1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

(Department Wise)

Academic Year: 2021-22

Course Code	Course Name	Programme	Factor addressed
202046	Technical English For Engineers	Mechanical Engineering Department	Human Values
202046	Entrepreneurship Development	Mechanical Engineering Department	Professional Ethics
202046	Developing soft skills and personality	Mechanical Engineering Department	Human Values and Professional Ethics
202046	Design Thinking	Mechanical Engineering Department	Human Values
202046	Foreign Language (preferably German/ Japanese)	Mechanical Engineering Department	Human Values
202046	Science, Technology and Society	Mechanical Engineering Department	Environment and Sustainability
202053	Language & Mind Emotional Intelligence	Mechanical Engineering Department	Human Values and Professional Ethics
202053	Advanced Foreign Language (preferably German/ Japanese)	Mechanical Engineering Department	Human Values
202053	Human Behaviour	Mechanical Engineering Department	Human Values and Professional Ethics
202053	Speaking Effectively	Mechanical Engineering Department	Human Values and Professional Ethics
202053	Business Ethics	Mechanical Engineering Department	Human Values
202053	Technical writing/ Research writing	Mechanical Engineering Department	Human Values
302047	Skill Development	Mechanical Engineering Department	Human Values and Professional Ethics

1.3.1List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

402044 C	Heating Ventilation and Air Conditioning	Mechanical Engineering Department	Environment and Sustainability
402049 B	Industrial Engineering	Mechanical Engineering Department	Professional Ethics
402050 B	Solar & Wind Energy	Mechanical Engineering Department	Environment and Sustainability

MECHANICAL ENGINEERING DEPARTMENT

Academic Year:-2021-2022



Savitribai Phule Pune University Board of Studies - Automobile and Mechanical Engineering Undergraduate Program - Automobile Engineering & Mechanical Engineering (2019 pattern)

Course	Course Name	Teaching Scheme (Hours/ Week)			Examination Scheme and Marks							Credit		
Code	Course manie	HT	PR	TUT	ISE	ESE	МТ	PR	OR	TOTAL	ΗT	PR	TUT	TOTAL
	Semester-	Π												
202041	Solid Mechanics	4	2	-	30	70	-	50	-	150	4	1	-	5
202042	Solid Modeling and Drafting	3	2	-	30	70	-	50	-	150	3	1	-	4
202043	Engineering Thermodynamics	3	2	-	30	70	-	-	25	125	3	1	-	4
202044	Engineering Materials and Metallurgy	3	2	-	30	70	25	-	-	125	3	1	-	4
203156	Electrical and Electronics Engineering	3	2	-	30	70	25	-	-	125	3	1	-	4
202045	Geometric Dimensioning and Tolerancing Lab	-	2	-	-	-	25	-	-	25	-	1	-	1
202046	Audit Course - III	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	16	12	-	150	350	75	100	25	700	16	6	-	22
	Semester-	IV	1	1										
207002	Engineering Mathematics - III	3	-	1	30	70	25	-	-	125	3	-	1	4
202047	Kinematics of Machinery	3	2	-	30	70	-	-	25	125	3	1	-	4
202048	Applied Thermodynamics	3	2	-	30	70	-	-	25	125	3	1	-	4
202049	Fluid Mechanics	3	2	-	30	70	-	-	25	125	3	1	-	4
202050	Manufacturing Processes	3	-	-	30	70	-	-	-	100	3	-	-	3
202051	Machine Shop	-	2	-	-	-	50	-	-	50	-	1	-	1
202052	Project Based Learning - II	-	4	-	-	-	50	-	-	50	-	2		2
202053	Audit Course - IV	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	15	12	1	150	350	125	-	75	700	15	6	1	22

Abbreviations: TH: Theory, PR: Practical, TUT: Tutorial, ISE: In-Semester Exam, ESE: End-Semester Exam, TW: Term Work, OR: Oral

Note: Interested students of SE (Automobile Engineering and Mechanical Engineering) can opt for any one of the audit course from the list of audit courses prescribed by BoS (Automobile and Mechanical Engineering)

Instructions

- Practical/Tutorial must be conducted in three batches per division only.
- Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
- Assessment of tutorial work has to be carried out as a term-work examination. Term-work Examination at second year of engineering course shall be internal continuous assessment only.
- Project based learning (PBL) requires continuous mentoring by faculty throughout the semester for successful completion of the tasks selected by the students per batch. While assigning the teaching workload of 2 Hrs/week/batch needs to be considered for the faculty involved. The Batch needs to be divided into sub-groups of 5 to 6 students. Assignments / activities / models/ projects etc. under project based learning is carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester.
- Audit course is mandatory but non-credit course. Examination has to be conducted at the end of Semesters for award of grade at institute level. Grade awarded for audit course shall not be calculated for grade point & CGPA.

	202046 - Audit Course - III	
Teaching Scheme	Credits	Examination Scheme
-	-	-

GUIDELINES FOR CONDUCTION OF AUDIT COURSE

Faculty mentor shall be allotted for individual courses and he/she shall monitor the progress for successful accomplishment of the course. Such monitoring is necessary for ensuring that the concept of self learning is being pursued by the students 'in true letter and spirit'.

- If any course through Swayam/ NPTEL/ virtual platform is selected the minimum duration shall be of 8 weeks.
- However if any of the course duration is less than the desired (8 weeks) the mentor shall ensure that other activities in form of assignments, quizzes, group discussion etc. (allied with the course) for the balance duration should be undertaken.

In addition to credits courses, it is mandatory that there should be an audit course (non-credit course) from second year of Engineering. The student will be awarded grade as AP on successful completion of the audit course. The student may opt for any one of the audit courses in each semester. Such audit courses can help the student to get awareness of different issues which make an impact on human lives and enhance their skill sets to improve their employability. List of audit courses offered in the semester is provided in the curriculum. Students can choose one of the audit courses from the list of courses mentioned. Evaluation of the audit course will be done at institute level.

The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not considered in the calculation of the performance indices SGPA and CGPA. Evaluation of the audit course will be done at institute level itself.

Selecting an Audit Course List of Courses to be opted (Any one) under Audit Course III

- Technical English For Engineers
- Entrepreneurship Development
- Developing soft skills and personality
- Design Thinking
- Foreign Language (preferably German/ Japanese)
- Science, Technology and Society

The titles indicated above are subject to change in time to come and such an alteration (if any) should be brought to the notice of the BoS.

Using NPTEL Platform: (preferable)

NPTEL is an initiative by MHRD to enhance learning effectiveness in the field of technical education by developing curriculum based video courses and web based e-courses. The details of NPTEL courses are available on its official website www.nptel.ac.in

- Students can select any one of the courses mentioned above and has to register for the corresponding online course available on the NPTEL platform as an Audit course.
- Once the course is completed the student can appear for the examination as per the guidelines on the NPTEL portal.
- After clearing the examination successfully; student will be awarded with a certificate.

Assessment of an Audit Course

- The assessment of the course will be done at the institute level. The institute has to maintain the record of the various audit courses opted by the students. The audit course opted by the students could be interdisciplinary.
- During the course students will be submitting the online assignments. A copy of the same can be submitted as a part of term work for the corresponding Audit course.
- On the satisfactory submission of assignments, the institute can mark as "Present" and the student will be awarded the grade AP on the marksheet.

202053 - Audit Course - IV										
Teaching Scheme	Credits	Examination Scheme								
	_	_								

GUIDELINES FOR CONDUCTION OF AUDIT COURSE

Faculty mentor shall be allotted for individual courses and he/she shall monitor the progress for successful accomplishment of the course. Such monitoring is necessary for ensuring that the concept of self learning is being pursued by the students 'in true letter and spirit'.

- If any course through Swayam/ NPTEL/ virtual platform is selected the minimum duration shall be of 8 weeks.
- However if any of the course duration is less than the desired (8 weeks) the mentor shall ensure that other activities in form of assignments, quizzes, group discussion etc. (allied with the course) for the balance duration should be undertaken.

In addition to credits courses, it is mandatory that there should be an audit course (non-credit course) from second year of Engineering. The student will be awarded grade as AP on successful completion of the audit course. The student may opt for any one of the audit courses in each semester. Such audit courses can help the student to get awareness of different issues which make an impact on human lives and enhance their skill sets to improve their employability. List of audit courses from the list of courses mentioned. Evaluation of the audit course will be done at institute level.

The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not considered in the calculation of the performance indices SGPA and CGPA. Evaluation of the audit course will be done at institute level itself.

Selecting an Audit Course

List of Courses to be opted (Any one) under Audit Course IV

- Language & Mind Emotional Intelligence
- Advanced Foreign Language (preferably German/ Japanese)
- Human Behaviour
- Speaking Effectively
- Business Ethics
- Technical writing/ Research writing

The titles indicated above are subject to change in time to come and such an alteration (if any) should be brought to the notice of the BoS.

Using NPTEL Platform: (preferable)

NPTEL is an initiative by MHRD to enhance learning effectiveness in the field of technical education by developing curriculum based video courses and web based e-courses. The details of NPTEL courses are available on its official website www.nptel.ac.in

- Students can select any one of the courses mentioned above and has to register for the corresponding online course available on the NPTEL platform as an Audit course.
- Once the course is completed the student can appear for the examination as per the guidelines on the NPTEL portal.
- After clearing the examination successfully; student will be awarded with a certificate.

Assessment of an Audit Course

- The assessment of the course will be done at the institute level. The institute has to maintain the record of the various audit courses opted by the students. The audit course opted by the students could be interdisciplinary.
- During the course students will be submitting the online assignments. A copy of the same can be submitted as a part of term work for the corresponding Audit course.
- On the satisfactory submission of assignments, the institute can mark as "Present" and the student will be awarded the grade AP on the mark sheet.



Savitribai Phule Pune University Board of Studies - Automobile and Mechanical Engineering Undergraduate Program - Mechanical Engineering (2019 pattern)

Course	Course Norma				ing ne eek)	Examination Scheme and Marks					Credit				
Code						ISE	ESE	$\mathbf{T}\mathbf{W}$	PR	OR	Total	TH	PR	TUT	Total
		Semest	ter-`	V											
<u>302041</u>	Nume	erical & Statistical Methods	3	-	1	30	70	25	-	-	125	3	-	1	4
302042	Heat	& Mass Transfer	3	2	-	30	70	-	50	-	150	3	1	-	4
<u>302043</u>	Desig	n of Machine Elements	3	2	-	30	70	-	-	25	125	3	1	-	4
302044	Mech	atronics	3	2	-	30	70	-	-	25	125	3	1	-	4
<u>302045</u>	Electi	ive I	3	-	-	30	70	-	-	-	100	3	-	-	3
<u>302046</u>	Digita	-	2	-	-	-	50	-	-	50	-	1	-	1	
<u>302047</u>	Skill	Development	-	2	-	-	-	25	-	-	25	-	1	-	1
<u>302048</u>	Audit	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total					1	150	350	100	50	50	700	15	5	1	21
		Semest	er-V	/Ι	•				r.	r.				r	
<u>302049</u>	Artific	cial Intelligence & Machine Learning	3	2	-	30	70	-	-	25	125	3	1	-	4
<u>302050</u>	Comp	outer Aided Engineering	3	2	-	30	70	-	50	-	150	3	1	-	4
302051	Desig	n of Transmission Systems	3	2	-	30	70	-	-	25	125	3	1	-	4
302052	Electi	ive II	3	-	-	30	70	-	-	-	100	3	-	-	3
<u>302053</u>	Meas	urement Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
<u>302054</u>	Fluid	Power &Control Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
302055 Internship/Mini project *				4	-	-	-	100	-	-	100	-	4	-	4
<u>302056</u> Audit course - VI ^{\$}				-	-	-	-	-	-	-	-	-	-	-	-
		Total	12	14	-	120	280	200	50	50	700	12	9	-	21
Elective-I								El	lecti	ve-I	Ι				
<u>302045</u>	5- <u>A</u>	Advanced Forming & Joining Proces	ses	<u>302052-A</u> Composite Materials											
302045	5- <u>B</u>	Machining Science & Technology		30)205	2-B		Surfa	ce E	ngir	neerii	ng			

Abbreviations: TH: Theory, PR: Practical, TUT: Tutorial, ISE: In-Semester Exam, ESE: End-Semester Exam, TW: Term Work, OR: Oral

Note: Interested students of TE (Automobile Engineering and Mechanical Engineering) can opt for any one of the audit course from the list of audit courses prescribed by BOS (Automobile and Mechanical Engineering)

Instructions:

- Practical/Tutorial must be conducted in FOUR batches per division only.
- Minimum number of Experiments/Assignments in PR/Tutorial shall be carried out **as mentioned in the syllabi** of respective courses.
- Assessment of tutorial work has to be carried out similar to term-work. The Grade cum marks for Tutorial and Term-work shall be awarded on the basis of **continuous evaluation**.
- ^{\$}Audit course is mandatory but non-credit course. Examination has to be conducted at the end of Semesters for award of grade at institute level. Grade awarded for audit course shall not be calculated for grade point & CGPA.

