inventory Management, Materials Management Systems.		

PRACTICAL		
Project No. 1	**Project Planning using MS Project**	**16 HOURS**
Developed a schedule for ten storied residential building using MS Project		
Project No. 2	**Prepare Line of Balance for project no. 1**	**4 HOURS**
Prepare LOB for above project		
Project No. 3	**Presentation on Safety Measures at site**	**4 HOURS**
Students must visit any ongoing high-rise construction site and identify various safety measures. Collect the information and give presentation.		

TEXT BOOK

1. S. Seetharaman, " Construction Engineering and Management", Umesh Publications Delhi, sixth edition, 2009, ISBN: 9382533095
2. B. Sengupta and H Guha, " Construction Management and Planning", Tata McGraw Hill Publishing Company, New Delhi, ISBN: 0074623982
3. K.K. Chitkara, "Construction Project Mangement", McGraw Hill Education third edition, ISBN: 9339205448

REFERENCE BOOK

1. Newnan, "Engineering Economic Analysis," tenth edition, Oxford University, ISBN: 091055496X
2. Dennis Lock, "The Essentials of Project Management", 2nd Revised edition, Gower Publishing Ltd, ISBN: 0566082241
3. P S Gahlot and B M Dhir, " Construction Planning and management", First Edition New Age International Limited Publishers

<table>
<tr><td rowspan="3">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="2">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

	COURSE SYLLABI (2016 – 2020)	
MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		
SCHOOL OF HUMANITIES AND ENGINEERING SCIENCES	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Professional Skills
	COURSE CODE	HP302
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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.

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	(ETAB) Extended3D Analysis of building System
		COURSE CODE	CV304
		COURSE CREDITS	2
RELEASED DATE : 1/06/2018		**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS						
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/		TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION		
-	4	-	-	50	-	25		75

PRE-REQUISITE : CV201: Continuum Mechanics of Solids

COURSE OBJECTIVES :

CV304.CEO.1: Understanding the concepts of mathematics, numerical analysis, statistics, computer and information sciences which underpin the engineering discipline.

CV304.CEO.2: To know application of engineering techniques, tools, softwares and resources.

CV304.CEO.3: Gain knowledge in application of software engineering for analysis and design processes of structures.

COURSE OUTCOMES :

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

CV304.CO.1: Select major theories, approaches and methodologies used in software for structural engineering

CV304.CO.2: Analysis to real engineering design problems.

CV304.CO.3: Articulate importance of softwares in research and industry by simulation work.

PRACTICAL		
Assignment No.1	**Introduction to ETABS**	**1 HOURS**

a. Overview of ETABS
b. Getting Help
c. Templates and Defaults
d. Graphical User Interface
e. ETABS Screen Menus
f. Units System
g. Coordinate Systems

Assignment No. 2	**Modelling In ETABS**	**1 HOURS**

a. Starting a New Model
b. New Model Quick Templates
c. Grid System Data
d. Add Structural Objects
e. Edit Stories and Grid Systems
f. Add Grid at Selected Joints
g. Grid Options
h. Save the Model

Assignment No. 3	**Editing Properties**	**2 HOURS**

a. Replicate
b. Extrude
i. Extrude Joints to Frames
ii. Extrude Frame to Shells
c. Merge Joints
d. Align Joints/Frames/Edges
e. Move Joints/Frames/Shells
f. Edit Frames
g. Edit Shells

Assignment No. 4	**Defining Properties**	**2 HOURS**

a. Material Properties
b. Section Properties
c. Load Patterns
d. Shell Uniform Load Sets
e. Load Cases
f. Load Combinations

Assignment No. 5	Structural Objects	4 HOURS

a. Draw Grids

b. Draw Dimension Lines

c. Draw Joint Objects

d. Draw Beam/Column/Brace Objects

e. Draw Floor/Wall Objects

f. Draw Reference Points

g. Draw Reference Planes

h. Draw Wall Stacks

Assignment No. 6	Selection Properties, Assigning the loads	2 HOURS

Selection Properties

a. Select

b. Deselect

c. Invert Selection

d. Select, Deselect, Invert Selection Assigning the loads

e. Joint

f. Frame

g. Shell

h. Joint Loads

i. Frame Loads

j. Shell Loads

Assignment No. 7	Design	4 HOURS

a. Steel Frame Design

b. Concrete Frame Design

Assignment No. 8	Detailing	2 HOURS

a. Detailing Process

b. Edit Views

c. Create and Manage Drawing Sheets

Assignment No. 9	Detailing	2 HOURS

a. Obtain Basic Graphical Displays

b. Graphical Displays using Model Explorer

c. Tabular Display of Results

d. Summary Report

e. Export Results

Assignment No. 10	Application of the software for a considered live scenario	4 HOURS

a. Selection of building/building elements

b. Complete 3D analysis for the building using ETAB

TEXT BOOK

1. Analysis and Design of a Multistorey Building using STAAD.Pro and E-TABS (with Manual Calculation) (First Edition,2016), by D. Rajendran

REFERENCE BOOK

1. ETAB 2016, Users Guide, July 2016, by Computers and Structures Inc.

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		W.E.F	AY: 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		COURSE NAME	Design of Structures
		COURSE CODE	CV321
		COURSE CREDITS	4
RELEASED DATE : 1/06/2018		REVISION NO	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE : CV101 Applied Mechanics , CV201 Continuum Mechanics of Solids

COURSE OBJECTIVES :

CV321.CEO.1: To design steel and reinforced concrete elements subjected to Axial force/Shear force/ Bending moment or any combination of these actions for Limit State of Collapse.

CV321.CEO.2: To design steel and reinforced concrete elements subjected to Axial force/Shear force/Twisting moment/ Bending moment or any combination of these actions for Limit State of Serviceability.

CV321.CEO.3: To design a structure using software to perform tasks mentioned in CEO.1 and 2

COURSE OUTCOMES :

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

CV321.CO.1: Design axially loaded elements using Limit state method

CV321.CO.2: Design elements subjected to bending and shear using Limit state method.

CV321.CO.3: Design elements subjected to combined axial force, bending and shear using LSM.

CV321.CO.4: Design connections of structural elements for the actions they are subjected to, using limit state method.

CV321.CO.5: Envisage lacunae of Force based design and understand recent trends in design.

	THEORY COURSE CONTENT	
UNIT 1	**Introduction and Connections**	**6 HOURS**

Properties of Structural Steel, I. S. Rolled Sections, I. S. Specifications, Factor of Safety, Permissible and Working Stresses, Elastic Method, Plastic Method, Introduction to Limit States of Design. Bolted connections: Bolted including friction grip connections subjected to shear and/or bending. Welded connections: Fillet and Butt weld.

UNIT 2	**Tension and compression Members**	**10 HOURS**

Design of Tension Member: Modes of failure, permissible stress in tension. Design of compression member: Modes of Failure of compression member, Buckling Failure: Eulers Theory, Effective Length, Slenderness Ratio, Design Formulae: I.S. Code Formulae. Designing of lacing and battening system for columns. Design of column base.

UNIT 3	**Design of flexure member**	**6 HOURS**

Design of members subjected to flexure: Laterally restrained and unrestrained members.

UNIT 4	**Preliminaries of RCC design**	**12 HOURS**

Material behaviour under tension and compression: Concrete and steel, Characteristic strength, Loads, Partial safety factors, general requirements for slab, beam, column and foundation. Detailing and Drawing: Reinforcement detailing of beam, column and slab.

UNIT 5	**Design of Slab and Beams**	**5 HOURS**

A] Design of slab for flexure, shear, bond and deflection falling under following categories
1. One-way slab: Simply supported, continuous, cantilever Slabs.
2. Two-way slabs: Restrained and unrestrained against torsion at corners.
B] Simply supported continuous and cantilever beams for limit state of flexure and shear, Design of RCC Beam subjected to bending plus twisting, Redistribution of moments.

UNIT 6	**Design of Column and Footings**	**5 HOURS**

A] Design of Column: Introduction, Strain and Stress variation diagrams, minimum eccentricity requirements. Design of Short Column for axial load, Uni-axial, Biaxial bending using interaction curves (SP-16).
B] Design of footing: Types of Footing, designing of isolated sloped or pad footing for one-way shear and two-way shear

PRACTICAL : Design of Industrial structures.		
PRACTICAL NO.01	**Planning of Industrial structure**	**2 HOURS**

Planning and drawing of Structural frame system (one full imperial sheet drawn using drafting software).

PRACTICAL NO.02	**Load Calculations**	**2 HOURS**

Calculate Dead load, Live load and Wind load for given locality and structure

PRACTICAL NO.03	**Analysis of the frame**	**2 HOURS**

Analyzing the frame for various load combinations and arriving at member forces.

PRACTICAL NO.04	**Design and Optimization**	**10 HOURS**

Design and optimisation of members subjected to tension, compression and flexure, including base system

Full imperial size sheets (Hand drawn)
Full imperial size sheets covering all practical from 1 to 4.
1. provisions and details of purlins, trusses, rafter and tie level bracings. 2. Connections showing roof truss to the column cap plate, beam to beam, beam to column, bracings and splicing details. 3. Column, column bracings, gable end bracings, base plates, shear keys, holding down bolts.

Design of G+2 structure (RCC)

PRACTICAL NO.05	**Planning and load calculation of G+2 Structure**	**2 HOURS**

Planning and drawing of Residential/commercial/Educational/Institutional etc. building having plan area greater than 125 m2. (one full imperial sheet drawn using drafting software). Calculate Dead load, Live load. and various load combinations as per IS stipulations.

PRACTICAL NO.06	**Design of Slabs**	**6 HOURS**

1. Design of one-way, two-way and cantilever slabs. (at least one of each type)
2. Design of stair case (Dog legged / Open well)

PRACTICAL NO.07	**Design of Beams**	**4 HOURS**

Design of simply supported Continuous and cantilever beams at Ground, plinth and floor level.

PRACTICAL NO.08	**Design of columns and footings**	**4 HOURS**

Design of columns along with footing (Axially loaded, uni-axially or bi-axially loaded)

Full imperial size sheets (Hand drawn)	

Full imperial size sheets covering all practical from 7 to 9.
1. Detailing of slabs and stair case.
2. Bar bending schedule and detailing of beams
3. Detailing of column and footing

TEXT BOOK

1. N. Krishnaraju, "Reinforced Concrete Structures",CBS Publishers and distributors, ISBN: 13 978 9385915369.
2. S.K.Duggal, "Design of Steel structures", McGraw Hill, ISBN: 978-0136077909
3. V. L. Shah and Karve,"Design of Reinforced Structures", Structures Publication, ISBN:813150990

REFERENCE BOOK

1. IS 800-2007, IS 456-2000, IS 875 (part I to IV), IS 2502, IS 3757, IS 400, SP-16 and SP6(4).
2. Karuna Moy Ghosh,"Practical Design of Steel Structures", Whittles Publishing ISBN 97814398357
3. Lus Simes da Silva, Rui Simes, Helena Gervsio, "Design of steel structures, Part 1-1 - General rules and rules for buildings", First Edition Author(s): Print ISBN: 9783433029732
4. Jack C. McCormac, Russell H. Brown, "Design of Reinforced Concrete", Feb 2013,2014, 9th Edition ISBN: 978-1-118-12984-5
5. W. H. Mosley J. H. Bungey, "Reinforced Concrete Design, Fourth Edition ISBN 978-0333-53718-3 ISBN 978-1-349-20929-3

COURSE SYLLABI
(2016 – 2020)

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019

THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Transportation Engineering
	COURSE CODE	CV322
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	30	20	150

PRE-REQUISITE: CV 101 Applied Mechanics , CV 201 Continuum Mechanics of Solids

COURSE OBJECTIVES:

CV322.CEO.1: To know about highway planning and geometric design of roads
CV322.CEO.2: To know about the traffic planning and fundamentals of traffic operations
CV322.CEO.3: To know about highway maintenance and public transportation systems
CV322.CEO.4: To know about basics of Bridges

COURSE OUTCOMES:

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

CV322.CO.1: Explain basics of highway network planning
CV322.CO.2: Design highway geometrics
CV322.CO.3: Design Road Intersections
CV322.CO.4: Design flexible and rigid pavements
CV322.CO.5: Perform marshall mix design
CV322.CO.6: Explain factors affecting choice of bridge type

THEORY COURSE CONTENT		
UNIT 1	**Highway Network Planning**	**6 HOURS**

Different modes of transportation, role of highway transportation, classification, network patterns, planning surveys, 20-year road development plans, salient features, determination of road lengths, introduction to highway economics

UNIT 2	**Traffic Engineering**	**6 HOURS**

Traffic characteristics; components of traffic stream: flow-speed-Density, measurement and analysis, q-k-v relationships, design hourly volume, concept of EPCU, capacity and level of service. Design of intersections. Introduction to grade separated intersections, cloverleaf, trumpet, flyovers. Traffic Management and Control: Traffic regulations, one-way streets, traffic signs, road markings, signals, warrants. Design of isolated fixed time signal, introduction to signal coordination.

UNIT 3	**Highway Alignment and Geometric Design**	**6 HOURS**

Principles of highway alignment, requirements, controlling factors, engineering surveys, design controls and criteria, cross section elements, pavement surface characteristics, camber, carriageway, kerbs, road margins, formation, right of way, typical cross sections. Sight distance, Design of horizontal alignment, super elevation, transition curves. Design of vertical alignment, gradients, vertical curves.

UNIT 4	**Pavement Materials, Mix Design and Design Of Pavements**	**6 HOURS**

Subgrade soil properties, CBR test, aggregates, desirable properties, tests, bituminous materials, bitumen and tar, tests. Bituminous mixes, requirements, design, Marshall Method. Types of pavement structures, functions of pavement components, design factors. Design of flexible pavements, methods, GI method, CBR method, IRC method, Burmisters method. Design of rigid pavements, design considerations, wheel load stresses, temperature stresses, frictional stresses, design of joints, IRC method of rigid pavement design.

UNIT 5	**Highway Construction**	**6 HOURS**

Types of highway construction, construction of earth roads, gravel roads, WBM roads. Bituminous pavements, types, surface dressing, penetration macadam, built up spray grout, bitumen bound macadam, bituminous carpet, bituminous concrete. Cement concrete pavements. Highway Maintenance: Pavement failures, causes, failures in flexible pavements and rigid pavements. Maintenance of highways, routine maintenance, periodic maintenance, Special repairs. Strengthening of existing pavements, evaluation, overlay design. Highway drainage, surface and sub-surface drainage

UNIT 6	Bridge Engineering	6 HOURS

Classification of bridges, components of bridges, determination of discharge imperical formula, direct methods, economical span, afflux, HFL, scour depth and clearance, factors influencing the choice of bridge super structure, approach roads. Loads on bridges: Brief, forces, stresse coming on bridges, IRC load specification, requirements of traffic in the design of highway bridges Substructure: Abutment, Piers, and wing walls with their types based on requirement and suitability. Type of Bridges

PRACTICAL All practicals are to be performed by students in a group of 4.		
PRACTICAL NO.01	**Aggregate Impact test for aggregate**	**2 HOURS**
Finding suitability of aggregates for different types of construction		
PRACTICAL NO.02	**Aggregate Crushing Strength of aggregate**	**2 HOURS**
Finding suitability of aggregates for different types of construction		
PRACTICAL NO.03	**Los Angeles Abrasion Test of aggregate**	**2 HOURS**
Finding suitability of aggregates for different types of construction		
PRACTICAL NO.04	**Flakiness index and Elongation index under shape Test of aggregate**	**2 HOURS**
Finding suitability of aggregates for different types of construction .		
PRACTICAL NO.05	**Specific Gravity and Water absorption test for aggregate**	**2 HOURS**
Evaluating quality of aggregates		
PRACTICAL NO.06	**Stripping Value test for aggregate**	**2 HOURS**
Evaluating quality of aggregates		
PRACTICAL NO.07	**Soundness test for aggregate**	**2 HOURS**
Evaluating quality of aggregates		
PRACTICAL NO.08	**Penetration test for bitumen**	**2 HOURS**
Classify bitumen based on its Penetration value		
PRACTICAL NO.09	**Ductility test for bitumen**	**2 HOURS**
Finding ductility value of bitumen		
PRACTICAL NO.10	**Softening Point test for bitumen**	**2 HOURS**
Finding Softening point of bitumen		
PRACTICAL NO.11	**Flash Point and Fire Point test for bitumen**	**2 HOURS**
Finding flash and fire point of bitumen		
PRACTICAL NO.12	**Specific gravity of bitumen**	**2 HOURS**
Finding the specific gravity of a bitumen sample		
PRACTICAL NO.13	**Bitumen extraction test**	**2 HOURS**
Finding the percentage content of bitumen in a bituminous mix		
PRACTICAL NO.14	**Marshall stability test**	**2 HOURS**
Finding the stability and flow value of a bituminous mix		

TEXT BOOK

1. S.K. Khanna and C.E.G. Justo, Highway engineering, Nem Chand and Brothers, 10th Edition, 2017, ISBN-10: 8185240930
2. S.P. Bindra, A Course in Highway Engineering, Dhanpat Rai and Sons, 2008, ISBN-10: 8189929860
3. S.P. Bindra, Principles and practice of Bridge Engineering, Dhanpatrai and Sons, 2012, ISBN-10: 8189928848
4. G.V.Rao, Principles of Transportation Engineering, Tata Mac-Graw Hill Publication, 2000, ISBN-10:007462363X

REFERENCE BOOK

1. Rangawala, Highway Engineering, Charotar publishing House, 10th Edition, 2015, ISBN10: 9385039091
2. Dr. L.R. Kadiyali and N.B. Lal, Principles and practices of Highway engineering, Khanna Publishers, 2005, ISBN-10: 8174091653.
3. Partha Chakraborty, Animesh Das, Principles of Transportation Engineering, Prentice Hall of India Pvt. Ltd., . ISBN: 978-81-203-2084-0
4. B.L. Gupta and Amit Gupta, Roads, Railways, Bridges, Tunnels and Harbour Dock, Standard publisher Distributors, 2009, ISBN-10: 8180140091.
5. D. Johnson and Victor, Essentials of Bridge Engineering, Oxford and IBH publishing co. Pvt. Ltd., 6th Edition, 2008, ISBN 13: 9788120417175.
6. S. Ponnuswamy, Bridge Engineering, Tata Mc GrawHill publishing co. Ltd., 3rd Edition, 2017, ISBN-10: 9339221079

<table>
<tr><td colspan="2" rowspan="2">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="3">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

MIT | Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**	**COURSE SYLLABI** **(2016 – 2020)**	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Water Resources Engineering
	COURSE CODE	CV323
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		**EXAMINATION SCHEME AND MARKS**					
LECTURE	**PRACTICAL**	**THEORY**			**TUTORIAL/ PRACTICAL**	**PRESENTATION/ DEMONSTRATION**	**TOTAL**
		MSE	**ESE**	**IA**			
3	2	30	40	30	50	-	150

PRE-REQUISITE : CV 301: Fluid Mechanics

COURSE OBJECTIVES :

CV323.CEO.1: To estimate the hydrological parameters for a given catchment or for a river basin

CV323.CEO.2: To analyze rainfall-runoff relationship using hydrograph methods.

CV323.CEO.3: To plan reservoirs as per the availability and demand of water.

CV323.CEO.4: To study the irrigation practices and design theories of canal systems

CV323.CEO.5: To estimate ground water availability using concepts of ground water hydrology

---

COURSE OUTCOMES :

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

CV323.CO.1: Analyze hydro-meteorological data

CV323.CO.2: Develop rainfall-runoff relationship hydrological models.

CV323.CO.3: Estimate reservoir capacities, yield and losses.

CV323.CO.4: Design irrigation canals and canal network.

CV323.CO.5: Estimate irrigation efficiencies and canal capacity.

CV323.CO.6: Estimate aquifer parameters.

THEORY COURSE CONTENT		
UNIT 1	**Introduction: Hydrology**	**6 HOURS**
Hydrologic Cycle, Forms and types of precipitation, measurement of precipitation, analysis of precipitation data, computation of mean rainfall, Abstractions of Precipitation Evaporation, Evapotranspiration, Penman Monteith method, Infiltration, Hortons equation and Green Ampt method, stream gauging techniques.		
UNIT 2	**Hydrograph Theory and Floods**	**6 HOURS**
Factors affecting runoff, Rainfall-Runoff relationships, Components of Hydrograph, Base flow separation, Effective rainfall, Derivation of unit hydrograph, S-curve hydrograph, synthetic Unit Hydrograph and its derivation, Floods- Estimation of peak discharge, rational method, SCS method and unit hydrograph method, Design flood, return period, flood frequency analysis, probabilistic and statistical concepts in estimating peak discharge through reservoirs and open channels.		
UNIT 3	**Reservoir Planning**	**6 HOURS**
Investigations for reservoir planning, Mass curve and demand curves, Fixation of reservoir capacity from annual inflow and outflow, using elevation capacity curve and dependable yield, Reservoir losses, Reservoir sedimentation, Trap Efficiency, Useful life of reservoir, Costs of reservoir, Apportionment of total cost.		
UNIT 4	**Canal Systems**	**6 HOURS**
Diversion head works: Types of hydraulic structures, Layout of a diversion head work, Types of cross drainage works Canal Systems: Types of canals, Principles of design of stable irrigation canals, Silt theories, Introduction to canal structures. Surface and subsurface flow analysis in hydraulic structures: Hydraulic structures on permeable foundations, Seepage theories		
UNIT 5	**Introduction to Irrigation Engineering**	**6 HOURS**
Irrigation Water Requirements of Crops: Soil moisture and crop water relationship, principal Indian crops - their season and water requirement, crop planning, Calculations of canal and reservoir capacities duty, delta, irrigation efficiency, Assessment of Canal Revenue		
UNIT 6	**Introduction to Ground Water Hydrology**	**6 HOURS**
Occurrence of groundwater, types of aquifers, aquifer properties, Groundwater movement, Darcys law, Conductivity and Transmissivity, yield from a well under steady state conditions, Pumping tests, unsteady flow in unconfined aquifers, well losses and specific capacity.		

PRACTICAL: All assignments to be submitted		
PRACTICAL NO.01	**Rainfall Data collection, preparation of mass curve and hyetograph using MS Excel from the obtained data**	**2 HOURS**
To collect Rainfall data by natural siphon recording type/ Automated rain gauge and plot the mass curve and hyetograph from obtained data for its analysis.		
PRACTICAL NO.2	**Analysis of Inconsistency in rainfall data**	**2 HOURS**
To carry out the double mass curve analysis of rainfall data.		
PRACTICAL NO.3	**Marking catchment area on a topo-sheet and working out average annual precipitation by various methods**	**6 HOURS**
To study and carry out demarcation of the catchment area on a topo-sheet and work out average annual precipitation by Thiessens Polygon and Isohyetel Method		
PRACTICAL NO.4	**Determination of peak flood discharge in a basin using unit hydrograph technique**	**2 HOURS**
To carry out the unit hydrograph analysis to find peak flood dischargest.		
PRACTICAL NO.5	**Design of lined canal**	**2 HOURS**
To design cross section of a lined canal with the help of crop water requirement analysis.		
PRACTICAL NO.6	**Watershed delineation using Remote Sensing data**	**6 HOURS**
To delineate watershed using Remotely Sensed Digital Elevation Model data and develop a stream network for the delineated watershed.		
PRACTICAL NO.7	**Calculation of Normalized Difference Vegetation Index (NDVI) using soft computing tool QGIS**	**4 HOURS**
To perform Normalized Difference Vegetation Index (NDVI) analysis for the delineated watershed using soft computing tool (QGIS).		

TEXT BOOK

1. Punmia B C, Irrigation and Water Power Engineering, Lakshmi Publications, 2016, ISBN13: 978-8131807637
2. Santosh Kumar Garg, Hydrology and Water Resources Engineering, Khanna Publishers, 2017, ISBN-13: 978-8174090614
3. Santosh Kumar Garg, Irrigation engineering and hydraulic structures, Khanna Publishers, 2017, ISBN-13: 978-8174090478

REFERENCE BOOK

1. Engineering Hydrology, Subrahmanya, K., 2008, Tata Mc Graw Hill Pub. Co., New Delhi, ISBN 13: 9781259029974.
2. Patra.K.C, Hydrology and Water Resources engineering, Narosa Publications, New Delhi, 2008, ISBN-13: 978-8173198465
3. Jeya Rami Reddy.P, A text book of Hydrology, Laximi Publications, New Delhi, third edition, 2016, ISBN-13: 978-9380856049.