302047: Skill Development											
Teaching	Scheme	Cred	its	Examina	tion Scheme						
Practical	2 Hrs./Week	Practical	1	TW	25 Marks						
Prerequisites:	Students shoul	d have knowle	edge of Con	nstruction and wor	king of IC engine /						
compressor / ge	ear box / centrifu	ıgal pump/tail s	stock. Worki	ng principles of any	y type of mechanism /						
power plants. Working of electric and hydraulic systems of 4 wheeler vehicle. Working of machine											
tools, engine and transmission of different automotive and home appliances. Advanced											
manufacturing	processes. Solid	mechanics and	design of ma	achine elements.							
Course Object	ives:										
1. INTRO	DUCE the skill	s required in a	n industry s	uch as design, deve	elopment, assembly &						
disassen	nbly.										
2. DEVEL	OP the skills r	equired for fat	ilt diagnose	of engine and trar	smission of different						
3 ESTAB	LISH the skills	required for ma	s. intenance of	any machine tool							
4. CREAT	\mathbf{E} awareness ab	out industrial er	nvironment.	any machine tool.							
Course Outcor	nes:										
On completion	of the course, le	arner will be ab	le to								
CO1.APPL	Y& DEMONS	FRATE proced	ure of assem	bly & disassembly	of various machines.						
CO2.DESI	GN & DEVELO)P a working/m	odel of mac	hine parts or any ne	w product.						
CO3.EVAL	UATE fault wit	h diagnosis on	the machine	s, machine tools and	d home appliances.						
CO4.IDEN	TIFY & DEMO	DNSTRATE th	e various ac	tivities performed	in an industry such as						
	chance, design 0.	Cour	se Contents								
1 Assemb	ly and Disassem	bly of any of th	e following	mechanical system	s/ subsystems: bicycle						
(geared)	. e-Bikes, e-Mo	tor Cycles. Dro	nes. Flving	devices, gear box. I	C engines, centrifugal						
pump et	c.	5	, , , ,								
2. Assemb	ly- Disassembly	/ Fault diagnosi	s of home a	opliances such as m	ixer, grinder, washing						
machine	e, fan, ovens, ga	s geyser, chopp	ping machin	e, kneading machin	e, exercise machines,						
etc.	mont and domain	atuation of war	lzin a /animat	ion model of only m	achanian						
3. Develop	a circuit of elect	istration of wor	c system of	wheelers and its ve	erification						
		ie und nydrudn	OR	wheelers and its v							
Circuit	design /PCB de	sign using soft	ware for cor	ntrol of BLDC elec	tric motors used in e-						
Vehicles	5.										
5. Underta	ke total preventi	ve maintenance	for any mad	chine tool or mechan	nical system.						
$\begin{array}{ccc} \text{o. V1S1t to} \\ 7 & \text{Use of } \end{array}$	an industry for a	wareness about	preventive provide sign of hand	tools control in a	tomobile dashboards						
human c	operated mobile	devices.	sign of hallu		nomoune dashibuarus,						
	-										

Savitribai Phule Pune University



Faculty of Science and Technology

Syllabus for Final Year of Mechanical Engineering

(Course 2015)

Savitribai Phule Pune University

Code	Subject	Teaching Scheme Hrs / week				Exami	nation S	Scheme	Total	Credits		
Code		Lecture	Tut	Pract	In Sem	End Sem	TW	PR	OR	Marks	Theory	TW/ Pr/OR
402041	Hydraulics and Pneumatics	3	-	2	30	70	25	-	25	150	3	1
402042	CAD CAM Automation	3	-	2	30	70	25	50	-	175	3	1
402043	Dynamics of Machinery	4	-	2	30	70	25	-	25	150	4	1
402044	Elective-I	3	-	2	30	70	25	-	-	125	3	1
402045	Elective-II	3	-	-	30	70	-	-	-	100	3	-
402046	Project-I	-	-	4	-	-	25	-	25	50	-	2
Total		16	-	12	150	350	125	50	75	750	16 2	6 2

B. E. (Mechanical) (2015 Course) Semester – I

B. E. (Mechanical) (2015 Course) Semester – II

Code	Subject	Teaching Scheme Hrs / week]	Examinatio	on Schei	Total	Credits			
Code		Lecture	Tut	Pract	In Sem	End Sem	TW	PR	OR	Marks	Theory	TW/ Pr/OR
402047	Energy Engineering	3	-	2	30	70	25	-	25	150	3	1
402048	Mechanical System Design	4	-	2	30 (1.5 Hrs)	70 (3 Hrs)	25	-	50	175	4	1
402049	Elective-III	3	-	2	30	70	25	-	-	125	3	1
402050	Elective-IV	3	-	-	30	70	-	-	-	100	3	-
402051	Project-II	-	-	12	-	-	100	-	100	200	-	6
	Total	13	-	18	120	280	175	-	175	750	13 2	9 2

	Elective – I	Elective – II			
Code	Subject	Code	Subject		
402044 A	Finite Element Analysis	402045 A	Automobile Engineering		
402044 B	Computational Fluid Dynamics	402045 B	Operation Research		
402044 C	Heating Ventilation and Air Conditioning	402045 C	Energy Audit and Management		
		402045 D	Open Elective**		

	Elective – III	Elective – IV				
402049 A	Tribology	402050 A	Advanced Manufacturing Processes			
402049 B	Industrial Engineering	402050 B	Solar & Wind Energy			
402049 C	Robotics	402050 C	Product Design and Development			
		402050 D	Open Elective**			

**: Open Elective – Board of studies (BoS) – Mechanical and Automobile Engineering will declare the list of subjects, which can be taken under open electives or any other Electives that are being taught in the current semester, to the same level, as Elective – II and Elective -IV under engineering faculty in the individual college and Industry can define new elective subject with proper syllabus using defined framework of Elective II and Elective IV and *get it approved from board of studies and other necessary statutory systems in the Savitribai Phule Pune University, Pune, before 30th November of previous academic year in which the subject to be introduced. Without prior approval from University statutory system, no one can introduce the open elective in curriculum.*

Savitribai Phule Pune University Final Year of Mechanical Engineering (2015 Course)

Course Code : 402044 C

Course Name : Elective – I

Heating, Ventilation, Air Conditioning and Refrigeration Engineering

Teaching Scheme:		Cred	lits			Exan	nination	Scheme:
Theory	: 03 Hrs Per Week	ТН	:03	Theory	In-Sem	: 30	PR	:
Practical	: 02 hrs per week	TW	:01		End-Sem	: 70	OR	:
							тw	: 25

Pre-requisites: Thermodynamics I and II, Refrigeration and Air Conditioning

Course Objectives:

- To understand the recent vapour compression cycle
- To provide the knowledge of analyze thermal design of refrigeration system components
- To understand practical aspects of vapour compression system
- To provide the knowledge of basic concepts of ventilation, infiltration and space distribution techniques
- To inculcate techniques of estimating building envelop load.
- To understand the working non-conventional air-conditioning systems.

Course Outcomes:

On completion of the course, students will be able to -

- Determine the performance parameters of trans-critical & ejector refrigeration systems
- Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
- Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
- Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
- Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope.
- Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

Course Contents

Unit 1: Advanced Vapour Compression Cycles

Review of vapour compression cycle, Trans-critical cycle and their types retical treatment) Ejector refrigeration cycle and their types. Presentation of cycle on P-h and T-s chart.

Unit 2: Thermal Design of Refrigeration System Components

<u>Compressor</u> : Characteristic curves of reciprocating & Centrifugal compressors, sizing of reciprocating compressor

Evaporator : Standards & Codes, Performance analysis of Dx evaporator,

<u>Condenser</u>: Standards & Codes, air-cooled condenser, shell & tube condenser and evaporative condenser.

4 Hrs

8 Hrs

Expansion Devices : Standards & Codes, Operating Characteristics, Liquid Charge in the Sensing Bulb , Hunting of Thermostatic Expansion Valve

<u>Cooling Tower</u>: Types & design of cooling towers, cooling tower thermal performance, tower efficiency.

Unit 3: Practical Aspects of Vapour Compression System

<u>Refrigerant Piping</u> : Copper Tubing, Piping Design for Reciprocating Refrigeration Systems, Size of Copper Tube, Refrigeration Load, and Pressure Drop, Sizing Procedure, Suction Line, Discharge Line (Hot-Gas Line), Liquid Line

Capacity Controls : Capacity Controls of reciprocating, centrifugal and scroll compressors

<u>Safety Controls</u>: Low-Pressure and High-Pressure Controls. Low-Temperature Control, Frost Control, Oil Pressure Failure Control. Motor Overload Control.

Vapour compression system balance: Performance characteristics of the condensing unit & compressor-capillary tube.

Unit 4: Ventilation and Infiltration

Indoor Design Criteria and Thermal Comfort: Basic parameters, factors affecting thermal comforts, Comfort-Discomfort Diagrams, Indoor Temperature, Relative Humidity, and Air Velocity

Indoor Air Quality : Indoor Air Contaminants, Basic Strategies to Improve Indoor Air Quality,

<u>Outdoor Design Conditions</u> : Outdoor Air Requirements for Occupants, The Use of Outdoor Weather Data in Design, Outdoor Weather Characteristics and Their Influence

<u>Ventilation for cooling</u> : Natural ventilation, mechanical ventilation

<u>Space air distribution</u>: Design of air distribution systems, Types of air distribution devices: Airflow patterns inside conditioned space: Stratified mixing flow: Cold air distribution: Displacement flow: <u>Spot cooling / heating</u>: Selection of supply air outlets.

Unit 5: Heat Load Estimation in Building Structures

Solar radiation, Heat gain through fenestrations, Space load characteristics, cooling load and coil load calculations, Overall heat transmission coefficient, air spaces, sol-air temperature, Decrement factor & time lag method,, Cooling load Temperature Difference method (CLTD) or Equivalent Temperature Differential (ETD), detailed calculation procedure using CLTD method, Total heat balance.

Energy-efficient and cost-effective measures for building envelope, Concept of ECBC

Unit 6: Advanced Air-conditioning Systems

<u>Desiccant-Based Air Conditioning Systems</u> : Introduction, Sorbents & Desiccants, Dehumidification, Liquid Spray Tower, Solid Packed Tower, Rotary Desiccant Dehumidifiers, Hybrid Cycles, Solid Desiccant Air-Conditioning (Theoretical treatment)

Evaporative-Cooling Air Conditioning Systems, Thermal Storage Air Conditioning Systems, Clean-Room Air Conditioning Systems, Radiant cooling. (Theoretical treatment)

Heat Pump Systems: Heat Pump Cycle, different heats pump Circuits.

Books

Text :

- 1. Arora R.C., Refrigeration and Air Conditioning, PHI, India
- 2. Dossat Ray J., Principal of Refrigeration, Pearson, India
- 3. Arora C P, Refrigeration and Air Conditioning, Tata McGraw Hill

6 Hrs

6 Hrs

6 Hrs

6 Hrs

4. Manohar Prasad, Refrigeration and Air-conditioning, Wiley Eastern Limited, 1983

References :

- 1. Threlkeld J.L., Thermal Environmental Engineering, Prentice Hall Inc. New Delhi
- 2. ASHRAE Handbook (HVAC Equipments)
- 3. Stocker W.F. and Jones J.W., Refrigeration and Air-conditioning, McGraw Hill International editions 1982.
- 4. Roger Legg, Air conditioning systems: Design, Commissioning and maintenance
- 5. Shan Wang, Handbook of Refrigeration and Air Conditioning, McGrawHill Publications
- 6. Wilbert Stocker, Industrial Refrigeration, McGrawHill Publications
- 7. Keith Harold, Absorption chillers and Heat Pumps, McGrawHill publications
- 8. ASHRAE, Air Conditioning System Design Manual, IInd edition, ASHRAE.

Term Work shall consist of following assignments:

- 1. Performance Simulation of Central Air-conditioning plant using Newton Raphson Method.
- 2. Performance analysis of Counter flow or cross flow cooling tower
- 3. Building heat load simulation using suitable software (Trace 700, Energy plus etc.)
- 4. Design of cold storage with process layout.

Savitribai Phule Pune University Final Year of Mechanical Engineering (2015 Course)

Course Code : 402049 B

Course Name : Elective – III Industrial Engineering

Teaching S	Cred	lits	Examination Schem							
Theory	: 03 Hrs Per Week	ТН	:03	Theory	In-Sem	: 30	PR	:		
Practical	: 02 hrs per week	TW	:01		End-Sem	: 70	OR	:		
				- -			тw	· 25		

Pre-requisites: NIL

Course Objectives:

- To introduce the concepts, principles and framework of contents of Industrial Engineering.
- To acquaint the students with various productivity enhancement techniques.
- To acquaint the students with different aspects of Production Planning and Control and Facility Design.
- To introduce the concepts of various cost accounting and financial management practices as applied in industries.
- To acquaint the students with different aspects of Human Resource activities and Industrial Safety rules.
- To acquaint students with different aspect of simulation modeling for various industrial engineering/applications.

Course Outcomes:

On completion of the course, students will be able to -

- Apply the Industrial Engineering concept
- Understand, analyze and implement different concepts involved in method study.
- Design and Develop different aspects of work system and facilities.
- Understand and Apply Industrial safety standards, financial management practices.
- Undertake project work based on modeling & simulation area.

Course Contents

Unit 1: Introduction to Industrial Engineering and Productivity

Definition and Role of Industrial Engineering, Types of production systems and organization structure, Functions of management.

<u>Measurement of productivity</u>: Factors affecting the productivity, Productivity Models and Index (Numerical), Productivity improvement techniques.

<u>Note</u>: Productivity improvement techniques viz. 5S, Kaizen, TPS, KANBAN, JIT, etc. shall be discussed at the end of this Unit.

6 Hrs

Unit 2: Method Study

Work Study: Definition, objective and scope of work-study, Human factors in work-study.

<u>Method Study</u>: Definition, objective and scope of method study, work content, activity recording and exam aids.

<u>Charts to record movements</u>: Operation process charts, flow process charts, travel chart, two-handed chart and multiple activity charts. Principles of motion economy, classification of movements, SIMO chart, and micro motion study.

Definition and installation of the improved method, brief concept about synthetic motion studies. Introduction to Value Engineering and Value Analysis.

Unit 3: Work Measurements

Work Measurements: Definition, objectives and uses, Work measurement techniques.

Work Sampling: Need, confidence levels, sample size determinations, random observation, conducting study with the simple problems.

<u>Time Study</u>: Definition, time study equipment, selection of job, steps in time study. Breaking jobs into elements, recording information, Rating and standard rating, standard performance, scales of rating, factors affecting rate of working, allowances and standard time determination.

Introduction to PMTS and MTM: (Numerical), Introduction to MOST.

Unit 4: Production Planning and Control

Introduction: Types of production systems, Need and functions of PPC, Aggregate production planning.

Capacity Planning, ERP: Modules, Master Production Schedule, MRP and MRP-II.

Forecasting Techniques: Causal and time series models, moving average, exponential smoothing, trend and seasonality (Numerical), Demand Control strategies (MTO, MTA, MTS).

Introduction to Supply Chain Management: Basic terminologies.

Unit 5: Facility Design

Plant Location : Need and factors influencing plant location,

<u>*Plant Layout*</u>: Objectives, principles, types of plant layouts, Introduction to Assembly Line Balancing and Layout parameters to evaluate.

<u>Material Handling</u>: Objectives, relation with plant layout, principles. Types and purpose of different material handling equipment, Selection of material handling equipment.

Inventory control and Management: Types of inventories, Need of inventories, terminology, costs, Inventory Models: Basic production models, (with and without shortage and discount), ABC, VED Analysis.

Unit 6: Engineering Economy, Human Resource and Industrial Safety

Introduction to Costing: Elements of Cost, Break-Even Analysis (Numerical).

Introduction to Debit and Credit Note, Financial Statements (Profit and loss account and Balance Sheet), Techniques for Evaluation of capital investments.

<u>Human Resource Development</u>: Functions: Manpower Planning, Recruitment, Selection, Training. Concept of KRA (Key Result Areas), Performance Appraisal (Self, Superior, Peer, 3600). Industrial Safety: Safety Organization, Safety Program

6 Hrs

6 Hrs

6 Hrs

6 Hrs

6 Hrs

Books

Text :

- 1. M Mahajan, Industrial Engineering and Production Management, Dhanpat Rai and Co.
- 2. O. P. Khanna, Industrial engineering and management, Dhanpat Rai publication
- 3. Martend Telsang, Industrial Engineering, S. Chand Publication.
- 4. Banga and Sharma, Industrial Organization & Engineering Economics, Khanna publication.

References :

- 1. Introduction to Work Study by ILO, ISBN 978-81-204-1718-2, Oxford & IBHPublishing Company, New Delhi, Second Indian Adaptation, 2008.
- 2. H. B. Maynard, K Jell, Maynard's Industrial Engineering Hand Book, McGraw Hill Education.
- 3. Askin, Design and Analysis of Lean Production System, Wiley, India
- 4. Zandin K.B., Most Work Measurement Systems, ISBN 0824709535, CRCPress, 2002
- 5. Martin Murry, SAP ERP: Functionality and Technical Configuration, SAP Press; 3rdNew edition (2010).
- 6. Barnes, Motion and time Study design and Measurement of Work, Wiley India
- 7. Raid Al-Aomar, Adwerd J Williams, Onur M. Uigen 'Process Simulation using WITNESS', Wiley

Term Work shall consist of following assignments:

- Minimum of 8 *Experiments* are compulsory from the following list of Experiments.
- Assignment number 1, 2, 3, 8 and 12 are compulsory.
- It is advisable that, students shall collect data by visiting suitable industry to complete following assignments (*Per batch of Max. 20 students*)
- For completing above assignments any suitable simulation software like WITNESS can be used
 - 1. Case study based Assignment on Method Study.
 - 2. Hands on Assignment on application of Work Measurement technique(s).
 - 3. Assignment on simulation of Routing & Scheduling Model
 - 4. Assignment on simulation of Manufacturing System / Service System Operations for demand forecasting of the given product using any two methods.
 - 5. Assignment on simulation determination of EOQ and plot the graphs.
 - 6. Assignment on analysis of Manufacturing / Service Operation for Capacity Planning.
 - 7. Case study based assignment on supply chain model.
 - 8. Assignment on analysis of (selected) plant layout modeling and simulation for bottleneck / line balancing.
 - 9. Assignment on analysis of material handling system modeling simulation for the selected plant layout.
 - 10. Case study based assignment on identification of Key Result Areas for performance appraisal for selected company (3600 feedback).
 - 11. Case study based assignment on cost-revenue model analysis.
 - 12. Assignment on industrial safety audit of selected work environment.

Savitribai Phule Pune University Final Year of Mechanical Engineering (2015 Course)

Course Code : 402050 B

$Course \ Name: Elective-IV$

Solar and Wind Energy

Teaching S	Cred	lits	Examination Schem							
Theory	: 03 Hrs Per Week	ТН	:03	Theory	In-Sem	: 30	PR	:		
Practical	:	TW	:		End-Sem	: 70	OR	:		
							тw	:		

Pre-requisites: Basic Mechanical Engineering, Basic Electrical and Electronics Engineering and
Heat Transfer

Course Objectives:

- To understand fundamentals of solar and wind energies.
- To understand constructions, working principle and design procedure of solar and wind power plants.
- To apply basic engineering principle to design a simple solar and wind power system.

Course Outcomes:

On completion of the course, students will be able to -

- Design of solar food drier for domestic purpose referring existing system
- Design of parabolic dish solar cooker for domestic purpose referring existing system
- Design of solar photovoltaic system for domestic purpose referring existing system
- Design miniature wind mill for domestic purpose referring existing system

Course Contents

Unit 1: Solar Energy Principles

Present solar energy scenario, world energy futures, governing bodies (self-study), solar radiations and its measurements, solar constant, solar radiation geometry, solar radiation data, estimation of average solar radiation, solar radiation on tilted surface.

Unit 2: Solar Thermal Systems and Applications

Types of Solar thermal collector, flat plate collector analysis, Evacuated tube collectors (ETC) analysis, its design and application, solar air heaters and its types, solar distillation.

Solar Concentrating collectors: types- line and point concentrator, theory of Concentrating collectors, parabolic trough collector, parabolic dish collector, solar tower, concentrated Fresnel linear receiver (CFLR).

Unit 3: Solar Photovoltaic and Applications

Forming the PN junction solar cells & its applications, Structure of a solar cell, types of modules, PV array, solar cell equation, Fill factor and maximum power, Grid aspects of solar power, equipment used in solar photovoltaic plants, Power Conditioning Equipment-inverters, Regulators, Other Devices; System Analysis-Design Procedure, Design Constraints, Other Considerations.

6 Hrs

8 Hrs

6 Hrs

Unit 4: Case Study on Solar Energy Applications

<u>Case study 1</u>: Design of solar food drier for domestic purpose referring existing system <u>Case study 2</u>: Design of parabolic dish solar cooker for domestic purpose referring existing system <u>Case study 3</u>: Design of solar photovoltaic system for domestic purpose referring existing system

Unit 5: Wind Energy

Principle of wind energy conversion; Basic components of wind energy conversion systems; various types and their constructional features; design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic forces acting on wind mill blades and estimation of power output; wind data and site selection considerations, wind energy potential and installation in India.

Unit 6: Case Study on Wind Mill Design

Case study on designing miniature wind mill for domestic purpose referring existing system.

Books

Text :

- 1. G. D. Rai, 'Non-Conventional Energy Sources', Khanna Publisher
- 2. S. P. Sukhatme, 'Solar Energy: Principles of thermal collections and storage', McGraw Hill
- 3. Tiwari G N. 'Solar Energy: Fundamentals, design, modeling and Applications', Narosa, 2002

References :

- 1. Mukund R. Patel, 'Wind And Solar Power Systems: Design, Analysis and Operation, Second Edition', CRC Press
- 2. Kreith And Kreider, Solar Energy Handbook, McGraw Hill
- 3. Ray Hunter, 'Wind Energy Conversion: From Theory to Practice', John Wiley and Son Ltd
- 4. Gary L Johnson, 'Wind Energy Systems', Prentice-Hall Inc., New Jersey
- 5. Martin O L Hansen, 'Aerodynamics of Wind Turbines', James & James/Earthscan.
- 6. Goswami D Y, Kreith F, Kreider J F, 'Principles of Solar Engineering', Taylor & Francis
- 7. Robert Gasch, 'Wind Power Plant Fundamentals, Design, Construction And Operations', Springer
- 8. C S Solanki, 'Solar Photovoltaic: Fundamentals, Technology And Applications', PHI Learning

8 Hrs

2 Hrs

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

Course	Course Name	Programme	Factor addressed			
Code						
210249	Business Communication Skills		Professional Ethics			
210250	Humanity and Social Science		Human Values			
	Green Construction and Design		Environment and Sustainability			
	Social Awareness and Governance		Human Values			
210251	Program					
	Environmental Studies		Environment and Sustainability			
	Smart Cities		Environment and Sustainability			
210258	Project Based Learning II		Professional Ethics			
210259	Code of Conduct		Professional Ethics			
	Water Management		Environment and Sustainability			
210260	Intellectual Property Rights and Patents		Human Values			
	The Science of Happiness		Human Values			
	Yoga and Meditation		Human Values			
310249	Seminar and Technical		Professional Ethics			
	Communication					
	Cyber Security	Computer	Professional Ethics			
	Professional Ethics and Etiquettes	computer	Professional Ethics			
	MOOC- Learn New Skills (Full stack		Professional Ethics			
310250	Developer)					
	Engineering Economics		Professional Ethics			
	Foreign Language (Japanese) Module 3		Professional Ethics			
310255	Internship		Professional Ethics			
	Digital and Social Media Marketing		Professional Ethics			
	Sustainable Energy Systems		Environment and Sustainability			
310259	Leadership and Personality		Professional Ethics			
	MOOC Loarn New Skills (DevOns)		Professional Ethics			
	Entrepreneurship Development		Professional Ethics			
	Industrial Safety and Environment		Environment and Sustainability			
410249	Consciousness					
	Emotional Intelligence		Human Values			
	Business Intelligence		Professional Ethics			
410257	Conversational Interfaces		Professional Ethics			

Department Of Computer Engineering

A.Y. 2021-22

Faculty of Science and Technology Savitribai Phule Pune University Maharashtra, India



Curriculum for

Second Year of Computer Engineering (2019 Course) (With effect from 2020-21)

http://unipune.ac.in/university_files/syllabi.htm

Savitribai Phule Pune University

Second Year of Computer Engineering (2019 Course)

(With effect from Academic Year 2020-21)

Semester-III														
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210241	Discrete Mathematics	03	-	-	30	70	-	-	-	100	03		-	03
210242	Fundamentals of Data Structures	03	-	-	30	70	-	-	-	100	03	-	-	03
210243	Object Oriented Programming (OOP)	03	-	-	30	70	-	-	-	100	03	-	-	03
210244	Computer Graphics	03	-	-	30	70	-	-	-	100	03	I	-	03
210245	Digital Electronics and Logic Design	03	-	-	30	70	-	-	-	100	03	-	-	03
210246	Data Structures Laboratory	-	04	-	-	-	25	50	-	75	-	02	-	02
210247	OOP and Computer Graphics Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
210248	Digital Electronics Laboratory	-	02	-	-	-	25	-	-	25	-	01	-	01
210249	Business Communication Skills	-	02	-	-	-	25	-	-	25	-	01	-	01
210250	Humanity and Social Science	-	-	01	-	-	25	-	-	25	-	-	01	01
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Savitribai Phule Pune University Second Year of Computer Engineering (2019 Course) 210249: Business Communication Skills

Teaching Scheme	Credit Scheme	Examination Scheme and Marks
Practical: 02 Hours/Week	01 ^{<u>\$</u>}	Term Work [§] : 25 Marks

Course Objectives:

- To facilitate Holistic growth ;
- To make the engineering students aware, about the importance, the role and the content of business communication skills ;
- To develop the ability of effective communication through individual and group activities;
- To expose students to right attitudinal and behavioural aspects and to build the same through various activities;

Course Outcomes:

On completion of the course, learner will be able to-

- **CO1:** Express effectively through verbal/oral communication and improve listening skills
- **CO2:** Write precise briefs or reports and technical documents.
- **CO3: Prepare** for group discussion / meetings / interviews and presentations.
- **CO4:** Explore goal/target setting, self-motivation and practicing creative thinking.
- **CO5: Operate** effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities.

Guidelines for Instructor's Manual

The instructor's manual is to be developed as a hands-on resource and reference. The instructor's manual needs to include prologue (about University/program/ institute/ department/foreword/preface), curriculum of course, conduction and Assessment guidelines, topics under consideration concept objectives, outcomes, guidelines, references.

Guidelines for Student's Laboratory Journal and Term Work Assessment

The student must prepare the journal in the form of report elaborating the activities performed. Continuous assessment of laboratory work is to be done based on overall performance and performance of student at each assignments. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage.

Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion of assignment, performance, punctuality, neatness, enthusiasm, participation and contribution in various activities- SWOT analysis, presentations, team activity, event management, group discussion, Group exercises and interpersonal skills and similar other activities/assignments and Well presented, timely and complete report.

Recommended Assessment and Weightage Parameters:

(Attendance 30%, Assignments/activities-Active participation and proactive learning 50% and report 20%)

Students must submit the report of all conducted activities conducted. The brief guidelines for report preparations are as follows:

1. One activity report must be of maximum 3 pages;

2. Combined Report of all activities with cover pages, table of contents and certificate (signed by instructor) is to be submitted in soft copy (pdf) format only.

3. The report must contain:

- General information about the activity;
- Define the purpose of the activity;
- Detail out the activities carried out during the visit in chronological order;
- Summarize the operations / process (methods) during the activities;
- Describe what you learned (outcomes) during the activities as a student;



Guidelines for Laboratory Conduction

The instructor may frame assignments to enhance skills supporting career aspects. Multiple set of activity based assignments can be prepared and distributed among batches.

Every student must be given adequate opportunity to participate actively in each activity. An exercise can be designed to allow multiple skills exposure for example a group task encouraging discussions, team building, value sharing, leadership and role play all at the same time.

MOOC at Swayam: ^s									
https://s	wayam.gov.in/nd2_imb19_mg14/preview								
Virtual	Laboratory:								
•	nttps://ve-iitg.vlabs.ac.in/								
Sr. No.	Suggested List of Laboratory Experiments/Assignments								
1	SWOT analysis The students should be made aware of their goals, strengths and weaknesses, attitude, moral values, self-confidence, etiquettes, non-verbal skills, achievements. through this activity. SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self-esteem. The concern teacher should prepare a questionnaire which evaluate students in all the above areas and make them aware about these aspects								
2	Personal and Career Goal setting – Short term and Long term The teacher should explain to them on how to set goals and provide template to write their short term and long term goals.								
3	 Public Speaking Any one of the following activities may be conducted : 1. Prepared speech (Topics are given in advance, students get 10 minutes to prepare the speech and 5 minutes to deliver.) 2. Extempore speech (Students deliver speeches spontaneously for 5 minutes each on a given topic) 3. Story telling (Each student narrates a fictional or real life story for 5 minutes each) 4. Oral review (Each student orally presents a review on a story or a book read by them) 								
4	Reading and Listening skills The batch can be divided into pairs. Each pair will be given an article (any topic) by the teacher. Each pair would come on the stage and read aloud the article one by one. After reading by each pair, the other students will be for correct answers and also for their reading skills. This will evaluate their reading and listening skills. The teacher should give them guidelines on improving their reading and listening skills. The teacher should also give passages asked questions on the article by the readers. Students will get marks on various topics to students for evaluating their reading comprehension.								
5	Group discussion Group discussions could be done for groups of 5-8 students at a time Two rounds of a GD for each group should be conducted and teacher should give them feedback.								
6	Letter/Application writing Each student will write one formal letter, and one application. The teacher should teach the students how to write the letter and application. The teacher should give proper format and layouts.								
7	Report writing The teacher should teach the students how to write report .The teacher should give proper format and layouts. Each student will write one report based on visit / project / business proposal.								
8	Resume writing- Guide students and instruct them to write resume								

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					<u> </u>	<u> </u>						-
9	Presentation Skill Students should make a presentation on any informative topic of their choice. The topic											
	may be technical or non-technical. The teacher should guide them on effective											
	presentation skills. Each student should make a presentation for at least 10 minutes.											
10	Team games for team building - Students should make to participate in team activity.											
11	Situational games for role playing as leaders											
12	Faculty may arrange one or more sessions from following:											
	Yoga a 	nd me	ditatio	n. Stre	ss man	ageme	nt, rela	axation	exerci	ses, an	d fitnes	s exercises.
12	Time management and personal planning sessions.											
13	IVIOCK II	ntervie	ws- gu	ide stu	dents a	na con	auct m	OCK INT	erviews	6		
14	Telephonic etiquettes -To teach students the skills to communicate effectively over the											
	phone.											
	phone call to enquire about job vacancy scheduling a meeting with team members											
	phone call for requesting of urgent leave from higher authorities. Students will be given											
	10 min to prepare. Assessment will be done on the basis of performance during the											
	telepho	one call	•									
15	Email e	tiquett	tes -To	provide	e stude	nts wit	h an in	-depth	unders	tanding	of emai	l skills.
	Studer	its will	be ma	de to s	end e-r	nails fo	or diffe	rent sit	uations	s such a	s sendir	ng an e-mail
·	to the	princip	al for a	a leave	, invitir	ng a fri	end fo	r a par	ty, e-m	ail to e	nquire	about room
	tariff of	t a hote	el. Stud	lents w	vill be a	ssesse	d on th	e basis	of e-m	nail such	i as clar	ity, purpose
	and pro	oot read	aing of	e-maii.			•					
				<u>@11</u>	ne CO.		appin	g iviat	<u>rix</u>			
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	2	1	-
CO3	-	-	-	-	-	-	-	-	2	-	-	1
CO4	-	-	-	-	-	-	-	-	-	2	-	2
CO5	-	-	-	-	-	-	-	-	3	-	-	2



Savitribai Phule Pune University Second Year of Computer Engineering (2019 Course)

210250: Humanity and Social Science

Teaching Scheme	Credit Scheme	Examination Scheme and Marks				
Tutorial: 01 Hours/Week	01 ^{<u>\$</u>}	Term work [§] :	25 Marks			

Course Objectives:

To enable the students to explore aspects of human society and to acquire the intellectual, communication skills and develop characteristics that encourages personal fulfilment, meaningful professional life and responsible citizenship.