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Operation Research
	COURSE CODE	CV331
	COURSE CREDITS	4
RELEASED DATE : 1/06/2018	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE: CV 311: Construction Planning and Management

COURSE OBJECTIVES:

CV331.CEO.1: To apply various optimization techniques in real world problems related to civil engineering

CV331.CEO.2: To evaluate maximum profit or minimum cost for interdisciplinary problems

CV331.CEO.3: To develop inventory models in terms of optimization

CV331.CEO.4: To study about assigning jobs to people in an efficient way

CV331.CEO.5: To demonstrate the sequencing techniques

CV331.CEO.6: To study how to play a game and replace models

COURSE OUTCOMES:

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

CV331.CO.1: Solve the optimization problems based on real scenario

CV331.CO.2: Apply Linear programming for minimizing the project cost and maximizing its profit.

CV331.CO.3: Apply LPP to Transportations problems and solve assignment problems in an easy way

CV331.CO.4: A Make decision of replacing for suitable outcome using assignment modeling and games theory.

CV331.CO.5: Examine the real conditions of a project so that loss can be avoided

CV331.CO.6: Organize an appropriate order of operations to service facilities

---

THEORY COURSE CONTENT		
UNIT 1	**Introduction and Linear programming**	**8 HOURS**

Introduction: Definition and Scope of Operations Research in Civil Engineering and Managerial Decision-making process. Linear Programming: Introduction, Formulation of linear programming problems, graphical method of solving LP problem, simplex method, maximization and minimization, Degeneracy in LPP, Unbounded and, Infeasible solutions

UNIT 2	**Duality and Dynamic Programming**	**8 HOURS**

Duality: Definition, Relationship between primal and dual solutions, Economic Interpretation, Post optimal of sensitivity analysis, Dual Simplex Method. Two phase method, Dynamic Programming multi stage decision process, Non-Linear programming-Uni-modal Function- Sequential Search Techniques

UNIT 3	**Transportation Models and Assignment Problems**	**6 HOURS**

Transportation Models: Finding an initial feasible solution - North West corner method, least cost method, Vogels Approximation method, Finding the optimal solution, methods of optimal solutions, Special cases in Transportation problems - Unbalanced Transportation problem. Assignment Problems: Hungarian method of Assignment problem, Maximization in Assignment problem, unbalanced problem, problems with restrictions, travelling salesman problems. Decision theory

UNIT 4	**Replacement Models and Game Theory**	**6 HOURS**

Replacement Models: Introduction, replacement of items that deteriorate ignoring change in money value, replacement of items that deteriorate considering change in money value with time, replacement of items that fail suddenly - Individual replacement policy, Group replacement policy. Game Theory: Introduction, 2-person zero sum games, Maximin - Minimax principle, Principle of Dominance, Solution for mixed strategy problems, Graphical method for games.

UNIT 5	**Sequencing Models and Queuing Theory**	**6 HOURS**

Sequencing Models: Introduction, General assumptions, processing n jobs through 2 machines, processing n jobs through m machines, Processing 2 jobs through m machines. Queuing Theory: Introduction, single channel - poission arrivals - exponential service times with infinite population and finite population, Multi-channel - poisson arrivals - Exponential service times with infinite population

UNIT 6	**Optimization Techniques**	**6 HOURS**

Optimization Techniques: Introduction to optimization techniques, its application in Engineering Planning, Design and Construction. Various models; Objective function and constraints, Multivariable optimization without constraints, Multivariable optimization with equality constraints, convex and concave functions, regions and sets. Single objective and multi objective optimization Techniques

PRACTICAL		
PRACTICAL NO.1		**2 HOURS**
Exercise on Graphical solution of linear programing problems		
PRACTICAL NO.2		**2 HOURS**
Exercise and case problems on Dual and Primal LP Problems		
PRACTICAL NO.3		**2 HOURS**
Exercise and case problems on Sensitivity Analysis		
PRACTICAL NO.4		**2 HOURS**
Exercise and case problems on Transportation Problems		
PRACTICAL NO.5		**2 HOURS**
Exercise and case problems on Queuing theory		
PRACTICAL NO.6		**2 HOURS**
Exercise and case problems on Game theory		
PRACTICAL NO.7		**2 HOURS**
Exercise on Inventory model		
PRACTICAL NO.8		**2 HOURS**
Exercise on Replacement theory		

TEXT BOOK

1. S.D. Sharma, Operations Research, Kedarnath, Ramnath and Co., Meerut
2. V.K. Kapoor, Operations Research, S. Chand Publishers, New Delhi.
3. R. Paneer Selvam, Operations Research, Second Edition, PHI Learning Pvt. Ltd., New Delhi.
4. Data Reconciliation by Prof. Shanker Narasimha

REFERENCE BOOK

1. Hamdy, A. Taha, Operations Research-An Introduction, Sixth Edition, Prentice Hall of India Pvt. Ltd
2. Harvey M. Wagner, Principles of Operations Research, Second Edition, Prentice Hall of India Ltd.
3. Operations Research: Principles and Practice-Ravindrav, Philip and S olberg, Wiley, India
4. Engineering Optimization Theory and Practice S.S. Rao., Wiely.

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 CIVIL ENGINEERING	**COURSE NAME**	Project Management
	COURSE CODE	CV302
	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

<table>
<tr><td rowspan="5">

MIT | Academy of Engineering

(An autonomous Institute Affiliated to SPPU)
</td><td colspan="2">

COURSE SYLLABI
(2016 – 2020)
</td></tr>
</table>

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 CIVIL ENGINEERING	**COURSE NAME**	Basic Entrepreneurship
	COURSE CODE	CV303
	COURSE CODE	HP 303
	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	
NIL	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 "IdentifyingCustomerNeeds" 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. The Battle for your mind using Positioning:https://www.youtube.com/watch?v=jQrY8xRx-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

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2018 - 2019
THIRD YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Mini Project
	COURSE CODE	CV324
	COURSE CREDITS	2
RELEASED DATE : 01/06/2018	**REVISION NO**	0.0

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

PRE-REQUISITE : Minor Project

COURSE OBJECTIVES :

CV324.CEO.1: To understand the Product Development Cycle through Mini project.

CV324.CEO.2: To undertake & execute a mini Project through a group of students

CV324.CEO.3: To inculcate skills in engineering product design and development process, budgeting, Planning, testing, effective trouble-shooting practices, aesthetics and ergonomics.

CV324.CEO.4: To understand the role of professional and ethical practices, management principles,Technical documentation and communication skills in engineering.

COURSE OUTCOMES :

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

CV324.CO1: Execute an idea in a team as well as within constraints.

CV324.CO2: Acquire knowledge of the techniques, skills and modern engineering tools necessary for engineering practices.

CV324.CO3: Use standard engineering tools and processes for design, simulation, testing,analysis in implementation and deployment of theoretical idea into practice.

CV324.CO4: Use standard documentation and presentation tools for a professional report and presentation 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 Specificationsy

- 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. Testing
  6. 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. Users 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.

Practical- 6	**Examination: Final Demonstration and presentation**	**Week-12**

- Final examination will be divided in three parts

  1. Demonstration
  2. Presentation
  3. Project documentation

- For final examination project must be demonstrated in front of examiner panel. For Industry sponsored projects or other installations examiner panel can visit the project venue.

- 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

---

Assessment:

Internal Assessment:

1. Project Review -2 Project Approval -05 Marks

2. Project Review -3 Internal review by project adviser- -05 Marks

3. Project Review -4 Final Project progress review- 10 Marks

Examination: Final Demonstration and presentation

1. Mini Project demonstration: 20 Marks

2. Mini Project presentation: 20 Marks

3. Mini Project documentation: 15 Marks

MIT ACADEMY OF ENGINEERING, ALANDI

An Autonomous Institute Affiliated to

Savitribai Phule Pune Univeristy

Curriculum

For

Final Year

Bachelor of Technology in Civil Engineering

2016-2020

(With Effect from Academic Year: 2019-2020)

			CURRICULUM STRUCTURE (2016 - 2020)		

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2019-20 (Part A)
FINAL YEAR BACHELOR OF TECHNOLOGY	RELEASE DATE	:	01/12/2018
DEPARTMENT OF CIVIL EGG	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC11	CV401	Drinking Water & Sanitary Engineering	3	2	4
2.	DE1	CV41#	Discipline Elective - Refer Annexure.	3	--	3
3.	OE3	CV42#	Open Elective - Refer Annexure.	3	2	4
4.	HSS7	HP401	Engineering Economics	2	--	2
5.	HSS9/ SDP7	HP403/ CV403	Business Strategies / Urban & Town Planning	--	2	1
6.	SDP8	CV402	Project - I	--	8	4
7.	SDP9	CV404	Summer Internship	--	--	4
			TOTAL	11	14	22

SEMESTER: VIII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC12	CV431	Estimation & Costing	3	2	4
2.	DE2	CV44#	Discipline Elective - Refer Annexure	3	--	3
3.	OE4	CV45#	Open Elective - Refer Annexure	3	2	4
4.	HSS8	HP402	Sociology	2	--	2
5.	SDP10	CV432	Project - II	--	8	4
			TOTAL	11	12	17

L: Lecture, P: Practical

Department Elective (DE): 2 Courses

	Course Code	Name of Course
1.	CV411	Building Services
	CV412	Advanced Design of Structures
	CV413	Railway Engineering
	CV414	Hydro Power Engineering
2.	CV441	Foundation Engineering
	CV442	Engineering Geology
	CV443	Design of Hydraulic Structures
	CV444	Air & Noise Pollution and Control measures
	CV445	Advances in Geospatial Engineering

Open Elective (OE): 4 Courses

	Sl. No.	Course Code	Name of Course
Construction Project Management	1.	CV311	Construction Planning & Management
	2.	CV331	Operation Research
	3.	CV421	Financial Management
	4.	CV451	Statistical Methods in Construction

<table>
<tr><td colspan="2" rowspan="2">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="3">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

MIT | Academy of Engineering (An autonomous Institute Affiliated to SPPU)		**COURSE SYLLABI** **(2016 – 2020)**		
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020	
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Drinking Water and Sanitary Engineering	
		COURSE CODE	CV401	
		COURSE CREDITS	4	
RELEASED DATE : 1/06/2019		**REVISION NO**	0.0	

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE:

COURSE OBJECTIVES:

CV401.CEO.1: To know the basics, importance, and methods of water supply.

CV401.CEO.2: To study the various sources and properties of water

CV401.CEO.3: To understand the various methods of conveyance of water.

CV401.CEO.4: To learn the objectives and methods of water treatment and to study the features and function of different water treatment units

CV401.CEO.5: To learn the importance of rain water harvesting and water pollution.

COURSE OUTCOMES:

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

CV401.CO.1: Analyze characteristics of water and wastewater

CV401.CO.2: Estimate the quantity of drinking water and domestic wastewater generated

CV401.CO.3: Design components of water supply systems and water treatment plant

CV401.CO.4: Design components of sewerage system and sewerage treatment plant

THEORY COURSE CONTENT		
UNIT 1	**SOURCES, QUALITY AND QUANTITY PERSPECTIVES OF WATER**	**8 HOURS**

Surface sources, subsurface sources, physical characteristics, chemical characteristics, biological characteristics, water quantity estimation, water consumption rate, fluctuations in rate of demand, design periods, population forecasting methods. Intakes, types of Intakes, factors governing location of intakes, pumps, types of conduits, types of pipes, pipe appurtenances.

UNIT 2	**WATER TREATMENT**	**6 HOURS**

Operations involved in water treatment, screening, plain sedimentation, sedimentation aided with coagulation, filtration, disinfection, water softening, miscellaneous treatments, water treatment plants (WTP). .

UNIT 3	**WATER DISTRIBUTION**	**6 HOURS**

Requirements of a good distribution system, methods of distribution, systems of supply of water, Distribution reservoirs, layout of distribution system, design of distribution system, analysis of pipe networks of distribution system, appurtenances in distribution system, detection, and prevention of wastage of water in a distribution system, use of SCADA in water distribution.

UNIT 4	**QUALITY AND QUANTITY PERSPECTIVES OF SEWAGE**	**6 HOURS**

Physical, chemical, and biological characteristics of sewage, analysis of sewage, estimation of dry weather flow, estimation of storm water flow

UNIT 5	**SEWER AND SEWER APPURTENANCES**	**8 HOURS**

Hydraulic design of sewer, minimum velocity of flow in sewer, maximum velocity of flow in sewer, effect of variation in flow of sewage on velocity of flow in sewer, forms of sewer, design of storm water drains. Construction of sewer: factors affecting the selection of material for sewer construction, materials for sewers, joints in sewer, shapes of sewer, maintenance, cleaning and ventilation of sewer. Sewer appurtenances.

UNIT 6	**TREATMENT OF SEWAGE**	**4 HOURS**

Preliminary and primary treatment of sewage: screening, grit removal basins, tanks for removal of oil and grease, sedimentation, sedimentation aided with coagulation. Secondary treatment of sewage: activated sludge process, sewage filtration, miscellaneous methods such as oxidation ditch, oxidation ponds, aerated lagoons, rotating biological reactors, sewerage treatment plant (STP), sludge disposal, reuse and recycle of effluent from STP.

PRACTICAL		
Project No. 1		**14 HOURS**

Water quality assessment of river Indrayani and suggesting measures to improve its quality by determining Total Solids, D.O., B.O.D., C.O.D., Phosphates, Sodium, Potassium, calcium, Total nitrogen. Prepare a detailed report on it.

Project No.02		**8 HOURS**

Checking the potability of water being supplied to the Alandi city and prepare a report on it containing the details like pH, Alkalinity, Total Hardness and its components, Chlorides, Chlorine Demand, Residual Chlorine, Turbidity and optimum dose of alum, MPN and Fluoride or iron. Suggest the various treatment measures to improve the quality of drinking water of Alandi city.

Project No.03		**2 HOURS**

Determination of Sludge Volume Index of given sample

TEXT BOOK

1. Water Supply Engineering: S. K. Garg, Khanna Publishers, ISBN-13: 978-8174091208
2. Water Supply and Sanitary Engineering: G. S. Birdie and J. S. Birdie, Dhanpat Rai Publishing Company, ISBN-13, 9788187433798
3. Environmental Engineering 1: Water Supply Engineering: B. C. Punmia, Ashok Jain and Arun Jain. Laxmi Publications (P) Ltd. ISBN 13: 9788174091208
4. Environmental studies by Rajgopalan- Oxford University Press. ISBN: 9780198072089
5. Waste Water Treatment Rao and Dutta. ISBN:9788120417120

REFERENCE BOOK

1. Environmental Engineering, Peavy, H.S, Rowe, D.R., and G. Tchobanoglous (1985), McGraw Hill Inc., ISBN-13: 978-0070491342
2. Water supply Engineering Environmental Engineering (Vol.I) P.N. Modi (2006), Standard Book House. ISBN-13: 978-8189401351
3. Sewage treatment and Disposal and waste water Engineering Environmental Engineering (Vol.II) P.N. Modi (2008), Standard Book House. ISBN-10, 8190089324.
4. Sewage Disposal and Air Pollution Engineering Environmental Engineering (Vol.II) S.K. Garg (1999), Khanna Publishers. ISBN-13: 978-8174092304
5. Wastewater Engineering Treatment and Reuse Metcalf and Eddy, Inc. (2003), McGraw Hill Inc., ISBN-10: 0070418780

<table>
<tr><td rowspan="3">MIT Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="4">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Building Services
	COURSE CODE	CV411
	COURSE CREDITS	3
**RELEASED DATE : ** 1/06/2019	**REVISION NO**	0.0

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

PRE-REQUISITE: CV 211: Building Design and Construction

COURSE OBJECTIVES:

CV411.CEO.1: To develop proficiency in building service industry.

CV411.CEO.2: To know the practices of building services

CV411.CEO.3: To develop proficiency in calculating estimates of services

CV411.CEO.4: To encourage students for entrepreneurship in service industry.

COURSE OUTCOMES:

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

CV411.CO.1: Understand the concepts of plumbing and drainage plan.

CV411.CO.2: Explain the concepts and techniques of water proofing and rain water harvesting.

CV411.CO.3: Develop a model showing details of the electrification work.

CV411.CO.4: Define principles of ventilation and air conditioning

CV411.CO.5: Select proper method for thermal insulating building.

CV411.CO.6: Select proper method for sound insulating building

THEORY COURSE CONTENT		
UNIT 1	**Plumbing and Sanitation**	**6 HOURS**

Plumbing Systems , Various Materials for system like PVC, GI, AC, CI, HDPE and stoneware, Various types of traps, Sanitary Fittings, , Concept of Plumbing and Drainage plan, underground drainage-location and use of manholes, disconnecting chambers, ventilating shafts, Need of Septic Tank, concept of plumbing and drainage plan.

UNIT 2	**Rain water harvesting and water proofing**	**6 HOURS**

Introduction to rainwater harvesting. Concept of rain water Gutters. Rainwater outlet and Down Tank systems. Specifications as per IS Code. Waterproofing of New and Existing Structures Materials used, Non Destructive Water Proofing, Water proofing of terraces, Damp Proofing .resistance to capillary action.

UNIT 3	**Electrification and Lighting**	**8 HOURS**

Concealed and Open Wiring, Requirements and Location of various points, Concept of earthling. Natural and artificial lighting-principles and factors, arrangement of luminaries, Distribution of illumination, Utilization factors.

UNIT 4	**Air conditioning and Thermal Insulation**	**8 HOURS**

Air conditioning: Purpose, Classification, Principles, Various Systems . Various Industry requirements. Thermal Insulation: General concept, Principles, Materials, Methods, Computation of Heat loss and heat gain in Buildings

UNIT 5	**Fire Safety**	**6 HOURS**

Fire resistance in building, Fire protection precautions, confining of fire, fire hazards, Characteristics of fire resisting materials, building materials and their resistance to fire, fire load.

UNIT 6	**Acoustics and Sound Insulation**	**6 HOURS**

Acoustics: Absorption of sound, various materials, Sabines formula, optimum reverberation time, conditions for good acoustics. Sound Insulation: Acceptable noise levels, Noise prevention at its source, Transmission of noise. Noise control. Practical Applications.

TEXT BOOK

1. Water Supply and Sanitary Engineering by S.C. Rangwala, Charotar Publishing House Pvt. Ltd, 29th Edition edition, ISBN-10: 9385039202, 8186314008
2. Building Energy Management Systems by G. Levermore Taylor and Francis. 2nd edition.. ISBN 978-04-1926140-7
3. Building Services Engineering by David V. Chadderton , Taylor and Francis. 5th edition ISBN-10: 0415413559
4. Building Construction by Dr. B.C.Punmia , Ashok Kumar jain , jain Book Depot , ISBN-13: 978- 8131804285

REFERENCE BOOK

1. Building Drawing with an Integrated Approach to Built Environment by M G Shah, C M Kale, S. Y. Patki; 5th Edition ISBN: 9780071077873
2. Building Services Engineers, 2015, by Peter, Trenter, N. A., Earthworks : a guide / London : ICE Publishing, 2015 ISBN: 9780849374920

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020	
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Advanced Design of Structures	
	COURSE CODE	CV412	
	COURSE CREDITS	3	
RELEASED DATE : 1/06/2019	**REVISION NO**	0.0	

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

PRE-REQUISITE : CV 302 Structural Analysis, CV 321 Design of Structures

---

COURSE OBJECTIVES :

CV412.CEO.1: To introduce process of prestressing and prestressed concrete

CV412.CEO.2: To design prestressed beam sections for flexure and shear.

CV412.CEO.3: To analyse and design building frames for vertical and horizontal loads.

CV412.CEO.4: To design rectangular and circular water tanks on ground.

CV412.CEO.5: To analyse and design retaining walls.

CV412.CEO.6: To design special foundations like combined, strap, raft, etc.

COURSE OUTCOMES :

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

CV412.CO.1: Understand process of prestressing.

CV412.CO.2: Design prestressed beam sections for flexure and shear.

CV412.CO.3: Design building frames for vertical and horizontal loads.

CV412.CO.4: Design rectangular and circular water tanks on ground.

CV412.CO.5: Analyse and design retaining walls.

CV412.CO.6: Design special foundations like combined, strap, raft, etc

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Prestressed Concrete**	**7 HOURS**
Introduction to prestressed concrete, concepts, systems and methods of prestressing. Losses in prestress, Pre and Post tensioned members.		
UNIT 2	**Prestressed Girders**	**7 HOURS**
General philosophy of design, permissible stresses in concrete and steel, suitability of section, safe cable zone, design of simply supported pretension and post tension beams using limit state method. Design of rectangular and Symmetrical I sections. concept of end block, stress distribution in end block.		
UNIT 3	**RC building frames**	**7 HOURS**
Analysis and design of rectangular portal frame, with vertical loads, design of hinge at the base. Substitute frames, frames subjected to horizontal forces, portal method, cantilever method, factor method. Determination of design forces using load combinations of IS:1893.		
UNIT 4	**Water Tanks**	**7 HOURS**
Design of water tank- design criteria, permissible stresses, design of circular water tank resting on ground with flexible and rigid base, design of rectangular water tank resting on ground by approximate method.		
UNIT 5	**Retaining Walls**	**7 HOURS**
Various types of retaining walls, Analysis and Design of cantilever and counterfort retaining walls with horizontal and inclined surcharge.		
UNIT 6	**Special Foundations**	**7 HOURS**
Design of combined rectangular pad footings, slab beam type footing and strap footing. Design of Raft foundation.		

TEXT BOOKS;

1. N.Krishnaraju, " Prestressed concrete", Tata McGraw Hill, ISBN: 978-00-70634442
2. P. Dayaratnam "Advanced Reinforced Concrete Design" ISBN: 978-8123909899
3. Varghese, P. C "Advanced Reinforced Concrete Design" ISBN: 978-81-203-2787-0
4. Lin T.Y. 'Design of prestressed concrete structures", John Wiley and Sons, ISBN: 978-8126528035
5. Krishna Raju, Advanced Reinforced Concrete, 2nd edition, CBS Publishers, ISBN: 978-8123912257
6. J.E. Bowles, Foundation Analysis and Design Tata McGraw Hill, ISBN: 978007162675
7. N.V .Naik, Foundation Design Manual Dhanpat Rai and sons, ISBN: 9780415469364

REFERENCES

1. IS 3370- 1991- Part 1-4- 'Code of Practice for concrete structures for the storage of liquids' BIS
2. IS: 800 - 2007 "Use of Structural Steel in General Building Constructions", BIS.
3. IS: 875 - 2007 "Code of Practice for Design Loads" (Parts I, II and III).
4. IS: 456- 2000 'Indian Standard code of practice for plain and reinforced concrete", BIS
5. IS: 1893 -2002 'Indian Standard Code of practice for criteria for Earthquake resistant design of Structures", BIS
6. IS: 3370 -2009 "Indian Standard code of practice for concrete structures for storage of liquids", BIS.

<table>
<tr><td>MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="2">COURSE SYLLABI
(2016 – 2020)</td></tr>
<tr><td>SCHOOL OF MECHANICAL AND CIVIL ENGINEERING</td><td>W.E.F</td><td>AY: 2019 - 2020</td></tr>
<tr><td rowspan="3">FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING</td><td>COURSE NAME</td><td>Railway Engineering</td></tr>
<tr><td>COURSE CODE</td><td>CV413</td></tr>
<tr><td>COURSE CREDITS</td><td>3</td></tr>
<tr><td>RELEASED DATE : 1/06/2019</td><td>REVISION NO</td><td>0.0</td></tr>
</table>

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	-	30	50	20	-	-	100

PRE-REQUISITE : CV322 Transportation Engineering

COURSE OBJECTIVES :

CV413.CEO.1: Comprehend different parts of the rail track, their functions and its operation system with respect to construction and engineering applications

CV413.CEO.2: Explain essential features and requirements of different types of crossings and signal system, maintenance of tracks and required procedures

COURSE OUTCOMES :

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

CV413.CO.1: explain components of Railway Track, different Railway Gauges

CV413.CO.2: design track gradients as per given requirements

CV413.CO.3: discuss various Types of Track Turnouts

CV413.CO.4: describe purposes and facilities at Railway Stations

CV413.CO.5: explain Interlocking and modern signal system

CV413.CO.6: describe Surface Defects on Railway Track and their Remedial Measures

THEORY COURSE CONTENT		
UNIT 1	**INTRODUCTION, ALIGNMENT OF RAILWAY LINES RAILS, TRACK FITTINGS AND TRACK STRESSES**	**9 HOURS**
The main objective of this course is to understand the Product Development Cycle through mini Project, where students will undertake and 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 troubleshooting practices, safety norms and standards, significance of aesthetics and 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		
UNIT 2	**SLEEPER and GEOMETRIC DESIGN OF TRACK**	**9 HOURS**
Functions and Requirements of sleepers, Types and Spacing of Sleepers, Method Of Fixing Rails With Pre-stressed Concrete And Wooden Sleepers, Function and Specifications of Track Ballast. Necessity and Details of geometric design of track, Design of track Gradients, Grade compensation on curves. Curves and Superelevation.		
UNIT 3	**RESISTANCE TO TRACTION, POINTS AND CROSSINGS**	**9 HOURS**
Resistance to-friction, wave action, speed, track irregularity, wind, resistance to gradient, curvature, starting and accelerating. Stress in rails, sleepers, ballast and formation. Necessity of Points and Crossing. Track Layouts And Sketches of Turn Out, Types Of Crossing, Types of Track Turnouts		
UNIT 4	**RAILWAY STATIONS, YARDS, SIGNALING AND INTER-LOCKING**	**9 HOURS**
Purposes, Facilities Required at Railway Stations. Requirements Of Station Yard, Classification Of Railway Stations, Types Of Yards. Visit to an Existing railway station and yard Objectives of signaling, Classification of signals. Types and working of Interlocking. Modern signal system. Visit to nearby railway crossing for signaling and locking system		
UNIT 5	**MAINTENANCE OF RAILWAY TRACK**	**9 HOURS**
Introduction of Maintenance Programme: Monsoon, Pre-Monsoon and Post- Monsoon Maintenance, Causes For Maintenance, Routine Maintenance, Tools For Railway Track Maintenance and Their Functions. Surface Defects And Their Remedial Measures		

TEXT BOOK

1. Satish Chandra and M.M. Agarwal, Railway Engineering, (2nd Edition) 2013, Oxford Higher Edu., ISBN : 9780198083535
2. S.C. Saxena, S.P. Arora, A Text Book of Railway Engineering, Dhanpat Rai Publications (p) Ltd, 2010, ISBN: 978-8189928834.