- To facilitate Holistic growth;
- To Educate about Contemporary, National and International affairs;
- To bring awareness about the responsibility towards society.
- To give an insight about the emergence of Indian society and the relevance of Economics.

Course Outcomes:

On completion of the course, learner will be-

- **CO1:** Aware of the various issues concerning humans and society.
- **CO2:** Aware about their responsibilities towards society.
- **CO3:** Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
- **CO4:** Able to understand the nature of the individual and the relationship between self and the community.
- **CO5:** Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

Course Contents

Preamble:

As applied sciences, Engineering and Technology are meant to come up with effective solutions to social problems making it imperative that the present generation of engineers and technologists understand the society they live in. Studying the social sciences can provide individuals with crucial answers and observations that could certainly help in understanding of one's life which can alleviate social relations. A broad perspective of nationalistic thinking will provide the students with the ability to be socially conscientious, more resilient and open to building an inclusive society.

Experiencing real-life situations and complex scenarios that arise in each situation will help the budding professions to contribute their skills and knowledge to helping people improve and understand their behaviour or psychological processes. Understanding how the world works begins with an understanding of oneself and gaining hands-on experience and/or thinking about human values and ethics will help trigger a sense of responsibility among the students and lead them to finding effective solutions.

Course Structure: The tutorial sessions to be divided into 2 groups

- 1. Interactive Sessions to be conducted in classroom
- 2. Interactive Activities to be conducted Outside Classroom

MOOC/ Video Lectures available at^{\$}:

- https://nptel.ac.in/courses/109/103/109103023/
- https://nptel.ac.in/courses/109/107/109107131/
- Teachers will play the role of interventionists and instigating students to apply their thinking abilities on social concepts
- As facilitators and mentors teachers will coax the students to thinking out-of-the-box to come up with creative solutions
- Teachers should focus on instilling a sense of social consciousness through the activities conducted indoors and outdoors.



Change of Mindset

- Since the course deviates from technical subjects, students will have to be counseled into the importance of social sciences
- A background understanding of the importance of this course in their professional and personal life will have to be enumerated to the students
- Teachers will have to rationalize the course outcomes to get the students invested in the activities being conducted

Designing of Course

- Since students lack prior knowledge, it is imperative that the tutorials conducted be engaging in its activities
- Focus of the sessions should be the learning outcome of each activity conducted either in the class or outside the class
- All activities designed should be as close to real-life making them relatable and applicable
- Student-engagement should be a priority so that the knowledge internalized will be higher
- The activities chosen can be modified to cater to the college location and social context
- The learning should be focused on application of ethics and values during each activity
- The chosen sessions should cater to giving the students the opportunity to be involved and engaged in their role as contributors to society and the nation at large

Basic function of the tutor

 To present a holistic view of the curriculum and the role of this course in it and emphasizing the benefit of the sessions towards developing communications kills, critical thinking and problems solving

Grouping

- The class will be divided into groups of 20 students
- The blend of cultural and social diversity will enhance the learning at the end of each activity
- Teachers will have to be mentored to handle sensitive issues diplomatically while encouraging students to stand up for their beliefs
- The groups will have to have inter-personal sessions so that they get to understand their team members better and work cohesively
- Management support and encouragement to engage students in life-enriching experiences is important

Assessment of Learning

- It is important for tutors to make sure that assessment is consistent with learning objectives of each activity
- Assessment of students should be focused on the students' ability to internalize the learning
- Tutors need to understand meaningful ways of assessing students' work to motivate learning

Interactive Sessions to be conducted during Tutorial (in classroom)

- 1. PREPARED SPEECH ON CURRENT AFFAIRS
 - a. Purpose Get students to stay abreast and invested in national current affairs
 - b. Method Each student has to read an editorial from any national paper (English), find out more information on the topic and present it to the class; ending the session with his/her opinion on the matter
 - c. Outcome Awareness of national state of affairs. Improve on oratory skills. Instil the thinking and contemplative skills and form non-judgmental opinions about an issue
- 2. UNDERSTANDING INDIA'S CULTURAL DIVERSITY
 - a. Purpose Expose students to the intricacies of Indian cultural across various states
 - b. Method Each student (or a small group of students in case the number of students is large) has to pick a state and come to the tutorial session prepared with a PPT that will showcase the demographic, sociographic and cultural information of that state
 - **c.** Outcome Information about the beauty of Indian cultural diversity. Enhance exploratory skill, communication skills and learn to present using technological tools.



- 3. WRITING AN ARTICLE ON ANY SOCIAL ISSUE
 - a. Purpose Highlight various social and cultural evil malevolence existing in our country and express one's opinion on how it can be changed
 - b. Method Each student will have to write a 200 word essay on any of existing social malice that is prevalent in society. On evaluation, the top 5 essays can be displayed on the college wall magazine and rewarded if deemed appropriate
 - c. Outcome Learn to raise one's voice against the wrong doings in communities. Build writing skills, improve language and gain knowledge about how to write an impactful essay
- 4. GROUP DISCUSSION ON COMMUNAL TOPIC
 - a. Purpose Make students aware of the issues that are pertinent in a society and express a learned opinion about it
 - b. Method Students in groups of 20 each will discuss a relevant and grave issue that is dogging the nation. Alternatively, topics from current affairs (National budget, democratic process, economical strengthening of the country).
 - c. Outcome Develop group communication skills. Learn to speak up one's opinion in a forum. Cultivate the habit of presenting solution-driven arguments making them contributors in any team
- 5. QUIZ ON SOCIAL BEHAVIOR
 - a. Purpose Augment proper social etiquette among students and make them responsible citizens
 - b. Method Conduct a quiz on traffic rules using audio-visual aids or using dumb charades where one student has to enact the traffic rule and the others have to guess that rule
 - c. Outcome Grasp of various traffic rules and driving etiquette. Build verbal and non-verbal communication skills
- 6. SCREEN A MOVIE (FOCUS ON POSITIVITY AND POWER OF THE MIND)
 - a. Purpose Expose students to introspective skills and try to develop a positive thinking in life
 - b. Method Screen a movie / a documentary / a video that focuses on the power of the mind and how to create affirmations in one's life. At the end of the movie, students can be asked to express their opinions and write down what changes / improvements they plan to take in their choices thereafter. This can be followed by a guest lecture by expert/s or workshop
 - **c.** Outcome Comprehend the areas of improvement within themselves. Understand the importance of staying positive and develop affirmations
- 7. QUIZ ON SOCIAL BEHAVIOR
 - a. Purpose Augment proper social etiquette among students and make them responsible citizens
 - b. Method Conduct a quiz on traffic rules using audio-visual aids or using dumb charades where one student has to enact the traffic rule and the others have to guess that rule
 - c. Outcome Grasp of various traffic rules and driving etiquette. Build verbal and non-verbal communication skills
- 8. SCREEN A MOVIE (FOCUS ON POSITIVITY AND POWER OF THE MIND)
 - a. Purpose Expose students to introspective skills and try to develop a positive thinking in life
 - b. Method Screen a movie / a documentary / a video that focuses on the power of the mind and how to create affirmations in one's life. At the end of the movie, students can be asked to express their opinions and write down what changes / improvements they plan to take in their choices thereafter. This can be followed by a guest lecture by expert/s or workshop



- c. Outcome Comprehend the areas of improvement within themselves. Understand the importance of staying positive and develop affirmations
- 9. DEBATE ON A TOPIC FROM SOCIAL SCIENCES
 - a. Purpose Educate students about various domains in social sciences and develop an interest towards gaining knowledge about these topics
 - b. Method Various topics from various domains of social sciences can be chosen and students in pairs can pick a topic and present their arguments for or against the topic. Time for each debate will be 10 minutes maximum
 - c. Outcome Recognize the significance of social sciences in our lives. Cultivate the habit to present forceful arguments while respecting the opponents perspective and enhance verbal skills.

Interactive Activities to be conducted during Tutorial (Outside Classroom)

- 1. WASTE MANAGEMENT and CLEAN CAMPUS
 - a. Purpose: Create awareness among students about the significance of a clean environment and social responsibility to deter littering and segregate waste
 - b. Method: Students (in groups) will be given charge of areas of campus and will be expected to clean that segment. Also, they will be entrusted with the responsibility to collect, separate waste and hand over to the housekeeping authority
 - c. Outcome: Develop the habit to maintain cleanliness at home as well as learn to respect community areas at college or workplace. It will also encourage them become ambassadors among their peers to advocate protection of the environment
- 2. MAKING A VIDEO ON SOCIAL WASTAGES.
 - a. Purpose: Instil among students a sense of responsibility towards judiciously using natural resources like water and electricity
 - b. Method: Using their phones / hand-held devices, groups of students will make a 3 4 minute short film that will highlight irresponsible behavior in terms of wastage of water, leaving lights, fans and other electrical appliances on when not in use, defacing public and campus property by scribbling on walls and common areas. They will make awareness for the same among students. The creative videos will be posted on the college website and social media as an encouragement
 - c. Outcome: Conscientious behavior towards saving public utility resources. Explore the use of audio-visual tools to create more meaningful messages that can effect a change in society

3. RELAY MARATHON (3 - 5 kms)

- a. Purpose: Propagate a social message by way of a sport activity
- b. Method: A group of students will begin the race with banner / placard in hand that contains a social message. The group runs for 500 meters and hands over the banner / placard to the next group of students. This chain of exchange will continue for 3 5 kms.
- c. Outcome: Become aware of the need for fitness and encouragement towards healthier lifestyle. Students will also be able to express their creativity in terms of meaningful messages and gain attention towards worthy social causes from the community in and around the campus.
- 4. TREE PLANTATION ON CAMPUS
 - a. Purpose: Involve students to actively participate in environment protection and develop greener surroundings
 - b. Method: Each student will plant a sapling and take care of that plant until it is able to sustain itself. Alternatively, students can organize a tree plantation drive in a public area and nurture it
 - c. Outcome: Besides increase in plants in the locality, students will feel a sense of empowerment and become social contributors towards protecting the environment.
- 5. VISIT TO AN OLD AGE HOME / ORPHANAGE
 - a. Purpose: Build a sense of responsibility towards the less fortunate in our society and feel privileged to be able to effect real change in the world around us



- b. Method: Students have to visit an old age home or orphanage in the vicinity of the college. They can interact with the inmates, probably donate utilities to the charity organization and/or probably stage a few inclusive activities with the residents of the place. After the visit, students can submit a brief report about their experience
- c. Outcome: Learn first-hand about the conditions and social situations that the no-soprivileged members of our society have to endure to survive and go beyond their embarrassment to interact with the destitute which will help students appreciate the importance of Indian family values

6. STREET PLAY ACTIVITY

- a. Purpose: Create awareness in themselves as well as people in the community on various social evils that need to be eradicated
- b. Method: Students will prepare and enact a street play on any pertinent issues in society. The topics suggested can be perils of mobile phones / online fraud / safety for girls / mental and physical health of the youth.
- c. Outcome: Allow students to deliberate and think deeply about the looming issues that is dogging our society and the future of the youth. This will also bring out the creative skills among the students and allow them to showcase their talent.
- 7. BUDDY / BIG BROTHER SYSTEM
- a. Purpose: Include and involve the less fortunate children making them feel wanted and cared for as well as use the opportunity to share knowledge among school students.
- b. Method: Students have to go to nearby schools after procuring appropriate permissions to teach a particular topic on either technical or non technical domains. Each student can choose to adopt 5 students from the class to be their mentor over a period of 1 year by staying in touch with them and helping them resolve their issues on academic or other matters.
- c. Outcome: Appreciation and respect towards the responsibility of teaching. They will learn to be accountable as social contributors and bring about some change in the lives of the young students they mentor as Buddies or Big Brother.

Term Work Assessment Guidelines

Students must submit the report of all conducted activities conducted during Tutorial (Outside Classroom) of at least 04 activities (out of 07 activities) from group (of 02-03) students.

The brief guidelines for report preparations are as follows:

1. One activity report must be of maximum 3 pages;

2. Combined Report of all activities with cover pages, table of contents and certificate (signed by instructor) is to be submitted in soft copy (pdf) format only.

3. The report must contain:

- General information about the activity;
- Define the purpose of the activity;
- Detail out the activities carried out during the visit in chronological order;
- Summarize the operations / process (methods) during the activities;
- Describe what you learned (outcomes) during the activities as a student;
- Add photos of the activity;(optional)
- Add a title page to the beginning of your report;
- Write in clear and objective language; and
- Get well presented, timely and complete report submitted.

Recommended Assessment and Weightage Parameters:

(Attendance 30%, Assignments/Activities-Active participation and proactive learning 50% and report 20%)

http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Forms/AllItems.aspx



AC3-I: Green Construction and Design

Prerequisites: General awareness of environment and eco system.

Course Objectives:

- To motivate students for undertaking green construction projects, technical aspects of their design, obstacles to getting them done, and future directions of the field.
- 2. To increase awareness of green construction issues, so that students will know the range of existing knowledge and issues.
- 3. Proper use of energy, water and other resources without harming environment.
- 4. To reduce waste pollution and Environment Degradation.

Course Outcomes:

On completion of the course, learner will be able to-

CO1: Understand the importance of environment friendly society.

CO2: Apply primary measures to reduce carbon emissions from their surroundings.

CO3: Learn role of IT solutions in design of green buildings.

CO4: Understand the use of software systems to complete statutory compliances involved in the design of a new home or office building through green construction.

Course Contents

- 1. Introduction to Green Construction, need of green construction, Importance, Government Initiatives, your role in the Green Environment.
- 2. How to do Green Construction, Project Definition, Team Building, Education and Goal Setting, Documents and Specification.
- 3. Elements of Green Construction, Materials Construction Waste Management, Indoor Air Quality, Energy Efficiency.
- 4. Indian Green Building Council (IGBC), Introduction to IGBC, IGBC rating system, Green building projects in India, Benefits of green building, effects on natural resources.

Team Projects:

Students will be formed into groups to research green construction and design in a particular construction context and report their results to the class. What are the particular obstacles and opportunities to integrating green construction techniques into the following sectors? Be sure to consider technical, social, political and economic issues:

Hotels (economy, luxury, resorts), Hospitals, Retail(big box, malls, small scale downtown retail), Office, Government, ,Schools, Universities, Housing, Transportation Stations (Airport Terminals, Train Stations).

References :

- 1. Kibert, C. (2008) Sustainable Construction: Green Building Design and Delivery, 2nd edition(Hoboken, NJ: John Wiley and Sons.
- 2. Handbook of Green Building Design and Construction 1st Edition, by Sam Kubba, eBook ISBN:9780123851291.