REFERENCE BOOK

1. J.S. Mundrey, Railway Track Engineering, 5th Edition, 2017, Tata McGraw Hill Publications, ISBN: 9352606485.
2. Clifford F. Bonnett, Practical Railway Engineering, 2nd Edition, 2005, Imperial College Press, ISBN: 1860945155.

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Hydropower Engineering	
	COURSE CODE	CV414	
	COURSE CREDITS	3	
RELEASED DATE : 1/06/2019	**REVISION NO**	0.0	

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

PRE-REQUISITE : CV 301: Mechanics of Fluid, CV 443: Water Resources Engineering

---

COURSE OBJECTIVES :

C414.CEO.1: Get knowledge of various Instruments used in Hydro power Engineering.

C414.CEO.2: Acquaint basic design of hydropower plants.

C414.CEO.3: Understand fundamental concepts of Hydraulic machines.

C414.CEO.4: Apply the design concepts of hydraulic turbines

C414.CEO.5: Describe design aspects of hydraulic pumps and their features

C414.CEO.6: Understand design elements of Power House.

COURSE OUTCOMES :

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

CV414.CO.1: Describe Instruments and their measurement techniques.

CV414.CO.2: Investigate requirements of Hydro power plants.

CV414.CO.3: Design components of Hydropower plant.

CV414.CO.4: Design Hydropower pumps

CV414.CO.5: Describe design details of Power House.

THEORY COURSE CONTENT		
UNIT 1	**HYDROLOGY AND INTRODUCTION TO HYDROPOWER ENERGY**	**6 HOURS**
Hydrology: runoff studies, Hydrological Cycle, Hydrograph, Flood Discharge Estimation, flood estimation studies, Forms of Energy, Need for hydropower energy and its power estimation. Law of conservation of energy, Assessment of hydropower potential of a basin, storage and pondage, load studies - Load curves, load duration curve, Connected load, maximum load, peak load, base load and peak load power plants, load factor, plant capacity factor, plant use factor, demand factor, diversity factor		
UNIT 2	**HYDROPOWER PROJECT**	**6 HOURS**
Types of hydropower projects and schemes, Classification of Hydropower Plants, Government Hydropower Policies, Environmental Issues, SWOT of a Hydropower Project, Survey and investigation, Process of development of site, Survey of land for Rehabilitation of affected people		
UNIT 3	**HYDROPOWER STATION**	**8 HOURS**
Brief idea about Major/Small/Mini/Micro Hydropower Stations, Layout Plan of Different Hydropower Stations. Brief idea about Generators and Turbines used in Major/Small/Mini/Micro Hydropower Stations. Pen Stock, Pipe Line and Tunneling, Surge Tank, Valve House, Synchronous Generator, Protection and Control equipment. Governors, Synchronous Generator and its Operational principle.Hydro dynamics of underground systems and types of underground stations, Economics of underground power stations, Civil works of micro/mini hydro schemes		
UNIT 4	**DESIGN OF HYDRAULIC TURBINES**	**8 HOURS**
Classification and Euler's equation for hydraulic machines of hydraulic turbines, Components of hydraulic turbines, energy losses in hydraulic machines, scale effects,cavitation, Standardization and selection of turbine, Francis turbine runner design, design of axial turbine runner including bulb turbine, hydraulic calculations of spiral casing and guide wheel, draft tube theory, standardization and applications draft rube, Pelton turbine design		
UNIT 5	**PUMPED STORAGE HYDROPOWER**	**4 HOURS**
Historical Review, Importance, Potential and Technology of a Pumped Storage Solution, Components and Layout, Reversible Power, Case studies, Seawater Pumped Storage Power Stations (SPSPS), Innovation: Seawater Pumped-Storage in Arid Regions		
UNIT 6	**ENVIRONMENTAL IMPACT ASSESSMENT FOR HYDROPOWER PROJECTS**	**4 HOURS**
Environmental impact of canal, dams, hydropower generation. Environmental impact assessment methodology including statutory requirement and procedures for obtaining environmental clearance for hydropower Projects. Modeling and Forecasting of Environmental parameters including as an environmental management tours and other environmental survey techniques.		

TEXT BOOK

1. Punmia B.C. Ashok K Jain, Arun K Jain, B. B. L Pande, Irrigation and Water Power Engineering, Laxmi Publications (P) Ltd. 2010. ISBN-13: 978-817491208
2. Water Power Engineering - M.M. Dandekar and K.N. Sharma, Dhanpat Rai and Sons
3. Arora, K.R., Irrigation, Water Power and Water Resources Engineering, Standard Publishers Distributors, Delhi, ISBN-10: 007041870.

REFERENCE BOOK

1. Centrifugal and axial flow Pump- A.J. Stephenoff, Krieger Publishing Company
2. Fluid Mechanics of Turbo Machinery- G. Wislicenus, Dever
3. Water Power Engineering - H.K. Barrows, New York: McGraw-Hill Book Company
4. Planning and Design of Hydro Electric Plants- Gilbert Gedeon, P.E, Continuing Education and Development Inc.

MIT **Academy of Engineering** (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Financial Management
	COURSE CODE	CV421
	COURSE CREDITS	4
RELEASED DATE : 1/06/2019	**REVISION NO**	0.0

TEACHING SCHEME		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	-	50	150

PRE-REQUISITE : CV311: Project Management

COURSE OBJECTIVES :

CV421.CEO.1: To identify the Goals and Functions of Financial Management

CV421.CEO.2: To understand Financial Forecasting

CV421.CEO.3: To study working capital management

COURSE OUTCOMES :

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

CV421.CO.1: Understand the basic of economic and finacial management

CV421.CO.2: Solve the issues of financial management in business operations

CV421.CO.3: Apply the principles of financial analysis, financial decisions, investment decisions to construction industry

CV421.CO.4: Employ working capital management in Indian construction industry with supply chain inventory management

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Financial Management**	**6 HOURS**
Review of engineering economics, elements of engineering economics, Time value of money, goals, objectives and principles of economic analysis, methods of economic analysis, necessity and importance of cash flows, ESCROW Account, Concept of project for major purchases.		
UNIT 2	**Financial Forecasting**	**6 HOURS**
Introduction, Basic tools: random variables, hypothesis tests, regression, time series. Smoothing and filtering: Simple exponential filters, trends and seasonality with filters.		
UNIT 3	**Financial Analysis**	**6 HOURS**
Introduction to financial analysis, Objectives and Limitations of Financial analysis. analysis of financial decisions, analysis of investment decision, Analysis of Operating Decision, Profitability Analysis, Returns and Liquidity .		
UNIT 4	**Working Capital Management**	**6 HOURS**
Nature and Scope of working capital, Factors determining working capital, estimating working capital, components of working capital. Inventory management, receivable management, working capital financing for Indian industry		
UNIT 5	**Supply Chain Management**	**6 HOURS**
Building blocks of a supply chain network. Business processes in supply chains. Types of supply chains. Strategic, tactical, and operational decisions in supply chains. Supply chain performance measures. Supply chain inventory management. Performance modeling of supply chains.		
UNIT 6	**Risk Management**	**6 HOURS**
Introduction, Types and Sources of Risk in Capital Budgeting, Risk Adjusted Discount Rate, Certainty Equivalent Approach, Probability Distribution Approach, Sensitivity Analysis, Simulation Analysis, Decision Tree Approach.		

PRACTICAL Project should be performed in group of 5 students		
PRACTICAL NO.1	Title	**14 HOURS**
Consider a financial management of typical construction industry or construction project. For that starting from planning stage to end of project, prepare detail report comprising of cash flow management, sources of funding, working capital management, profit and loss accounts, balance sheets, Income tax, GST and other necessary factors etc.		

TEXT BOOK

1. Khan M. Y. , Jain P. K. Financial Management McGrawHill, ISBN-13: 978-9339213053
2. Paramasivan C., Subramanian T. "Financial Management New Age International publishers, ISBN-13: 978-8122425734
3. Pandey I. M. "Financial Management", Vikas Publishing House, ISBN-13: 978-9325982291

REFERENCE BOOK

1. Goyal V. K. Financial Accounting2012,Prentice Hall Publications
2. Indian Institute of Banking and Finance (IIBF) Risk Management MacMillan Publishers India, ISBN-13: 978-9387914544
3. Chopra S., Meindl P. and Kalra D. V. Supply Chain Management2016, Pearson Education India, ISBN-13: 978-9332548237

MIT Academy of Engineering (An autonomouse Institute Afilated 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**	Sociology
		COURSE CODE	HP402
		COURSE CREDITS	2
RELEASED DATE : 01/06/2019		**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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 .

	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Major Project - I
	COURSE CODE	CV402
	COURSE CREDITS	4
RELEASED DATE : 01/01/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TERMWORK	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	ICE	ECE	IA			
-	8	–	–	–	100	50	150

PRE-REQUISITE : Minor Project, Mini Project

COURSE OBJECTIVES :

ME402.CEO.1: To implement the idea/ real time industrial problem/ current application from engineering domain

ME402.CEO.2: To evaluate an alternative approaches and justify the use of selected tools and methods

ME402.CEO.3: To inculcate skills in engineering product design and development process, budgeting, Planning, testing, effective trouble-shooting practices.

ME402.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,

ME402.CO1: Solve real life problems by applying the knowledge and problem solving ability.

ME402.CO2: Analyze alternative approaches, find feasible solution and apply most appropriate one.

ME402.CO3: Use standard engineering tools and processes for analysis, design, simulation, testing, Implementation and deployment of idea into practice.

ME402.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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**		Estimation and Costing
	COURSE CODE		CV431
	COURSE CREDITS		4
RELEASED DATE : 1/6/2019	**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 : CV 211: Building Design and Construction

COURSE OBJECTIVES :

CV431.CEO.1: To have knowledge in preparation of block estimates and detail estimation, tender practices, contract procedures, and valuation.

CV431.CEO.2: The student will be able to prepare estimates, call for tenders and execute works.

COURSE OUTCOMES :

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

CV431.CO.1: To have understanding of managerial functions like planning, organizing, staffing, leading and controlling and have same basic knowledge on international aspect of management

CV431.CO.2: To take out of quantities for various construction projects

CV431.CO.3: To prepare estimates for various civil engineering works

CV431.CO.4: To calculate rates for various items of construction

CV431.CO.5: To draft specifications and tender notice.

CV431.CO.6: To prepare valuation report for residential building

THEORY COURSE CONTENT		
UNIT 1	**Introduction to Estimation**	**6 HOURS**
Philosophy, Purpose, Methods of estimation, Types of estimates - Approximate estimates and detailed estimate, Approximate Estimates- Meaning, purpose, methods of approximate estimation of building and other civil engineering projects like roads, irrigation/ water supply, sanitary engineering, electrical works.		
UNIT 2	**Quantity Surveying**	**10 HOURS**
Methods of estimating-P.W.D. and center-line methods of working out quantities. Calculation of quantities for Load bearing and R.C.C framed structures		
UNIT 3	**Rate Analysis**	**8 HOURS**
Standard Data, Observed Data, Schedule of rates, Market rates, Assessment of Man Hours and Machineries for common civil works, Rate Analysis,		
UNIT 4	**Specifications**	**6 HOURS**
Specifications: Meaning, purpose and types. Drafting detailed specifications for materials, quality, workmanship, method of execution, mode of measurement and payment for major items like, excavation, stone/ brick masonry, plastering, ceramic tile flooring, R.C.C. work.		
UNIT 5	**Tenders and Contracts**	**6 HOURS**
Tende: Tender notices, types, tender procedures, Drafting model tenders and E-tendering. Contract Types of contracts, Formation of contract and Contract conditions.		
UNIT 6	**Valuation**	**4 HOURS**
Valuation: Purpose of valuation. Meaning of price, cost and value. Factors affecting value. Types of value: only Fair Market Value, Book Value, Salvage/ Scrap Value, Distressed Value and Sentimental Value. Concept of freehold and leasehold property. Estimation versus valuation. Meanings of depreciation and obsolescence. Valuation of any building		

PRACTICAL All assignments to be submitted		
PRACTICAL NO.1	**Working out quantities**	**12 HOURS**
Working out Detailed Quantities for i) A Two storied R.C.C. framed building based on prevailing DSR rates for Pune District ii) Estimation of quantities of steel reinforcement for an R.C.C. frame structure		
PRACTICAL NO.02	**Earthwork Estimate**	**6 HOURS**
Preparation of Estimate for Earthwork (for a road, Railway, Canal or a small dam) using Computer Software		
PRACTICAL NO.03	**Rate Analysis**	**4 HOURS**
Analysis of Rates For the two Items of Works based on the prevailing market rates of various items and labour involved.		
PRACTICAL NO.04	**Draft Tender Notice**	**4 HOURS**
Preparation of draft of tender notice For the Work for which Detailed Estimate is Prepared		

TEXT BOOK

1. Building Construction by Dr. B.C.Punmia , Ashok Kumar jain , jain Book Depot , ISBN-13: 978-8131804285

REFERENCES

1. Building Drawing with an Integrated Approach to Built Environment by M G Shah, C M Kale, S. Y. Patki; 5th Edition ISBN: 9780071077873
2. Building Services Engineers, 2015, by Peter, Trenter, N. A., Earthworks : a guide / London : ICE Publishing, 2015 ISBN: 9780849374920
3. Building Energy Management Systems by G. Levermore Taylor and Francis. 2nd edition.. ISBN 978-04-1926140-7
4. Building Services Engineering by David V. Chadderton , Taylor and Francis. 5th edition ISBN-10: 0415413559

<table>
<tr><td rowspan="2">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="2">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

		COURSE SYLLABI (2016 – 2020)
MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)		
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Foundation Engineering
	COURSE CODE	CV441
	COURSE CREDITS	3
RELEASED DATE : 1/6/2019	**REVISION NO**	0.0

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

PRE-REQUISITE : CV212 Geotechnical Engineering

COURSE OBJECTIVES :

CV441.CEO.1: To have knowledge about exploration of soil .

CV441.CEO.2: To acquire the capacity to design both shallow and deep foundations

CV441.CEO.3: To have adequate knowledge about concept and design of special types of foundation

COURSE OUTCOMES :

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

CV441.CO.1: identify types of soil and its characteristics

CV441.CO.2: adopt suitable soil exploration technique and interpretation of related data

CV441.CO.3: design both shallow and deep foundation

CV441.CO.4: design special cases of foundations

THEORY COURSE CONTENT		
UNIT 1	**Soil Properties and Exploration**	**9 HOURS**

Soil properties and its applications, Soil exploration techniques comparisons, Sounding tests, Geophysical methods, Sampling, Interpretation of Laboratory and field Testing

UNIT 2	**Introduction Shallow Foundation**	**9 HOURS**

Introduction to bearing capacity of soil Basic definitions Bearing capacity theories Types of shear failure Effect of water table Bearing capacity from plate load test. Shallow foundation- Types and Applications. Floating foundation. IS code method - Rectangular and Circular Footings. Settlement of Foundations

UNIT 3	**Deep Foundations**	**9 HOURS**

Pile foundations Types of piles, Factors affecting choice of types of piles, Load carrying capacity of piles, Pile group, Group efficiency, Lateral resistance of piles, settlement of piles, Negative skin friction, Settlement of pile group in cohesive soil by approximate method. Piers and Caissons- Definition, Types and uses. Well foundation: components, sand island method

UNIT 4	**Special Foundations**	**9 HOURS**

Classification of Foundations, Special foundations, Raft foundation, types of rafts, Beams on elastic foundation, Footing subjected to moments, Footing subjected to tension, Geotextiles, various methods of foundations design, Technological consideration in Geotechnical Engineering.

TEXT BOOK

1. Gopal Ranjan and A. S. Rao, Basic and Applied Soil Mechanics, G. K. Publications Pvt. Ltd, Dec. 2006, ISBN : 978-81-224-1223-9 .

2. V. N. S. Murthy, Soil Mechanics and Foundation Engineering, B. S. Publications, Dec 2009, ISBN 0 324 06680 5.

3. B. C. Punmia, Soil Mechanics and Foundation Engineering, Laxmi Publishing Co, Dec. 2005, ISBN: 81-7008-081-9.

4. Dr. K .R. Arora, "Soil Mechanics and Foundation Engineering", (8th Edition) 2015, Standard Publishers, ISBN:81-8014-112-8

5. Donald P. Coduto, Foundation Design: Principles and Practices, Prentice Hall 2 edition (July 20, 2000)ISBN-10: 0135897068

REFERENCE BOOK

1. Joseph E Bowles, Engineering Properties of Soils And Their Measurements, McGraw Hill Publications, 1992, ISBN: 0070067783, 9780070067783.
2. Palanikumar. M, Soil Mechanics, PHI Learning Private Limited, 2013, ISBN: 978-81-203-4838-7.
3. R. F. Craig "Craigs Soil Mechanics", E and FN Spon an imprint of Chapman and Hall, 2012, ISBN: 0-415-32702-4, 0-415-32703-2
4. Venkatramaiah, C. Geotechnical Engineering, (3rd edn.) New Age International Publishers, New Delhi, 2006.
5. Braja M. Das, Principles of Foundation Engineering, Cengage India Private Limited, Eighth edition (1 August 2017), ISBN-10: 9386650959

<table>
<tr><td rowspan="4">**MIT | Academy of Engineering**
(An autonomous Institute Affiliated to SPPU)</td><td colspan="3">**COURSE SYLLABI**
(2016 – 2020)</td></tr>
</table>

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**		Engineering Geology
	COURSE CODE		CV442
	COURSE CREDITS		3
RELEASED DATE :	**REVISION NO**		0.0

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

PRE-REQUISITE : CV212 Geotechnical Engineering

COURSE OBJECTIVES :

CV442.CEO.1: To understand the basic building units of which the solid crust of the earth

CV442.CEO.2: To have knowledge about the nature of geological structures and their importance in the civil engineering structures.

CV442.CEO.3: To study the nature of geographic distribution of rocks and engineering properties of rock on the earth.

COURSE OUTCOMES :

Students successfully completing the course will be able to

CV442.CO.1: classify the geological hazards, erosion, flooding, dewatering and seismic investigations etc.

CV442.CO.2: demonstrate the earthquake and landslide to check the stability of structure

THEORY COURSE CONTENT	

UNIT 1	Engineering Geology	9 HOURS

Applications of geology to Civil Engineering projects, Engineering properties of rocks. Engineering considerations of structures of rocks. Rock as a construction material, Building stone, Road metal and Ballast. Surface and subsurface geotechnical investigation, Geological mapping, sampling, drilling, photogeology, geophysical methods. Application of geology for location, design and construction of dams, hydraulic structures, bridges and tunnels

UNIT 2	Indian Geology and Geomorphology	9 HOURS

Principles of stratigraphy and geological time scale, Physiographic and tectonic divisions of India, Introduction to the stratigraphy of India. Geomorphologic processes and their external and internal agents, Geological action of wind, glaciers, running water and oceans and their resulting landforms, Geomorphic forms and their consideration in engineering structures.

UNIT 3	Structural Geology and Earthquake Engineering	9 HOURS

Deformation of rocks, folds, parts of fold, its classification and nomenclature, Identification joints, its definition, nomenclature and classification, Definition, nomenclature and classification of fault, Recognition of fault and fold in the field and its effect on outcrops, Outliers and inliers, Problems on dip, strikes, thickness and depth of rock strata. Earthquake waves, causes and effects, magnitude and intensity. Tectonic zones of India. Landslides: causes of landslides and their prevention .

UNIT 4	Geohydrology	9 HOURS

Hydrologic cycle, Occurrence and distribution of groundwater, Water table and water table maps. Aquiclude, Aquifuge and aquifers, confined and unconfined aquifers, Springs and geysers, Importance of ground water studies in Civil Engineering Works

---

TEXT BOOK

1. Singh Parbin, Engineering and General Geology, 2009,S. K. Kataria and Sons
2. Kesavulu, Textbook of Engineering Geology,2009,Macmillan India Ltd
3. Aggarwal P,"Earthquake Resistant Design of Structures" Prentice Hall India Learning Private Limited; 1 edition (2006) ISBN-10: 9788120328921

REFERENCE BOOK

1. Sengupta Supriya, Introduction to Sedimentology 1994, A. A. Balkema
2. Park R. G., Foundation of Structural Geology, 2004 Routledge Publishing House
3. Roberto Villaverde , "Fundamental Concepts of Earthquake Engineering" CRC Press; 1 edition (26 January 2009) ISBN-10 : 9781420064957 NPTEL Videos and Web notes of course Soil Mechanics

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**		Design of Hydraulic Structures
	COURSE CODE		CV443
	COURSE CREDITS		3
RELEASED DATE : 1/06/2019	**REVISION NO**		0.0

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

PRE-REQUISITE :

CV 301: Mechanics of Fluid

CV 323: Water Resources Engineering

CV212: Geotechnical Engineering

COURSE OBJECTIVES :

CV443.CEO.1: Get knowledge of various types of dam and its components

CV443.CEO.2: Understanding of advanced fluid mechanics principles

CV443.CEO.3: Convey the knowledge on design criteria and stability analysis of different types of dams

CV443.CEO.4: Apply the design concepts of hydraulic structures

CV443.CEO.5: Describe theories of structures on Pervious Foundations.

CV443.CEO.6: Design different Canal regulatory works.

COURSE OUTCOMES :

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

CV443.CO.1: Perform the stability analysis of gravity dams.

CV443.CO.2: Explain the causes of failure of different types of dams and their design criteria

CV443.CO.3: Design components of dam outlet works.

CV443.CO.4: Design minor irrigation structures.

CV443.CO.5: Integrate relevant concept and methodologies in the area of hydraulics, water resources and geotechnical engineering.

THEORY COURSE CONTENT		
UNIT 1	**Reservoir Planning**	**6 HOURS**
Investigations, Capacities, Zones of storage, Mass Inflow and Mass Demand curves, Life of Reservoir, site assessment and selection of type of dam, Introductory perspectives, Embankment types and Characteristics - Gravity dams and characteristics - Spillways and ancillary works		
UNIT 2	**Structures on Pervious Foundations**	**6 HOURS**
Diversion head works- layout and functions of components, Weir and Barrage- Causes of failure of weir on permeable soils, Blighs theory, limitations, Design of vertical drop weir, Khoslas theory of independent variables, Khoslas corrections.		
UNIT 3	**Earthen Dam**	**6 HOURS**
Types, principles of design, Material and construction, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden drawdown, steady seepage condition		
UNIT 4	**Gravity Dam**	**6 HOURS**
Concepts and design criteria, Loading, Gravity dam analysis, Stability, Elementary profile of gravity dam, Concrete for dams, Roller Compacted Concrete gravity dams, Foundation treatment, Construction joints, Galleries in gravity dams. (Dam site visit is recommended)		
UNIT 5	**Dam outlets works**	**6 HOURS**
Ogee spillway and its design, Cavitations on spillway, design feature, Design principles and Design of spillways, Chute spillways, Principles of Energy dissipators based on jump height curves, stilling basins, Spillway crest gates, vertical lift and radial gates, their design principles		
UNIT 6	**Design of canal regulating structures**	**6 HOURS**
Design of Hydraulic Structures: Aqueduct (Type-III), siphon aqueduct (Type-III), Canal falls - notch type, Siphon well type, Sarda type (High Discharge only),Glacis fall and Cross regulator, Head regulator and functions. (Regulatory structures site visit is recommended).		