IGBC Green New Buildings Rating System, Version 3.0, Abridged Reference Guide September 2014. Available:https://igbc.in/igbc/html_pdfs/abridged/IGBC%20Green%20New%20Buildings%20Rating %20System%20(Version%203.0).pdf

	@The CO-PO Mapping Matrix												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	РО 10	PO 11	PO 12	
CO1	-	-	2	-	-	3	3	-	-	-	-	-	
CO2	-	-	2	-	-	3	3	-	-	-	-	-	
CO3	-	-	-	-	3	-	2	-	-	-	-	-	
CO4	-	-	1	-	3	-	2	-	-	-	-	-	



AC3-II: Social Awareness and Governance Program

Prerequisites:

Awareness about basic terms in Social Science and Governance

Course Objectives:

- To Increase community awareness about social issues and to promote the practice of good governance in both private and public institutions, through policy advocacy and awareness creation in order to ensure proper utilization of public resources and good service delivery.
- 2. Increase community awareness on health, education, and human rights.
- 3. Transferring costs of social activities to other various segments of society.
- 4. To enhance youth participation in decision-making, democracy and economic development.

Course Outcomes:

On completion of the course, learner will be able to-

CO1: Understand social issues and responsibilities as member of society.

CO2: Apply social values and ethics in decision making at social or organizational level

CO3:Promote obstacles in national integration and role of youth for National Integration

CO4: Demonstrate basic features of Indian Constitution.

Course Contents

- 1. Indian Society as Pluralistic, Fundamentals of unity in diversity, diversity and disparity in Indian society, women in mass media, disparities due to disability.
- 2. The Indian constitution as unifying factor, Introduction Making of Indian Constitution, Basic features of Indian Constitution, Strengths of Indian Constitution, and Fundamental Duties.
- 3. National Integration: Introduction, The Value of Tolerance, Minority Classes And Constitution, Pre-Requisites of National Integration, Obstacles To National Integration, Promotion of National Integration, Role of Youth In Promoting Communal Harmony.
- Socialization, Ethics, Values and Prejudices, Meaning of Socialization, Functions of Socialization, Agents of Socialization, Importance of Socialization, Role of Ethics In Individual Development, Role of Basic Human Values In Individual Development, Relative Value System.

Activities:

- 1. Conducting training/workshops/debates on HIV/AIDS prevention and stigma reduction.
- 2. Public shows on girls' education and empowerment.
- 3. Conducting campaigns on adult/disabled education.
- 4. To support the government to develop policy that encourages youth participation in decision-making through government agencies.

References:

- 1. Devidas M. Muley , S Chand, " Social Awareness and Personality Development", ISBN: 812193074X.
- 2. Bhagabati Prosad Banerjee, Durga Das Basu, Shakeel Ahmad Khan, V. R. Manohar, "Introduction to the Constitution of India", ISBN : 9788180385599.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	-	-	-	-	-	-	3	2	-	-	-
CO3	-	-	-	-	-	-	-	2	2	-	-	-
CO4	-	-	-	-	-	-	-	1	1	-	-	-

@The CO-PO Mapping Matrix
AC3-III: Environmental Studies

Environmental studies are the field that examines this relationship between people and the environment. An environmental study is an interdisciplinary subject examining the interplay between the social, legal, management, and scientific aspects of environmental issues.

Course Objectives:

- 1. Understanding the importance of ecological balance for sustainable development.
- 2. Understanding the impacts of developmental activities and mitigation measures.
- 3. Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment
- Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard

Course Outcomes:

On completion of the course, learner will be able to-

CO1: Comprehend the importance of ecosystem and biodiversity

CO2: Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention

CO3: Identify different types of environmental pollution and control measures

CO4: Correlate the exploitation and utilization of conventional and non-conventional resources

Course Contents

- 1. **Natural Resources:** Introduction, Renewable and non-renewable, Forest, water, mineral, food, energy and land resources, Individual and conservation of resources, Equitable use of resources.
- 2. **Ecosystems:** Concept, Structure, Function, Energy flow, Ecological succession, Forest, grassland, desert and aquatic ecosystems Introduction, characteristic features, structure and function.
- 3. **Biodiversity:** Genetic, Species and ecological diversity, Bio Geographical classification of India, Value and hot spots, Biodiversity at global, national and local levels, India as megabiodiversity nation, Threats to biodiversity, Endangered and endemic species of India, Conservation of Biodiversity, Endangered and endemic species, Conservation of biodiversity.
- Pollution: Definition, Causes, effects and control measures of the pollution Air, soil, Noise, Water, Marine and Thermal and Nuclear Pollution, Solid waste management, Role of Individual in Prevention of Pollution, Pollution #Exemplar/Case Studies, Disaster management

Reference:

- Bharucha, E.,-Textbook of "Environmental Studies", Universities Press(2005),ISBN-10:8173715408
- 2. Mahua Basu, "Environmental Studies", Cambridge University Press, ISBN-978-1-107-5317-3

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	3	3	-	-	-	-	1
CO3	-	2	-	-	-	2	3	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	-

@The CO-PO Mapping Matrix

#46/87

AC3-IV: Smart Cities

We breathe in a world defined by urbanization and digital ubiquity, where mobile broadband connections outnumber fixed ones, machines dominate a new "internet of things," and more people live in cities than in the countryside. This course enables us to take a broad historical look at the forces that have shaped the planning and design of cities and information technologies from the rise of the great industrial cities of the nineteenth century to the present. This course considers the motivations, aspirations, and shortcomings of them all while offering a new civics to guide our efforts as we build the future together, one click at a time.

Course Objectives

- To identify urban problems
- To study Effective and feasible ways to coordinate urban technologies.
- To study models and methods for effective implementation of Smart Cities.
- To study new technologies for Communication and Dissemination.
- To study new forms of Urban Governance and Organization.

Course Outcomes

On completion of the course, learner will be able to-

CO1: Understand the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors

CO2: Explore the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows

CO3: Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing

CO4: Knowledge about the latest research results in for the development and management of future cities

CO5: Understand how citizens can benefit from data-informed design to develop smart and responsive cities

Course Contents

Urbanization and Ubiquity - The slow emergence of learning cities in an urbanizing world. Cities as collective learners, what do we know?- Framing a view -A gamut of learning types - Secrets of knowing and accelerating change - Why some cities learn and others do not.

References:

- 1. Anthony M. Townsend, W. W. Nortonand Company "Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia", ISBN: 0393082873,9780393082876.
- Tim Campbell, Routledge, "Beyond Smart Cities: How Cities Network, Learn and Innovate" , Routledge, ISBN:9781849714266.
- 3. StanGeertman, JosephFerreira, Jr.Robert Goodspeed, JohnStillwell, "Planning Support System ms and Smart Cities", Lecture notes in Geo information and Cartography, Springer.

<u>@The CO-PO Mapping Matrix</u>												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	2	2	-	-	2	2	1	-	-	-	-
CO2	1	2	1	-	-	1	1	-	-	-	-	-
CO3	2	1	3	3	2	-	1	-	1	1	1	
CO4	-	3	2	-	-	-	-	-	-	-	1	2



Savitribai Phule Pune University Second Year of Computer Engineering (2019 Course) 210258: Project Based Learning II

Teaching Scheme	Credit Scheme	Examination Scheme and Marks
Practical: 04 Hours/Week	02	Term Work: 50 Marks

Course Objectives:

- To develop critical thinking and problem solving ability by exploring and proposing solutions to realistic/social problem.
- To Evaluate alternative approaches, and justify the use of selected tools and methods.
- To emphasizes learning activities that are long-term, inter-disciplinary and student-centric.
- To engages students in rich and authentic learning experiences.
- To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.
- To develop an ecosystem that promotes entrepreneurship and research culture among the students.

Course Outcomes:

- CO1: Identify the real life problem from societal need point of view
- CO2: Choose and compare alternative approaches to select most feasible one
- **CO3:** Analyze and synthesize the identified problem from technological perspective
- **CO4:** Design the reliable and scalable solution to meet challenges
- CO5: Evaluate the solution based on the criteria specified
- CO6: Inculcate long life learning attitude towards the societal problems

Course Contents

Preamble:

Project-based learning is an instructional approach designed to give students the opportunity to develop knowledge and skills through engaging projects set around challenges and problems they may face in the real world. PBL, is more than just projects. With PBL students "investigate and respond to an authentic, engaging, and complex problem, or challenge" with deep and sustained attention. PBL is "learning by doing." The truth is, many in education are recognizing we live in a modern world sustained and advanced through the successful completion of projects. In short, If students are prepared for success in life, we need to prepare them for a project-based world. It is a style of active learning and inquiry-based learning. (Reference: Wikipedia). Project based learning will also redefine the role of teacher as mentor in learning process. Along with communicating knowledge to students, often in a lecture setting, the teacher will also to act as an initiator and facilitator in the collaborative process of knowledge transfer and development. The PBL model focuses the student on a big open-ended question, challenge, or problem to research and respond to and/or solve. It Brings what students should academically know, understand, and be able to do and requires students to present their problems, research process, methods, and results.[1]

Project based learning (PBL) requires regular mentoring by faculty throughout the semester for successful completion of the idea/project tasks selected by the students per batch. For the faculty involved in PBL, teaching workload of 4 Hrs/week/batch needs to be considered. The Batch should be divided into sub-groups of 4 to 5 students. Idea implementation /Real life problem/Complex assignments / activities / projects. under project based learning is to be carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester

Group Structure:

Working in supervisor/mentor monitored groups; the students plan, manage, and complete a task/project/activity which addresses the stated problem.

- 1. There should be team/group of 4-5 students
- 2. A supervisor/mentor teacher assigned to individual groups



Selection of Project/Problem:

The problem-based project oriented model for learning is recommended. The model begins with the identifying of a problem, often growing out of a question or "wondering". This formulated problem then stands as the starting point for learning. Students design and analyze the problem/project within an articulated interdisciplinary or subject frame.

A problem can be theoretical, practical, social, technical, symbolic, cultural, and/or scientific and grows out of students' wondering within different disciplines and professional environments. A chosen problem has to be exemplary. The problem may involve an interdisciplinary approach in both the analysis and solving phases.

By exemplarity, a problem needs to refer back to a particular practical, scientific, social and/or technical domain. The problem should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry.

There are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content, and structure of the activity.

A few hands-on activities that may or may not be multidisciplinary.

Use of technology in meaningful ways to help them investigate, collaborate, analyse, synthesize, and present their learning.

Activities may include- Solving real life problem, investigation, /study and Writing reports of in depth study, field work.

Assessment:

The institution/head/mentor is committed to assessing and evaluating both student performance and program effectiveness.

Progress of PBL is monitored regularly on weekly basis. Weekly review of the work is necessary. During process of monitoring and continuous assessment and evaluation of the individual and the team performance is to be measured. PBL is monitored and continuous assessment is done by supervisor /mentor and authorities.

Students must maintain an institutional culture of authentic collaboration, self-motivation, peerlearning and personal responsibility. The institution/department should support students in this regard through guidance/orientation programs and the provision of appropriate resources and services. Supervisor/mentor and Students must actively participate in assessment and evaluation processes.

Group may demonstrate their knowledge and skills by developing a public product and/or report and/or presentation.

1. Individual assessment for each student (Understanding individual capacity, role and involvement in the project)

2. Group assessment (roles defined, distribution of work, intra-team communication and togetherness)

3. Documentation and presentation

Evaluation and Continuous Assessment:

It is recommended that all activities should to be recorded regularly, regular assessment of work need to be done and proper documents need to be maintained at college end by both students as well as mentor (PBL work book).

Continuous Assessment Sheet (CAS) is to be maintained by all mentors/department and institutes.

Recommended parameters for assessment/evaluation and weightage:

1. Idea Inception and Awareness /Consideration of -Environment/ Social /Ethics/ Safety measures/Legal aspects (10%)

2. Outcomes of PBL/ Problem Solving Skills/ Solution provided/ Final product (Individual assessment and team assessment) (40%)

3. Documentation (Gathering requirements, design and modelling, implementation/execution, use of technology and final report, other documents) (15%)

4. Demonstration (Presentation, User Interface, Usability) (20%)



5. Contest Participation/ publication (15%)

PBL workbook will serve the purpose and facilitate the job of students, mentor and project coordinator. It will reflect accountability, punctuality, technical writing ability and work flow of the work undertaken.

Note :

- While planning for the assessment, choose a valid method based on your context. It should be able to understand by both the students as well as the faculty.
- The student group must follow the principles of Software Engineering (Scoping out the problem, the solution implementation and related documentation).
- Researching the problem and outlining various approaches is key here and should be emphasized by the tutor and the mentor.
- Aspects of design thinking (from the point of view of the person facing the problem) are very important. Students should not jump into the technology aspects first.
- The team can follow the principles of Agile Software Development. The weekly meetings could be used as a Scrum meeting.
- The tutor and mentor should actively help the students to scope the work and the approach. They must validate the technology choices.
- If the implementation code is well documented, the project can be continued by subsequent batch which will help solve a bigger problem.

Text Books:

- 1. A new model of problem based learning. By Terry Barrett. All Ireland Society for higher education (AISHE). ISBN:978-0-9935254-6-9; 2017
- 2. Problem Based Learning. By Mahnazmoallem, woei hung and Nada Dabbagh, Wiley Publishers. 2019.
- 3. Stem Project based learning and integrated science, Technology, Engineering and mathematics approach. By Robert Capraro, Mary Margaret Capraro

Reference Books:

- 1. De Graaff E, Kolmos A., red.: Management of change: Implementation of problem-based and project-based learning in engineering. Rotterdam: Sense Publishers. 2007.
- 2. Gopalan," Project management core text book", 2 Indian Edition
- 3. James Shore and Shane Warden, "The Art of Agile Development"

Tutors Role in Project Based Learning

- The fundamentals of problem based learning, lies with the Tutors role.
- Tutors are not the source of solutions rather they act as the facilitator and mentor.
- The facilitator skills of the Tutors / Teacher are central to the success of PBL.

Change of Mindset

- Students are not used to the constructivist approach to learning, it is important that they are carefully told what to expect in PBL.
- Tutors need to explain the differences between PBL and traditional learning.
- Tutors need to explain the principals involved and role of the students in PBL learning.

Designing Problem

- Considering the prior knowledge of the students, their ability and creativity, problem statement should be designed.
- For 2nd year PBL students the tutor should place more emphasis on getting the students to perform higher-level tasks.
- It is important for tutors to design problems that are anchored in authentic contexts only
- Students should take ownership of the problem.
- Problems should not be over simplified or well defiled
- Learning should not be the sequencing of instructional events, but the application of principles for responding to the needs of the situation.
- The problems given to students in PBL should be realistic, complex, and should reflect, as



much as possible, the actual problems that students would encounter in real life.

Basic function of the tutor

• A good understanding of the overall curriculum the students have to study, the principles of problems solving, critical thinking and meta-cognitive skills.

Grouping

- Study the background and profile of each student.
- Make sure that students of different backgrounds and experience are assigned in a group
- It is useful to group students of different abilities, gender, and nationalities together.
- Tutors must have the commitment to devote the time to the tutorial process.
- A good tutor is always interested in helping students to learn better.
- Sufficient resources should be made available for students to take part the PBL tutorial.
- Time management is important.

Assessment of Learning

- It is important for tutors to make sure that assessment is consistent with learning objectives of the groups in PBL
- Assessment of students should not be focused only on the final leaning product.
- PBL tutors need to understand meaningful ways of assessing students' work to motivate learning.
- For assessment to be implemented properly there should be well designed and clearly defined goals and objectives and well thought out strategies, techniques, criteria, and marking schemes.

Student's Role in PBL

- Prepare students for PBL before starting the sessions.
- Students must have ability to initiate the task/idea .they should not be mere imitators.
- They must learn to think.
- Students working in PBL must be responsible for their own learning.
- Throughout the PBL process, students have to define and analyze the problem, generate learning issues and apply what they have learned to solve the problem and act for themselves and be free.
- Students must quickly learn how to manage their own learning, Instead of passively receiving instruction.
- Students in PBL are actively constructing their knowledge and understanding of the situation in groups.
- Students in PBL are expected to work in groups.
- They have to develop interpersonal and group process skills, such as effective listening or coping creatively with conflicts.

Inquiry Skills

- Students in PBL are expected to develop critical thinking abilities by constantly relating:
- What they read to do?
- What they want to do with that information?
- They need to analyze information presented within the context of finding answers.
- Modeling is required so that the students can observe and build a conceptual model of the required processes.
- Formative and summative questions for evaluation:
- How effective is?
- How strong is the evidence for?
- How clear is?
- What are the justifications for thinking?
- Why is the method chosen?
- What is the evidence given to justify the solution?



Information Literacy

• Information literacy is an integral part of self- directed learning Information literacy involves the ability to:

- Know when there is a need for information
- Identify the information needed to solve a given problem or issue
- Be able to locate the needed information
- Use the information to solve the given problem effectively.
- Skills required by students in information literacy include:
- How to prepare the search , How to carry out the research,
- Sorting and assessing of information in general

Collaborative learning

- It is an educational approach to teaching and learning that involves
- groups of students working together to solve a problem or complete a project
- In collaborative learning, learners have the opportunity to talk with peers, exchange diverse beliefs present and defend ideas, as well as questioning other ideas.

Interpersonal Skills

- Interpersonal skills relating to group process are essential for effective problem solving and learning.
- It is important that students are made aware of these inter personal skills.
- Consensual decision making skills, Dialogue and discussion skills, Team maintenance skills
- Conflict management skills and Team leadership skills.
 Students who have these skills have a better opportunity to learn than students who do not have these skills and Time Management

Resources

• Students need to have the ability to evaluate the resources used

Students have to evaluate the source of the resources used by asking the following questions:

- How current is it?, Is there any reason to suspect bias in the source?
- How credible and accurate is it?

Meta-cognitive Skills

- Students need to reflect on the processes they are using during the learning process,
- Compare one strategy with another, and evaluate the effectiveness of the strategy used

Reflection Skills

- Reflection helps students refine and strengthen their high-level thinking skills and abilities through self-assessment.
- Reflection gives students opportunities to think about how they answered a question, made a decision, or solved a problem.
- What strategies were successful or unsuccessful? ,What issues need to be remembered for next time? , What could or should be done differently in the future?

Follow the practices learned in Software Engineering course- Requirement Analysis, Designing and Modeling.

	@The CO-PO Mapping Matrix											
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2



Savitribai Phule Pune University Second Year of Computer Engineering (2019 Course) 210259: Code of Conduct

Teaching Scheme	Credit Scheme	Examination Scheme and Marks
Tutorial: 01 Hours/Week	01 [§]	Term work [§] : 25 Marks

Preamble:

Engineering is one of the important and cultured professions. With respect to any engineering profession, engineers are expected to exhibit the reasonable standards of integrity and honesty. Engineering is directly or indirectly responsible to create a vital impact on the quality of life for the society. Acceptably, the services provided by engineers require impartiality, honesty, equity and fairness and must give paramount importance to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the principles of ethical conduct.

Prime aim is to recognize and evaluate ethical challenges that they will face in their professional careers through knowledge and exercises that deeply challenge their decision making processes and ethics.

Course Objectives:

- To promote ethics, honesty and professionalism.
- To set standards that are expected to follow and to be aware that If one acts unethically what are the consequences.
- To provide basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues
- To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, Exposure to Safety and Risk, Risk Benefit Analysis
- To have an idea about the Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights.

Course Outcomes:

On completion of the course, learner will be able to-

- **CO1: Understand** the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
- **CO2:** Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
- **CO3: Understand** the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **CO4:** Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

Course Contents

The following are the certain guidelines as far as ethics and code of conduct are concerned to be clearly and elaborately explained to the students,

Fundamental norms Engineers, in the fulfillment of their professional duties, should include paying utmost attention to the safety, health, and welfare of the society. Along with that engineers should execute the services only in their areas of competence. Whenever there is a need to issue public statements then such statements should be expressed in objective and truthful manner. Engineer should extend high sense of integrity by acting for each employer or client as faithful agents or trustees. Whatever may be the working scope engineer should conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Forms/AllItems.aspx



As far as ethical practices are concerned engineers should not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or Code. Engineers should not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise moreover he/she should not aid or abet the unlawful practice of engineering by a person or firm.

Engineers having knowledge of any alleged violation of the Code should report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required. Engineers should disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services. Engineers should not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties. Engineers should not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.

Engineers should never falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or past accomplishments.

Engineers should not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They should not offer any gift or other valuable consideration in order to secure work. They should not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

There are certain obligations accompanied with engineering profession. Engineers should acknowledge their errors and should not distort or alter the facts. Candid advises in special cases are always welcome. Engineers should not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.

Engineers should not promote their own interest at the expense of the dignity and integrity of the profession furthermore they should treat all persons with dignity, respect, fairness, and without discrimination. Engineers should at all times strive to serve the public interest. Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community. Engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminar.

Engineers should not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice. They should not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action. "Sustainable development" is the challenge for the engineers meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

Following are contents to be covered in tutorial session-



- Introduction to Ethical Reasoning and Engineer Ethics: Senses of 'Engineering Ethics' Variety of moral issues – Types of inquiry – Moral dilemmas –Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy –Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.
- Professional Practice in Engineering: Global Issues -Multinational Corporations Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct
- 3. Ethics as Design Doing Justice to Moral Problems : Engineer's Responsibility for Safety Safety and Risk Assessment of Safety and Risk Risk Benefit Analysis Reducing Risk The Government Regulator's Approach to Risk
- Workplace Responsibilities and Rights Collegiality and Loyalty Respect for Authority Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination
- 5. Computers, Software, and Digital Information
- 6. Responsibility for the Environment

#Exemplar/Case Studies :

General Motors ignition switch recalls (2014), Space Shuttle Columbia disaster (2003), Space Shuttle Challenger disaster (1986), Therac-25 accidents (1985 to 1987), Chernobyl disaster (1986), Bhopal disaster (1984), Kansas City Hyatt Regency walkway collapse (1981)

Guidelines for Conduction:

The course will exemplify the budding engineers the Code of Conduct and ethics pertaining to their area and scope of their work. The Instructor/Teacher shall explain the students the importance and impact of the ethics and code of conduct.

Confined to various courses and project/mini-project development the possible vulnerabilities and threats need to be elaborated and the students' participation need to be encouraged in designing such document explicitly mentioning Code of Conduct and Disclaimers.

Suggested set of Activities

1. Purpose-Introduce the concept of Professional Code of Conduct

Method – Using Group Discussion as a platform, ask students to share one practice in their family / home that everyone has to follow. For ex. not wearing footwear in the house, taking a bath first thing in the morning, seeking blessings from elders, etc. Connect this Code of Conduct in their family to one that exists in the professional world

Outcome – Awareness of profession-specific code of conduct and importance of adherence of that code specified. Ability to express opinions verbally and be empathetic to diverse backgrounds and values

2. **Purpose-**Impress upon the students, the significance of morality

Method – Role play a professional situation where an engineer is not competent and is trying to copy the work of a colleague and claim credit for that work. Ask observing students to react to that situation. Alternatively, a short video that clearly shows unethical behavior can be played and ask viewers their opinion about the situation. Note to teachers – read about Kohlber's theory and Gilligan's theory to understand levels of moral behavior

Outcome – Incite students to contemplate their own immoral behavior in public space or academic environment (like copying homework or assignment). Will coax students to introspect their own values and encourage them to choose the right path

3. Purpose-Highlight the importance of professional ideals like conflict management, ambition, ethical manners and accountability

Method – Each student will have to write a 200 word essay on any of above mentioned virtues of being a good professional. On evaluation, the top 5 essays can be displayed on the college wall magazine and rewarded if deemed appropriate

Outcome – Learn to express one's ideas and identify and relate to good virtues. Build writing skills, improve language and gain knowledge about how to write an impactful essay

#77/87

4. Purpose-Make students aware of proper and globally accepted ethical way to handle work, colleagues and clients

Method – Teacher can form groups of 6 – 7 students and assign them different cases (these can be accessed online from <u>copyright free</u> websites of B-school content)

Outcome – Develop group communication skills. Learn to speak up one's opinion in a forum. Cultivate the habit of presenting solution-driven analytical arguments making them contributors in any team.

5. Purpose – Make students aware that technology can be harmful if not used wisely and ethically Method – Conduct a quiz on various ethical dilemmas that are relevant in today's world pertaining to privacy right, stalking, plagiarism, hacking, weaponizing technology, AI, electronic garbage creating environmental hazard etc

Outcome – Make students aware of various adverse consequences of technology development and allow them to introspect on how to use technology responsibly.

6. Purpose – Expose students to professional situations where engineers must use their skills ethically and for the betterment of society and nation

Method – Students in groups of 4 can be given an assignment in the earlier session to present in front of the class one specific case where they felt unethical treatment has been meted out to a person by an engineer – either as a witness, advisor, dishonesty, improper skills testimony etc. The group has to make a short presentation and also suggested plausible solutions to that situation. Q&A from other students must encouraged to allow healthy discussion

Outcome – Become aware of unethical code of conduct in the professional world and how to follow a moral compass especially when one reaches positions of power.

- Purpose Provide an insight into rights and ethical behavior.
 Method Movies like The Social Network can be played and students can be asked to discuss their opinion about collegiality, intellectual property, friendship and professional relationships
 Outcome help them look at success stories from an ethical point of view. Develop critical thinking and evaluation of circumstances.
- **8. Purpose** Make students contemplate about ideal and safe professional environment and decide on making right decisions based on codes of conduct

Method – Students can be asked to write down 5 most important codes of conduct that they feel that every computer engineer should follow. After evaluation by teacher / experts, the collection of codes can be converted into a handbook to be given to every student as a memoir to help them in their professional life.

Outcome – Introspection and think about how to shape the professional environment. Also, when they carry back with them their own codes of conduct, they could feel bound to adhere to these ethics.

Term Work Assessment Guidelines

Students must submit the report of all conducted activities. The brief guidelines for report preparations are as follows:

1. One activity report must be of maximum 3 pages;

2. Combined Report of all activities with cover pages, table of contents and certificate (signed by instructor) is to be submitted in soft copy (pdf) format only.

3. The report must contain:

- General information about the activity;
- Define the purpose of the activity;
- Detail out the activities carried out during the visit in chronological order;
- Summarize the operations / process (methods) during the activities;
- Describe what you learned (outcomes) during the activities as a student;
- Add photos of the activity;(optional)
- Add a title page to the beginning of your report;
- Write in clear and objective language; and
- Get well presented, timely and complete report submitted.



Recommended Assessment and Weightage Parameters:

(Attendance 30%, Assignments/Activities- Active participation and proactive learning 50% and report 20%)

Term Work Assessment Guidelines

Students must submit the report of all conducted activities conducted during Tutorial (Outside Classroom) of at least 04 activities (out of 07 activities) from group (of 02-03) students. The brief guidelines for report preparations are as follows:

1. One activity report must be of maximum 3 pages;

2. Combined Report of all activities with cover pages, table of contents and certificate (signed by instructor) is to be submitted in soft copy (pdf) format only.

3. The report must contain:

- General information about the activity;
- Define the purpose of the activity; •
- Detail out the activities carried out during the visit in chronological order;
- Summarize the operations / process (methods) during the activities; •
- Describe what you learned (outcomes) during the activities as a student;
- Add photos of the activity; (optional) •
- Add a title page to the beginning of your report;
- Write in clear and objective language; and
- Get well presented, timely and complete report submitted.

Recommended Assessment and Weightage Parameters:

(Attendance 30%, Active participation and proactive learning 50% and report 20%)

Web Links:

- https://www.ieee.org/about/compliance.html
- https://www.cs.cmu.edu/~bmclaren/ethics/caseframes/91-7.html
- https://www.nspe.org/
- http://www.ewh.ieee.org/soc/pes/switchgear/presentations/tp_files/2017-1 Thurs Shiffbauer Singer Engineering Ethics.pdf

MOOC/ Video lectures available at:

https://swayam.gov.in/nd1 noc20 mg44/preview

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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1	-	-	-	-	-	-	2	2	-	-	-	-	
CO2	-	-	-	-	-	-	2	2	-	-	-	-	
CO3	-	-	-	-	-	-	3	2	-	-	-	-	
CO4	-	-	-	-	-	-	2	3	-	-	-	-	

@The CO-PO Manning Matrix



Savitribai Phule Pune University Second Year of Engineering (2019 Course) 210260: Audit Course 4

In addition to credits, it is recommended that there should be audit course in preferably in each semester starting from second year in order to supplement student's knowledge and skills. Student will be awarded the bachelor's degree if he/she earns specified total credits [1] and clears all the audit courses specified in the syllabus. The student will be awarded grade as AP on successful completion of audit course. The student may opt for one of the audit courses per semester, starting in second year first semester. Though not mandatory, such a selection of the audit courses helps the learner to explore the subject of interest in greater detail resulting in achieving the very objective of audit course's inclusion. List of options offered is provided. Each student has to choose one audit course from the list per semester. Evaluation of audit courses are suggested.

Criteria:

The student registered for audit course shall be awarded the grade AP (Audit Course Pass) and shall be included such AP grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself. [1]

Guidelines for Conduction and Assessment (Any one or more of following but not limited to):

 Lectures/ Gue 	est Lectures	Surveys									
 Visits (Social/I 	Field) and reports	Mini-Project									
 Demonstratio 	ns	 Hands on experience on focused topic 									
Course Guidelines for Assessment (Any one or more of following but not limited to):											
Written Test											
Demonstrations/ Practical Test											
Presentations, IPR/Publication and Report											
Audit Course 4 Options											
Audit Course Code	Audit Course Title										
AC4-I	Water Management										
AC4-II	Intellectual Property Rights and Patents										
AC4-III	The Science of Happiness										
AC4-IV	Stress Relief: Yoga and Medi	tation									
AC4-V	Foreign Language (one	of Japanese/Spanish/French/German) Course									
	contents for Japanese(Mod	ule 2) are provided. For other languages institute									
	may design suitably.										
Note: It is permitted to	opt one of the audit courses list	ed at SPPU website too, if not opted earlier. [1]									
http://collegecirculars.unipune.ac.in/sites/documents/Syllabus%202017/Forms/AllItems.aspx											
http://www.unipune.a	c.in/university files/syllabi.htm										

AC4-I: Water Management

Water is a vital resource for all life on the planet. Only three percent of the water resources on Earth are fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. One fifth of the remaining one percent is in remote, inaccessible areas. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. Pure water supply and disinfected water treatment are prerequisites for the well-being of communities all over the world. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. This course will provide students a unique opportunity to study water management activities like planning, developing, distributing and optimum use of water resources. This course covers the topics that management of water treatment of drinking water, industrial water, sewage or

Wastewater, management of water resources, management of flood protection.