TEXT BOOK

1. Modi, P.N., Introduction to Water Resources And Waterpower Engineering, Standard Publication, Delhi, ISBN-13: 978-8189401290
2. Punmia B.C. Ashok K Jain, Arun K Jain, B. B. L Pande, Irrigation and Water Power Engineering, Laxmi Publications (P) Ltd. 2010. ISBN-13:978-8131807637
3. Garg, S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers, ISBN-13: 978-8174090478.
4. Arora, K.R., Irrigation, Water Power and Water Resources Engineering, Standard Publishers Distributors, Delhi, ISBN-10: 8180140075

REFERENCE BOOK

1. Asawa, G, L Irrigation And Water Resources Engineering, New Age Int. Ltd. ISBN-13: 978-8122416732.
2. Sathyanarayana M. C. Water Resources Engineering-Principles and Practice, New Age Internatio ISBN-13:
3. Varshney, R.S. Theory and Design of Irrigation Structures - Vol III, Nem Chand and Bros., Roorkee, ISBN-13:
4. P. Novak, A. I. B. Moffat, C. Nalluri and R.Narayanan, Taylor and Francis, U. K., Hydraulic Structures, ISBN-13:
5. Manual on Barrages and Weirs on Permeable Foundation, Publication 179, (Volumes I and II), Central Board of Irrigation and Power, New Delhi.

MIT | Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)		
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020	
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Air and Noise Pollution and Control Measure	
	COURSE CODE	CV444	
	COURSE CREDITS	3	
RELEASED DATE : 1/06/2019	**REVISION NO**	0.0	

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

PRE-REQUISITE :

COURSE OBJECTIVES :

CV444.CO.1: To study various metrological parameters affecting air pollution

CV444.CO.2: To understand the plume behavior for atmospheric stability conditions

CV444.CO.3: To study dispersion modeling and assess the concentrations

CV444.CO.4: To know about air pollution controlling devices

CV444.CO.5: To understand the effects of pollutants on the environment

CV444.CO.6: To study the effects of noise pollution and its control techniques.

COURSE OUTCOMES :

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

CV444.CO.1: Understand meteorological aspects of air pollution

CV444.CO.2: Understand air pollution control methods

CV444.CO.3: Design unit operations for pollution control.

CV444.CO.4: Identify sampling and analysis techniques for air quality assessment

CV444.CO.5: Understand noise pollution control methods

THEORY COURSE CONTENT		
UNIT 1	**INTRODUCTION**	**6 HOURS**
Definition, Types of pollution, Indoor and outdoor air pollution, Sources and classification of Air Pollutants, Photochemical smog, Effects of air pollution on health, vegetation and materials, Global effects of air pollution..		
UNIT 2	**METEOROLOGICAL ASPECTS**	**6 HOURS**
Basis and statistical consideration of sampling sites, Devices and methods used for sampling gases and particulates, Isokinetic sampling, Ambient air quality monitoring as per the procedure laid down by CPCB, Air Pollution indices, National Ambient Air Quality Standards (NAAQS) 2009.		
UNIT 3	**AMBIENT AIR SAMPLING AND MONITORING**	**6 HOURS**
Investigations for reservoir planning, Mass curve and demand curves, Fixation of reservoir capacity from annual inflow and outflow, using elevation capacity curve and dependable yield, Reservoir losses, Reservoir sedimentation, Trap Efficiency, Useful life of reservoir, Costs of reservoir, Apportionment of total cost.		
UNIT 4	**AIR POLLUTION CONTROL**	**6 HOURS**
Air (Prevention and Control) Pollution Act, 1981, The Environment (Protection) Act, 1986, Environmental Related Current Topics- Ozone Layer depletion, Carbon credit, Green bench, Carbon Sequestration, Carbon footprints, Emission standards for stationary and mobile sources.		
UNIT 5	**LEGISLATION AND REGULATION**	**6 HOURS**
Air (Prevention and Control) Pollution Act, 1981, The Environment (Protection) Act, 1986, Environmental Related Current Topics- Ozone Layer depletion, Carbon credit, Green bench, Carbon Sequestration, Carbon footprints, Emission standards for stationary and mobile sources. .		
UNIT 6	**NOISE POLLUTION AND CONTROL**	**8 HOURS**
Noise: Definition, Characteristics, Sources, Types of noise, Impact of noise, Permissible limits, Noise Acts. Noise measuring equipment: Sound Level Meter, Octave Band Analyser, Statistical Analyser and Noise Average Meter Enclosures and Barriers: Lead as a noise barrier, Plenum barriers, Barrier around pipe, wires and rectangular ductwork, High transmission loss ceilings, Acoustical foams, Nylon in noise reduction, damping compounds.		

TEXT BOOK

1. Air pollution and control, C.S. Rao, New age international publication, ISBN: 812241835X, 9788122418354
2. Air Pollution, Rao M.N. and Rao H.V.N., Tata McGraw Hill Publishing Company Ltd., ISBN 10: 0074518712
3. Advanced Air and noise pollution control, Wang L.K., Pereira N.C., Hung Y.T., Volume I and II, Humana Press, ISBN 1-58829-359-9

REFERENCES

1. Environmental Engineering, Peavy, Rowe and Tchobanoglous: McGraw-Hill , ISBN 13: 9780070491342
2. Air Pollution Control Theory, Martin Crawford: McGraw-Hill Inc., ISBN 13: 9780070134904
3. Air Pollution: Its Origin and Control, Wark and Warner: Prentice Hall, ISBN 13: 9780673994165
4. Noise pollution and control strategy, Singal S.P., Alpha Science International, ISBN 13: 9781842652374
5. Environmental Pollution Principles, Analysis and Control, Narayanan P., CBS Publishers, ISBN 13: 9788123914510

<table>
<tr><td rowspan="5">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="3">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

		COURSE SYLLABI (2016 – 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Advances In Geospatial Engineering
		COURSE CODE	CV445
		COURSE CREDITS	3
RELEASED DATE : 1/06/2019		**REVISION NO**	0.0

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

PRE-REQUISITE : CV 202: Geospatial Engineering Technology

COURSE OBJECTIVES :

CV445.CEO.1: To understand the basics of Geodetic Surveying

CV445.CEO.2: To understand how to perform Hydrographic Surveying using Nautical Sextant

CV445.CEO.3: To know setting out of construction

CV445.CEO.4: To find points on earth surface and in space

CV445.CEO.5: To prepare plans of an area by aerial Photogrammetry

CV445.CEO.6: To know in detail the concept of remote sensing and GPS in identification of land features from space

---

COURSE OUTCOMES :

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

CV445.CO.1: Locate points from fixed baseline and determine positioning using GPS

CV445.CO.2: Utilize knowledge of Hydrographic Surveying to identify points and solve problems

CV445.CO.3: Develop Setting out various Civil Engineering works

CV445.CO.4: Make necessary adjustment of errors occurred during geospatial observation

CV445.CO.5: Read photographs and prepare plans by aerial survey

CV445.CO.6: Interpret satellite images in terms of utility and precision of data collection

THEORY COURSE CONTENT		
UNIT 1	**Geodetic Surveying, Total station**	**4 HOURS**
Introduction to Plane and Geodetic Surveying, Geodetic surveying- Objects, Methods of Geodetic Surveying, Introduction to Triangulation, classification of Triangulation Systems, Triangulation figures, Concept of well-conditioned Triangle, selection of stations, intervisibility and height of stations		
UNIT 2	**Hydrographic Surveying**	**8 HOURS**
Objects, applications, Establishing controls, Shore line survey, Sounding, Sounding Equipment, Methods of locating soundings conventional and using GPS , Reduction of soundings, Plotting of soundings, Nautical Sextant and its use, Three point problem and its use, solution of three point problem by all methods, Tides and tide gauges, determination of MSL.		
UNIT 3	**Setting out works**	**8 HOURS**
a) Trignometric Levelling - Terrestrial refraction, Angular corrections for curvature and refraction, Axis Signal correction, Determination of Difference in Elevation by single observation and reciprocal observations. b) Setting out of Construction works. Setting out of a bridge, determination of the length of the central line and the location of piers. Setting out of a tunnel		
UNIT 4	**Triangulation Adjustment**	**8 HOURS**
Kinds of errors, Laws of weights, Determination of most probable values (MPV) of conditioned and independent quantities, Method of Least Squares, Indirect observations, Probable error and its determination, Distribution of error to the field measurements, Normal equation, Method of correlates. Station and figure adjustment of Geodetic Quadrilateral without central station. Spherical triangle, Calculations of spherical excess and sides of spherical triangle.		
UNIT 5	**Aerial Photogrammetry**	**8 HOURS**
Objects, Classification- qualitative and quantitative photogrammetry Applications, comparison of map and aerial photograph, Vertical, Tilted and Oblique photographs, Scale of and Relief displacement in vertical photograph, Ground control points (GCPs), Flight planning Introduction to digital photogrammetry, different stereo viewing techniques in digital photogrammetry, Method of creation of elevation data, Different products of digital photogrammetry, Drones/UVA in aerial surveying.		
UNIT 6	**Remote Sensing and GPS**	**8 HOURS**
Remote sensing concepts Idealized remote sensing system characteristics Types of remote sensing system Remote sensing from space Data interpretation application of remote sensing LIDAR RADAR -SONAR. GPS Basics system overview working principle of GPS Satellite ranging calculating position Ranging errors and its correction GPS surveying Methods static, Rapid static, DGPS and Kinematic methods Real time and post processing DGPS visibility diagram GAGAN		

TEXT BOOK

1. R Subramanian, Surveying and Levelling, Oxford University Press, 2013 2nd Revised edition. Revised, ISBN-13: 9780198085423
2. Dr. B. C. Punmia, Ashok Kumar Jain, A.K. Jain Higher Surveying- III, Laxmi Publication 2005 Edition, ISBN-13: 9788170088257
3. T. P. Kanetkar and S. V. Kulkarni, Surveying and Levelling Vol. II, Pune Vidyarthi Publication

REFERENCE BOOK

1. Alfred Leick,GPS Sattelite Surveying, Wiley Publishers, 2003 3rd Revised ed, ISBN- 13: 9780471059301
2. M. Chandra and S. K. Ghosh, Remote sensing and Geographical Information System, Narosa Publishing House, 2006 Edition, ISBN-13: 9781842652787
3. Peter Burrough, Rachel A McDonnell, Rachael A McDonnell, Principles of Geographical Information System Oxford University Press, 1998 2nd ed, ISBN-13: 9780198233657
4. M.D.Saikia, Surveying, PHI Learning Pvt . Ltd, 2010 Edition, ISBN-13:97881203398

<table>
<tr><td colspan="2" rowspan="2">MIT | Academy of Engineering
(An autonomous Institute Affiliated to SPPU)</td><td colspan="2">COURSE SYLLABI
(2016 – 2020)</td></tr>
</table>

MIT | Academy of Engineering **(An autonomous Institute Affiliated to SPPU)**		**COURSE SYLLABI (2016 – 2020)**	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING		**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING		**COURSE NAME**	Statistical Methods in Construction
		COURSE CODE	CV451
		COURSE CREDITS	4
RELEASED DATE : 1/06/2019		**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	PRACTICAL	DEMONSTRATION	
3	2	30	40	30	50	-	150

PRE-REQUISITE : CV311 Construction Planning and Management, CV331 Operation Research

COURSE OBJECTIVES :

CV451.CEO.1: To furnish students with statistical methods which will let them to solve Construction Engineering and Management problems

CV451.CEO.2: To pioneer students to quantitative and qualitative methods for conducting meaningful inquisition and research in construction

CV451.CEO.3: To develop optimizing approach towards construction problems.

COURSE OUTCOMES :

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

CV451.CO.1: Simulate, Sample, and test the data that will accurately addresses the research problem

CV451.CO.2: Analyze result appropriateness using correlation and regression analysis.

CV451.CO.3: Understand basic principles of statistical inference

CV451.CO.4: Apply probability and distribution concepts in construction.

CV451.CO.5: Compute probabilities and check for hypothesis and failure conditions.