Course Objectives

- To develop understanding of water recourses.
- To study global water cycle and factors that affect this cycle.
- To analyze the process for water resources and management.
- To study the research and development areas necessary for efficient utilization and management of water recourses.

Course Outcomes

On completion of the course, learner will be able to-

CO1: Understand the global water cycle and its various processes

CO2: Understand climate change and their effects on water systems

CO3: Understand Drinking treatment and quality of groundwater and surface water

CO4: Understand the Physical, chemical, and biological processes involved in water treatment and distribution.

Course Contents

- 1. Understanding 'water'-Climate change and the global water cycle, understanding global hydrology
- 2. Water resources planning and management-Water law and the search for sustainability: a comparative analysis, Risk and uncertainty in water resources planning and management
- 3. Agricultural water use -The role of research and development for agriculture water use
- 4. Urban water supply and management The urban water challenge, Water sensitive urban design

References:

- R. Quentin Graft, Karen Hussey, Quentin Graft, Karen Hussey, Publisher, "Water Resources Planning and Management", Cambridge University Press, ISBN: 9780511974304, 9780521762588.
- **2.** P.C. Basil, "Water Management in India", ISBN: 8180690970, 2004.
- **3.** C.A. Brebbia, "Water Resources Management", ISBN: 978-1-84564-960-9, 978-1-84564-961-6.

@The CO-PO Mapping Matrix												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	1
CO3	-	-	-	-	-	-	1	-	-	-	-	
CO4	-	-	-	-	-	2	2	-	-	-	-	2



AC4-II: Intellectual Property Rights and Patents

Intellectual property is the area of law that deals with protecting the rights of those who create original works. It covers everything from original plays and novels to inventions and company identification marks. The purpose of intellectual property laws is to encourage new technologies, artistic expressions and inventions while promoting economic growth.

Innovation and originality have great potential value. Whatever line of activity you are engaged in, future success depends on them. The last few years have seen intellectual property rights become an issue of general interest: the smart phone "patent wars", the introduction of Digital Rights management (DRM) and the rise of generic pharmaceuticals and open-source software are just some examples that have been in the public eye. Protecting your intellectual rights appropriately should be at a priority. Yet too many people embark on their chosen professions without even a basic awareness of intellectual property.

Course Objectives:

- To encourage research, scholarship, and a spirit of inquiry
- To encourage students at all levels to develop patentable technologies.
- To provide environment to the students of the Institute for creation, protection, and commercialization of intellectual property and to stimulate innovation.

Course Outcomes:

On completion of the course, learner will be able to-

- **CO1: Understand** the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
- **CO2:** Identify, apply and assess principles of law relating to each of these areas of intellectual property
- **CO3: Apply** the appropriate ownership rules to intellectual property you have been involved in creating

Course Contents

- 1. IntroductiontoIntellectualPropertyLaw—TheEvolutionaryPast-TheIPRToolKit-Para-Legal Tasks in Intellectual Property Law
- Introduction to Trade mark Trade mark Registration Process Post registration Procedures -Trade mark maintenance - Transfer of Rights – Inter partes Proceeding – Infringement - Dilution Ownership of Trade mark
- **3.** Introduction to Copyrights Principles of Copyright Principles -The subjects Matter of Copy right The Rights Afforded by Copyright Law Copy right Ownership, Transfer and duration Right to prepare Derivative works
- 4. IntroductiontoTradeSecret-MaintainingTradeSecret-PhysicalSecurity-EmployeeLimitation - Employee confidentiality agreement

Reference:

- 1. Debirag E. Bouchoux, "Intellectual Property" Cengage learning, New Delhi, ISBN-10:1111648573
- 2. Ferrera, Reder, Bird, Darrow, "Cyber Law. Texts and Cases", South-Western's Special Topics Collections, ISBN:0-324-39972-3
- 3. Prabhuddha Ganguli, "Intellectual Property Rights", Tata Mc-Graw–Hill, NewDelhi,ISBN-10:0070077177

	@The CO-PO Mapping Matrix												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	
CO1	-	-	-	-	-	-	-	1	-	-	-	1	
CO2	-	-	-	-	-	-	-	2	-	-	-	1	
CO3	-	-	-	-	-	-	-	1	-	-	-	1	



AC4-III: The Science of Happiness

Everybody wants to be happy. One can explore innumerable ideas about what happiness is and how we can get some. But not many of those ideas are based on science. That's where this course comes in. The subject "Science of Happiness" aims to teach the pioneering science of positive psychology, which explores the ancestry of a happy and meaningful life. Clinical psychologists have been dealing with miserable feelings since their discipline was established. In the last 30 years, neuroscientists have made major headway in the understanding of the sources of anger, depression, and fear.

Today, whole industries profit from this knowledge—producing pills for every sort of pathological mood disturbance. But until recently, few neuroscientists focused on the subject of happiness. This course focuses on discovering how cutting-edge research can be applied to their lives. Students will learn about the Intra-disciplinary research supporting this view, spanning the fields of psychology, neuroscience, evolutionary biology, and beyond. The course offers students practical strategies for tapping into and nurturing their own happiness, including trying several research-backed activities that foster social and emotional well-being, and exploring how their own happiness changes along the way.

Course Objectives

- To understand the feeling of happiness
- To study the sources of positive feelings
- To analyze the anatomy of the happiness system
- To study the effect of thoughts and emotions on the happiness system

Course Outcomes

On completion of the course, learner will be able to-

CO1: Understand what happiness is and why it matters to you

CO2: Learn how to increase your own happiness

CO3: Understand of the power of social connections and the science of empathy

CO4: Understand what is mindfulness and its real world applications

Course Contents

- 1. Happiness: what is it? , 2. The secret of smiling
- 3. The autonomy of positive feelings
- 4. Positive feelings as a compass
- 5. The happiness system
- 6. Foundations: Emotions, Motivation and nature of Wellbeing
- 7. Subjective well being
- 8. Love and well being
- 9. Optimal well being
- 10. Religion, Spirituality and wellbeing

References:

- 1. Happier, Stefan Klein, "The Science of Happiness, How Our Brains Make Us Happy and what We Can Do to Get", Da Capo Press, ISBN 10: 156924328X, 13: 978-1569243282.
- 2. C. Compton, Edward Hoffman, "Positive Psychology: The Science of Happiness and Flourishing", William, Cengage Learning, 2012, ISBN10: 1111834121.

@The CO-PO Manning Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	1	-	-	-	-	-	-	-	1
CO2	-	-	-	1	-	-	-	-	-	-	-	2
CO3	-	-	-	-	-	-	1	-	1	-	-	2
CO4	-	-	-	-	-	-	-	-	-	-	-	2

AC4-IV: Yoga and Meditation

The concepts and practices of Yoga originated in India about several thousand years ago. Its founders were great Saints and Sages. The great Yogis presented rational interpretation of their experiences of Yoga and brought about a practical and scientifically sound method within every one's reach. Yoga today, is no longer restricted to hermits, saints, and sages; it has entered into our everyday lives and has aroused a worldwide awakening and acceptance in the last few decades. The science of Yoga and its techniques have now been reoriented to suit modern sociological needs and lifestyles.

Yoga is one of the six systems of Vedic philosophy. The Yoga advocates certain restraints and observances, physical discipline, breathe regulations, restraining the sense organs, contemplation, meditation and Samadhi. The practice of Yoga prevents psychosomatic disorders and improves an individual's resistance and ability to endure stressful situations.

Course Objectives:

- To impart knowledge about the basic technique and practice of yoga, including instruction in breath control, meditation, and physical postures
- To gain an intellectual and theoretical understanding of the principles embodied in the Yoga Sutras, the Bhagavad-Gita, and other important texts and doctrines
- Relaxation and stress reduction ,Personal insight and self understanding, Personal empowerment, Gaining wisdom and spiritual discernment
- Awakening the abilities or powers of the Super conscious mind

Course Outcomes:

On completion of the course, learner will be able to-

CO1: Understand philosophy and religion as well as daily life issues will be challenged and enhanced.

CO2: Enhances the immune system.

CO3: Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.

CO4: Powers of concentration, focus, and awareness will be heightened.

Course Contents

- Meaning and definition of yoga Scope of Yoga Aims and Objectives of Yoga Misconception about yoga.
- 2. Ayurveda: an introduction to this system of health care derived from the Vedic tradition Anatomy and Physiology as they relate to Yoga
- 3. Yoga Philosophy and Psychology

References:

- 1. B.K.S. Iyengar, "BKS Iyengar Yoga The Path to Holistic Health", DK publisher, ISBN-13: 978-1409343479
- 2. Osho, "The Essence of Yoga", Osho International Foundation, ISBN: 9780918963093

@The CO-PO Manning Mat

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	-	-	2	-	-	2	-	-	-
CO2	-	-	-	-	-	2	1	-	-	-	-	-
CO3	-	2	-	-	-	2	-	-	-	-	-	-
CO4	-	2	-	-	-	-	-	2	-	-	-	-



Faculty of Science and Technology Savitribai Phule Pune University Maharashtra, India



Curriculum for Third Year of Computer Engineering (2019 Course) (With effect from 2021-22)

http://unipune.ac.in/university_files/syllabi.htm

	Savitribai Phule Pune University Third Year of Computer Engineering (2019 Course) (With offect from Academic Year 2021 22)													
	Semester V													
Course Code	Course Name	Te S (1	eachin chem Hours week)	ng ie s/	Exa	aminati	on Sch	eme a	nd M	larks	Cı	edit \$	Scher	me
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310241	Database Management Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
310242	Theory of Computation	03	-	-	30	70	-	-	-	100	03	-	-	03
310243	Systems Programming and Operating System	03	-	-	30	70	-	-	-	100	03	-	-	03
310244	Computer Networks and Security	03	-	-	30	70	-	-	-	100	03	-	-	03
310245	Elective I	03	-	-	30	70	-	-	-	100	03	-	-	03
310246	Database Management Systems Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
310247	Computer Networks and Security Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
310248	Laboratory Practice I	-	04	-	-	-	25	25	-	50	-	02	-	02
310249	Seminar and Technical Communication	-	01	-	-	-	50	-	-	50	-	01	-	01
	Total	15	11	-	150	350	125	50	25	700	15	06	-	21
310250	Audit Course 5										-	-	Gra	ade
								1	otal	Credit	15	06	-	21
Elective Image: state s	Elective I Audit Course 5 • Internet of Things and Embedded Systems • Cyber Security • Human Computer Interface • Professional Ethics and Etiquettes • Distributed Systems • MOOC- Learn New Skills • Software Project Management • Engineering Economics • Foreign Language • Foreign Language													

Assignments from Systems Programming and Operating System and Elective I

	Savitribai Phule Pune University Third Year of Computer Engineering (2019 Course) (With effect from Academic Year 2021-22)													
Semester VI														
Course Code	Course Name	Te S (1	eachin chem Hours week)	ng ie s/)	E	xaminat	ion Sch	ieme ai	nd Ma	arks	Cı	redit S	Scher	ne
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310251	DataScienceandBigDataAnalytics	03	-	-	30	70	-	-	-	100	03	-	-	03
310252	Web Technology	03	-	-	30	70	-	-	-	100	03	-	I	03
310253	Artificial Intelligence	03	-	-	30	70	-	-	-	100	03	-	-	03
310254	Elective II	03	-	-	30	70	-	-	-	100	03	-	-	03
310255	Internship**	-	**	-	-	-	100 **	-	-	100	-	04 **	-	04
310256	Data Science and Big Data Analytics Laboratory	-	04	-	-	-	50	25	-	75	-	02	-	02
310257	Web Technology Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
310258	Laboratory Practice II	-	04	-	-	-	50	25	-	75	-	02	-	02
										Total	12	09	-	21
	Total	12	10	-	120	280	225	50	25	700	12	05	-	21
310259	Audit Course 6												Gra	ıde
Elective	II				А	udit C	ourse 6							
• 1	nformation Security					• D	igital a	nd Soc	cial N	Iedia M	larke	ting		
• 4	Augmented and Virtual Rea	ality				• Si	ıstainal	ble En	ergy	System	S			
• •	<u>Lioud Computing</u> Software Modeling and Ard	hited	rtures			• Le	eadersh	ip and	l Pers	sonality	Dev	elopr	nent	
<u> </u>	boltware would have and the		<u>/////////////////////////////////////</u>			• Fo	breign l	Langu	age	C1-:11-				
Laborat	orv Practice II:					• 101	000-	Learn	new	SKIIIS				
Assignm	ents from Artificial Intelli	igenc	e and	l Elec	tive II	•								
** Inter	nship:													
Internsh	Internship guidelines are provided in course curriculum sheet.													

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SavitribaiPhule Pune University Third Year of Computer Engineering (2019 Course) 310249: Seminar and Technical Communication

Teaching Scheme	Credit Scheme	Examination Scheme and Marks
Practical: 01 Hours/Week	01	Term Work: 50 Marks
Course Objectives:		

• To explore the basic principles of communication (verbal and non-verbal) and active, empathetic listening, speaking and writing techniques

- To explore the latest technologies
- To enhance the communication skills
- To develop problem analysis skills

Course Outcomes:

On completion of the course, learners will be able to

CO1: Analyze a latest topic of professional interest

CO2: Enhance technical writing skills

CO3: Identify an engineering problem, analyze it and propose a work plan to solve it

CO4: Communicate with professional technical presentation skills

Guidelines

- Each student will select a topic in the area of Computer Engineering and Technology preferably keeping track with recent technological trends and development beyond scope of syllabus avoiding repetition in consecutive years.
- The topic must be selected in consultation with the Institute guide.
- Each student will make a seminar presentation using audio/visual aids for a duration of 20-25 minutes and submit the seminar report prepared in Latex only.
- Active participation at classmate seminars is essential.
- BoS has circulated the Seminar Log book and it is recommended to use it.

Guidelines for Assessment

Panel of staff members along with a guide would be assessing the seminar work based on these parameters-Topic, Contents and Presentation, regularity, Punctuality and Timely Completion, Question and Answers, Report, Paper presentation/Publication, Attendance and Active Participation.