THEORY COURSE CONTENT		
UNIT 1	**Project Probability and Distributions**	**8 HOURS**
Probability theory and its importance: Definition of probability, Rules of Probability, The Bayes theorem. Random variable. Probability distribution. Mean or Expectation of Random variable. Properties of Mean of Expectation. Theoretical probability Distributions: Binomial Distribution, Poisson distribution. Normal Distribution, Exponential Distribution, Beta, Gamma.		
UNIT 2	**Sampling and Testing**	**8 HOURS**
Sampling and sampling distribution: Probability samples, Non-probability samples, sample Random sampling, Other sampling schemes, sampling distribution and standard error, some Sampling and Quality control. Use of concepts of standard deviation, coefficient of variance, ranges in quality control of concreting and similar such activities. Testing Hypothesis: Sampling of distribution Test based on Normal Distribution, students- t test, chisquare, K-S test for goodness of fit and distribution. Analysis of variance- one way and two way classification.		
UNIT 3	**Correlation and Regression Analysis**	**8 HOURS**
Correlation types, co-efficients. Bi-variate Frequency Distribution, Scatter Diagram, Correlation Analysis. Regression and Multivariate Analysis, Multiple Regression Analysis-Non linear Regression. Use of regression analysis in resources management		
UNIT 4	**Simulation**	**6 HOURS**
Simulation Types, case studies in construction using simulation techniques, simulation softwares used. Griffis waiting line Method.		

ASSIGNMENTS		
Assignment No. 1	**Exercise of Probability distribution**	**4 HOURS**
Apply principles of Probability and distribution to real life construction Problems		
Assignment No. 2	**Sampling and Testing**	**6 HOURS**
a. Collect data using one of the methods of sampling. b. Test the data collected through testing methods (Any two)		
Assignment No. 3	**Data Simulation**	**8 HOURS**
Simulate data using Monte-Carlo simulation using random numbers.		
Assignment No. 4	**Correlation and Regression Analysis**	**6 HOURS**
Exercise on correlation and regression analysis		

TEXT BOOK

1. Probability and Statistics for Engineers Miller, Freund-Hall, Prentice India Ltd. 20092
2. Applied Mathematics for Engineers and Physiscists-pipes and Harvill. McGraw Hill 8 International Edition, 1970
3. Sampling techniques-Cochran, Wiley Series, 2008.
4. Shrivastava, Shenoy and Sharma, Quantitative Techniques for Managerial Decisions, Wiley, 1989
5. Applied Statistics for Civil and Environmental Engineers by Kottegoda.- Stratford Books

REFERENCE BOOK

1. Statistics-Concepts and Controversies-David S. Moore-Freeman Company, New York.
2. Reliability Principles and practices-Calabro-McGraw Hill Book Company, 1963
3. P S Gahlot and B M Dhir, " Construction Planning and management", First Edition New Age International Limited Publishers

MIT **Academy of Engineering** (An autonomouse Institute Affilated 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**	Engineering Economics
	COURSE CODE	HP401
	COURSE CREDITS	2
RELEASED DATE : 01/06/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		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** (An autonomouse Institute Affilated 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		EXAMINATION SCHEME AND MARKS					
(HOURS/WEEK)		THEORY			TUTORIAL/	PRESENTATION/	TOTAL
LECTURE	PRACTICAL	MSE	ESE	CA	PRACTICAL	DEMONSTRATION	
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. Tools of Titans: The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Performers, Timothy Ferriss, Random House,ISBN: 9781785041273.
3. Disrupted: My Misadventure in the Start-Up Bubble, Dan Lyons, Penguin Publishers, ISBN: 9781786491022
4. Unshakeable: Your Financial Freedom Playbook, Tony Robbins, Simon & Schuster Publishers,ISBN: 9781471164934
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. Essentials of Management : An International and Leadership Perspective, 10th Ed., Harold Koontz and Heinz Weihrich, MGH, ISBN: 9789339222864
11. Kites in a Hurricane: Startups from Cradle to Fame, Rishi Kapal, SAGE Publishing, ISBN: 9789352807895
12. Wadhwani Foundation Advanced Course in Entrepreneurship

MIT Academy of Engineering (An autonomous Institute Affiliated to SPPU)	COURSE SYLLABI (2016 – 2020)	
SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Urban and Town Planning
	COURSE CODE	CV403
	COURSE CREDITS	1
RELEASED DATE : 1/06/2019	**REVISION NO**	0.0

TEACHING SCHEME (HOURS/WEEK)		EXAMINATION SCHEME AND MARKS					
		THEORY			TUTORIAL/ PRACTICAL	PRESENTATION/ DEMONSTRATION	TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA			
-	2	-	-	25	-	25	50

PRE-REQUISITE : CV 211: Buildings Design and Construction, CV 202: Geospatial Engineering Technology

COURSE OBJECTIVES :

CV403.CEO.1: To familiarize students with potentials of planner and the system of Spatial planning and spatial policy, laws,

CV403.CEO.2: To develop skills in developing and presenting spatial development project for a building complex with greenery and selected urban facilities. .

CV403.CEO.3: To develop skills in preparing land use plan for selected urban area dealing with various acts, guidelines planning agencies

COURSE OUTCOMES :

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

CV403.CO.1: Apply the principles and elements of architectural composition in spatial planning system and spatial policies in India.

CV403.CO.2: Demonstrate the knowledge of contemporary ideas of shaping space in cities, Make Landscape design in urban context by solving issues involved in Urban Renewal

CV403.CO.3: Acknowledge scope and breadth of planning theories, its contemporary manifestation

CV403.CO.4: Conduct civic surveys for development plans and short and long range planning for alternative infrastructure systems while designing for present and future cities and regions.

CV403.CO.5: Apply UDPFI guidelines for new towns and new global trends in planning techniques and carry out spatial analysis, mapping and planning using GIS by Identify specific data and methodologies for effective mapping and evaluation of special townships

---

PRACTICAL

PRACTICAL NO.1	**4 HOURS**

Study and analysis of Development Plan of a town with respect to land use, services, infrastructure, street, furniture, housing etc

PRACTICAL NO.2	**2 HOURS**

Study of salient features of urban renewal program (group work)

PRACTICAL NO.3	**4 HOURS**

Study of special townships: Report on any existing town planning scheme, visit any project nearby (group work).

PRACTICAL NO.4	**6 HOURS**

Neighborhood development plan (group work)

PRACTICAL NO.5	**4 HOURS**

Comparative study on any existing new towns and planned towns like PCNTDA, New Mumbai etc. focusing on disaster management and Infrastructure (individual work).

PRACTICAL NO.6	**4 HOURS**

The smart city approach as a response to emerging challenges for urban development (individual work)

TEXT BOOK

1. Town Planning By G K Hiraskar –Town Planning by S Rangwala
2. Building Drawing and Built Environment- 5th Edition Shah, Kale, Patki–Planning
3. Legislation by Koperdekar and Diwan.
4. G. K. Bandopadhyaya, Text Book of Town Planning
5. Climate Responsive Architecture Arvind Krishnan.
6. Introduction to Landscape Architecture by Michael Laurie

REFERENCE BOOK

1. Manual of Tropical Housing And Building By Koenigsbeger. Publisher: Universities Press; Latest Edition edition (1975), ISBN-10: 9788173716973, ISBN-13: 978-8173716973 .
2. Sustainable Building Design Manual. Publisher: The Energy and Resources Institute, TERI (30 January 2009), ISBN-10: 9788179930533 ISBN-13: 978-8179930533
3. The Urban Pattern: City planning and design by Gallion and Eisner. Publisher: Van Nostrand Reinhold; Subsequent edition (1 February 1986, ISBN-10: 0442227310, ISBN-13: 978-044222731
4. Design of cities by Edmond bacon. Publisher: Penguin USA; Revised edition (20 May 1976), ISBN-10: 0140042369, ISBN-13: 978-0140042368

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

SCHOOL OF MECHANICAL AND CIVIL ENGINEERING	**W.E.F**	**AY:** 2019 - 2020
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**COURSE NAME**	Major Project - II
	COURSE CODE	CV432
	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 : Major Project I

COURSE OBJECTIVES :

ME432.CEO.1: To follow the standard guideline to meet the objective for development of Project.

ME432.CEO.2: To test rigorously before deployment of Systems

ME432.CEO.3: To Verify and Validate the work Undertaken

ME432.CEO.4: To Consolidate the work and preparation of final report

COURSE OUTCOMES :

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

ME432.CO1: Show the evidence of independent evaluation.

ME432.CO2: Critically analyzed the result and their implementation methodology.

ME432.CO3: Validate the results with standard tools and techniques.

ME432.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):

GUIDELINES:

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

Civil 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 AND 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 science	2 Credits
SDP	Skill development and Project	4 Credits

    III.   For a student who are opting 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 are 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 graduation in the same academic year.

5. **ASSESSMENT METHOD:**

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.

        a. Dean, Respective School

        b. Project Guide

        c. CR Coordinator / Project Coordinator

        d. Project Guide (Industry)

        e. 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).** It can 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 MECHANICAL & CIVIL ENGINEERING	**W. E. F**	**:**	**2019-20** (PART B)
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	**RELEASE DATE**	**:**	**01/12/2018**
	REVISION NO.	**:**	**0.0**

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC11	CV401	Drinking Water & Sanitary Engineering	3	2	4
2.	DE1	CV41#	Discipline Elective - Refer Annexure.	3	--	3
3.	OE3	CV42#	Open Elective - Refer Annexure.	3	2	4
4.	HSS7	HP401	Engineering Economics	2	--	2
5.	HSS9/ SDP7	HP403/ CV403	Business Strategies / Urban & Town Planning	--	2	1
6.	SDP8	CV402	Project - I	--	8	4
7.	SDP9	CV404	Summer Internship	--	--	4
TOTAL				11	14	22

SEMESTER: VIII (SLIP not Online with the Open elective)

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC12	CV431	Estimation & Costing	3	2	4
2.	DE2	CV44#	Discipline Elective - Refer Annexure	3	--	3
3.	OE4	CV45#	Open Elective - Refer Annexure	3	2	4
4.	SEMESTER LONG INTERNSHIP – Project Design			--	6	3
5.	SEMESTER LONG INTERNSHIP – Project Implementation			--	6	3
TOTAL				7	20	17

L: Lecture, P: Practical

MIT	academy of Engineering (An Autonomous Institute)	CURRICULUM STRUCTURE (2016 - 2020)		

SCHOOL OF MECHANICAL & CIVIL ENGINEERING	W. E. F	:	2019-20 (PART C)
FINAL YEAR BACHELOR OF TECHNOLOGY CIVIL ENGINEERING	RELEASE DATE	:	01/12/2018
	REVISION NO.	:	0.0

SEMESTER: VII

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC11	CV401	Drinking Water & Sanitary Engineering	3	2	4
2.	DE1	CV41#	Discipline Elective - Refer Annexure.	3	--	3
3.	OE3	CV42#	Open Elective - Refer Annexure.	3	2	4
4.	HSS7	HP401	Engineering Economics	2	--	2
5.	HSS9/ SDP7	HP403/ CV403	Business Strategies / Urban & Town Planning	--	2	1
6.	SDP8	CV402	Project - I	--	8	4
7.	SDP9	CV404	Summer Internship	--	--	4
TOTAL				11	14	22

SEMESTER: VIII (SLIP not Online with the Open elective)

SL. No.	COURSE TYPE	COURSE CODE	COURSE	TEACHING SCHEME		
				L	P	CREDIT
1.	DC12	CV431	Estimation & Costing	3	2	4
2.	DE2	CV44#	Discipline Elective - Refer Annexure	3	--	3
3.	SEMESTER LONG INTERNSHIP – Project Design				--	10	5
4.	SEMESTER LONG INTERNSHIP – Project Implementation				--	10	5
TOTAL				6	22	17

L: Lecture, P: Practical

@ - Courses run through institute LMS.

DEPARTMENT ELECTIVE ON MOOCS PLATFORM			
SR. NO.	COURSE DETAILS	MOOC DETAILS	NO. OF WEEKS
1.	Geotechnical Engineering II Foundation EngineeringBy Prof. Dilip Kumar Baidya, IIT KGP	SWAYAM	12
2.	Maintenance and Repair of Concrete Structuresby Prof. Radhakrishna G. Pillai, IIT Madras	SWAYAM	12
3.	Plastic Waste Managementby Prof. Brajesh Kumar Dubey, IIT KGP	SWAYAM	8
4.	Higher Surveying by Prof. Ajay Dashora, Behdad, IITG	COURSERA	12