Recommended Format of the Seminar Report

- Title Page with Title of the topic, Name of the candidate with Exam Seat Number / Roll Number, Name of the Guide, Name of the Department, Institution and Year and University
- Seminar Approval Sheet/Certificate
- Abstract and Keywords
- Acknowledgements
- Table of Contents, List of Figures, List of Tables and Nomenclature
- Chapters Covering topic of discussion- Introduction with section including organization of the report, Literature Survey/Details of design/technology/Analytical and/or experimental work, if any/,Discussions and Conclusions ,Bibliography/References
- Plagiarism Check report
- Report Documentation page

Reference Books :

1. Rebecca Stott, Cordelia Bryan, Tory Young, "Speaking Your Mind: Oral Presentation and Seminar Skills (Speak-Write Series)", Longman, ISBN-13: 978-0582382435



Home

2. John	2. Johnson-Sheehan, Richard, "Technical Communication", Longman. ISBN 0-321-11764-6											
3. Vikas	3. Vikas Shirodka, "Fundamental skills for building Professionals", SPD, ISBN 978-93-5213-146-5											
	<u>@The CO-PO Mapping Matrix</u>											
PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	2	1	-	-	-	-	-	-	-	-
CO2	-	1	2	1	-	-	-	-	-	-	-	-
CO3	2	1	1	-	-	-	-	-	-	-	-	-
CO4	1	2	2	1	-	-	-	-	-	-	-	-



Savitribai Phule Pune University Third Year of Engineering (2019 Course) 310250: Audit Course 5

In addition to credits, it is recommended that there should be audit course, in preferably in each semester starting from second year in order to supplement students' knowledge and skills. Student will be awarded the bachelor's degree if he/she earns specified total credit [1] and clears all the audit courses specified in the curriculum. The student will be awarded grade as AP on successful completion of audit course. The student may opt for one of the audit courses per semester, starting in second year first semester. Though not mandatory, such a selection of the audit courses helps the learner to explore the subject of interest in greater detail resulting in achieving the very objective of audit course's inclusion. List of options offered is provided. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at Institute level itself. Method of conduction and method of assessment for audit courses are suggested.

Criteria

The student registered for audit course shall be awarded the grade AP (Audit Course Pass) and shall be included such AP grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at Institute level itself [1]

Guidelines for Conduction and Assessment (Any one or more of following but not limited to):

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Surveys

Mini-Project Hands on experience on focused topic •

Home

Demonstrations or presentations •

Course Guidelines for Assessment (Any one or more of following but not limited to):

- Written Test •
- **Demonstrations/ Practical Test** •
- Presentation or Report

Audit Course 5 Options								
Audit Course Code	Audit Course Title							
AC5-I	Cyber Security							
AC5-II	Professional Ethics and Etiquette							
AC5-III	MOOC- Learn New Skills							
AC5- IV	Engineering Economics							
AC5-V	Foreign Language (one of Japanese/ Spanish/ French/ German). Course contents for Japanese (Module 3) are provided. For other languages institute may design suitably.							

Note: It is permitted to opt one of the audit courses listed at SPPU website too, if not opted earlier. http://collegecirculars.unipune.ac.in/sites/documents/Syllabus%202017/Forms/AllItems.aspx http://www.unipune.ac.in/university_files/syllabi.htm



AC5-I: Cyber Security

Prerequisites: Computer Network and Security (310244)

Course Objectives:

- To motivate students for understanding the various scenarios of cybercrimes
- To increase awareness about the cybercrimes and ways to be more secure in online activities
- To learn about various methods and tools used in cybercrimes
- To analyze the system for various vulnerabilities

Course Outcomes : On completion of the course, learners will be able to

CO 1: Understand and classify various cybercrimes

- CO 2: Understand how criminals plan for the cybercrimes
- CO 3: Apply tools and methods used in cybercrime
- CO 4: Analyze the examples of few case studies of cybercrimes

Course Contents

- 1. Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Cybercriminals, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective.
- 2. Cyber offenses: How Criminals Plan Them: Introduction, How Criminals Plan the Attacks, Social Engineering, Cyberstalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.
- **3.** Tools and Methods Used in Cybercrime : Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks (Expected to cover the introduction to all these terms).
- 4. Cybercrime: Illustrations, Examples and Mini-Cases: Introduction, Real-Life Examples, Mini-Cases, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios, Digital Forensics Case Illustrations, Online Scams.

Text Books :

1. Nina Godbole, Sunit Belapure , "Cyber Security- Understanding Cyber Crimes", Computer Forensics and Legal Perspectives, Wiely India Pvt.Ltd, ISBN- 978-81-265-2179-1

2. William Stallings, "Computer Security: Principles and Practices", Pearson 6th Ed, ISBN 978-0-13-335469-0

Reference Books :

- 1. Berouz Forouzan, "Cryptography and Network Security", TMH, 2 edition, ISBN -978-00-707-0208-0. 5.
- **2.** Mark Merkow, "Information Security-Principles and Practices", Pearson Ed., ISBN- 978-81-317-1288-7
- **3.** CK Shyamala et el., "Cryptography and Security", Wiley India Pvt. Ltd, ISBN-978-81-265-2285-9

© The CO-1 O Mapping Matrix												
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	1	1	1	1	2	1	-	3	-	1	-	2
CO2	1	1	1	1	1	1	-	3	-	1	-	2
CO3	1	1	1	1	1	1	-	3	-	1	-	2
CO4	1	1	1	1	1	1	-	3	-	1	-	2

@The CO-PO Mapping Matrix



AC5-II: Professional Ethics and Etiquettes

Prerequisites: Business Communication Skill

Course Objectives:

- To learn importance of ethics and the rules of good behavior for today's most common social and • business situations
- To acquire basic knowledge of ethics to make informed ethical decisions when confronted with problems in the working environment
- To develop an understanding towards business etiquettes and the proper etiquette practices for different business scenarios
- To learn the etiquette requirements for meetings, entertaining, telephone, email and Internet business interaction scenario

Course Outcomes:

On completion of the course, learners will be able to

CO1: Summarize the principles of proper courtesy as they are practiced in the workplace

CO2: Apply proper courtesy in different professional situations

CO3: Practice and apply appropriate etiquettes in the working environment and day to day life **CO4:** Build proper practices personal and business communications of Ethics and Etiquettes

Course Contents

- 1. Introduction to Ethics: Basics, Difference Between Morals, Ethics, and Laws, Engineering Ethics: Purpose of Engineering Ethics-Professional and Professionalism, Professional Roles to be played by an Engineer, Uses of Ethical Theories, Professional Ethics, Development of Ethics.
- 2. Professional Ethics: IT Professional Ethics, Ethics in the Business World, Corporate Social Responsibility, Improving Corporate Ethics, Creating an Ethical Work Environment, Including Ethical Considerations in Decision Making, Ethics in Information Technology, Common Ethical issues for IT Users, Supporting the Ethical Practices of IT users.
- 3. Business Etiquette: ABC's of Etiquette, Developing a Culture of Excellence, The Role of Good Manners in Business, Enduring Words Making Introductions and Greeting People: Greeting Components, The Protocol of Shaking Hands, Introductions, Introductory Scenarios, Addressing Individuals Meeting and Board Room Protocol: Guidelines for Planning a Meeting, Guidelines for Attending a Meeting.
- 4. Professional Etiquette: Etiquette at Dining, Involuntary Awkward Actions, How to Network, Networking Etiquette, Public Relations Office(PRO)'s Etiquettes, Technology Etiquette : Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, interview Etiquette, Dressing Etiquettes : for interview, offices and social functions.

References Books:

- 1. Ghillyer, "Business Ethics Now", 3rd Edition, McGraw-Hill.
- 2. George Reynolds, "Ethics in Information Technology", Cengage Learning, ISBN-10:1285197151.
- 3. Charles E Harris, Micheat J. Rabins, "Engineering Ethics", Cengage Learning, ISBN-13:978-1133934684,4th Edition.

	<u>@The CO-PO Mapping Matrix</u>											
CO	ΡΟ1	PO	PU3	ΡΩΙ	PO5	PO6	PO7	POS		PO10	PO11	PO12
PO	101	102	105	104	105	100	107	100	109	1010	1011	1012
CO1	-	-	-	-	-	1	1	3	1	2	-	2
CO2	-	-	-	-	-	1	1	3	1	2	-	2
CO3	-	-	-	-	-	1	1	3	1	2	-	2
CO4	-	-	-	-	-	1	1	3	1	2	-	2

AC5-III: MOOC- Learn New Skills (Full stack Developer)

Prerequisites: Programming Skills

Course Objectives:

- To understand the fundamental concepts in designing web based applications and applying frontend and backend technologies
- To understand the fundamental concepts in applying database techniques in application
- To progress the student towards term "industry ready engineer"

Course Outcomes:

On completion of the course, learners will be able to

- **CO1:** Design and develop web application using frontend and backend technologies.
- CO2: Design and develop dynamic and scalable web applications

CO3: Develop server side scripts

CO4: Design and develop projects applying various database techniques

Course Contents

Full stack Developer

- 1. HTML5
- 2. CSS3
- 3. Bootstrap
- 4. Vanilla JS (ES6+)
- 5. Flask or Django
- 6. Wagtail CMS
- 7. Node.js
- 8. MySQL
- 9. jQuery

Team Projects: Design and develop an e-commerce a dynamic, scalable and responsive web application. (Sample Project similar problem statements and be formulated).

Reference Books:

- 1. Laura Lemay, Rafe Colburn and Jennifer Kyrnin, "Mastering HTML, CSS & Javascript Web Publishing", SAMS, BPB Publications
- 2. DT Editorial Services "HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)" 2Ed, Dreamtech Press.

	<u>Wine CO-PO Mapping Matrix</u>											
CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	1	1	1	1	1	1	1
CO2	3	3	3	3	3	1	1	1	1	1	1	1
CO3	3	3	3	3	3	1	1	1	1	1	1	1
CO4	3	3	3	3	3	1	1	1	1	1	1	1



AC5-IV: Engineering Economics

Engineering economics is one of the most practical subject matters in the engineering curriculum, but it is an always challenging, ever-changing discipline. Engineers are planners and builders. They are also problem solvers, manager, decision makers. Engineering economics touches of these activities.

Course Objectives:

- To understand engineering economics and money management
- To understand financial project analysis
- To estimate project cost and apply for business
- To understand making financial decisions when acting as team member or manager in the engineering project

Course Outcomes:

On completion of the course, learners will be able to

- **CO1:** Understand economics, the cost money and management in engineering
- CO2: Analyze business economics and engineering assets evaluation
- CO3: Evaluate project cost and its elements for business
- CO4: Develop financial statements and make business decisions

Course Contents

- 1. Understanding money and its management: Engineering Economic Decisions, Time value of money, Money management, Equivalence calculations.
- 2. Evaluating business and engineering assets: Present worth analysis, Annual equivalence Analysis, Rate of Return Analysis, Benefit Cost Analysis.
- **3. Development project cash flow**: Accounting of Income Taxes, Project cash flow Analysis, Handling Project Uncertainty.
- **4. Special topics in Engineering Eonomics**: Replacement decisions, understanding financial statements.

Reference Books :

- 1. Chan S Park, "Fundamentals of Engineering Economics", Pearson, ISBN-13: 9780134870076
- 2. James Riggs, "Engineering Economics", Tata McGraw-Hill, ISBN 13: 9780070586703

CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	1	1	1	-	-	-	-	-	2	2	3	1
CO2	1	1	1	-	-	-	-	-	2	2	3	1
CO3	1	1	1	-	-	-	-	-	2	2	3	1
CO4	1	1	1	-	-	-	-	-	2	2	3	1

@The CO-PO Mapping Matrix



AC5-V: Foreign Language (Japanese) Module 3

Prerequisites: We recommend that candidates should have previously completed AC3-V(210251) and AC4-V (210260)

Course Objectives:

- To open up more doors and job opportunities
- To introduce to Japanese society, culture and entertainment

Course Outcomes:

On completion of the course, learners will be able to

- CO1: Apply language to communicate confidently and clearly in the Japanese language
- **CO2:** Understand and use Japanese script to read and write
- CO3: Apply knowledge for next advance level reading, writing and listening skills
- CO4: Develop interest to pursue further study, work and leisure

Course Contents

- 1. The Kanji: Brief Historical Outline, Introduction to Kanji, From Pictures to characters
- 2. Read and Write 58 Kanji Characters, talk about yourself/family/others, things, time, events, and activities-in the present, future, and past tense; shop at stores and order food at restaurants;
- 3. Lessons: Karate, Park(Playground), The Grandpa's Inaka, The Sun and the Moon, My little sister, Rice Fields, My Teacher, People who Exit and People who Enter.

Reference Books :

- 1. Japanese Kanji and Kana, "A complete guide to the Japanese writing system", Wolfgang Hadamitzky & Mark Spahn, Tuttle Publishing, Third edition ISBN: 978-1-4629-1018-2 (eBook)
- **2.** Banno, Eri, Yoko Ikeda, et al. Genki I, "An Integrated Course in Elementary Japanese", 2nd ed. Japan Times/Tsai Fong Books, 2011. ISBN: 9784789014403.
- **3.** Anna Sato and Eriko Sato, "My First Japanese Kanji Book, Learning kanji the fun and easy way", TUTTLE PUBLISHING, First Edition ISBN: 978-1-4629-1369-5 (eBook)

	<u>@The CO-PO Mapping Matrix</u>											
CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	-	-	-	1	3	1	1
CO2	-	-	-	-	1	-	-	-	-	3	1	1
CO3	-	-	-	-	1	-	-	-	-	3	2	2
CO4	-	-	-	-	-	-	-	-	-	1	-	1

#54/87

Savitribai Phule Pune University Third Year of Computer Engineering (2019 Course) 310255: Internship**											
Teaching Scheme:	Credit: 04	Examination Scheme:									
** Term work: 100 Marks											
Course Objectives:	·										
Internship provides a	n excellent opportuni	ity to learner to see how the conceptual aspects learned in									
classes are integrated	l into the practical wo	orld. Industry/on project experience provides much more									
professional experier	nce as value addition t	to classroom teaching.									
• To encourage	and provide opportun	nities for students to get professional/personal experience									
through internships.											
• To learn and understand real life/industrial situations.											
• To get familiar with various tools and technologies used in industries and their applications.											

- To nurture professional and societal ethics.
- To create awareness of social, economic and administrative considerations in the working environment of industry organizations.

Course Outcomes:

On completion of the course, learners should be able to

CO1: To demonstrate professional competence through industry internship.

CO2: To apply knowledge gained through internships to complete academic activities in a professional manner.

CO3: To choose appropriate technology and tools to solve given problem.

CO4: To demonstrate abilities of a responsible professional and use ethical practices in day to day life.

CO5: Creating network and social circle, and developing relationships with industry people. **CO6:** To analyze various career opportunities and decide carrier goals.

**** Guidelines:**

Internships are educational and career development opportunities, providing practical experience in a field or discipline. Internships are far more important as the employers are looking for employees who are properly skilled and having awareness about industry environment, practices and culture. Internship is structured, short-term, supervised training often focused around particular tasks or projects with defined time scales.

Core objective is to expose technical students to the industrial environment, which cannot be simulated/experienced in the classroom and hence creating competent professionals in the industry and to understand the social, economic and administrative considerations that influence the working environment of industrial organizations.

Engineering internships are intended to provide students with an opportunity to apply conceptual knowledge from academics to the realities of the field work/training. The following guidelines are proposed to give academic credit for the internship undergone as a part of the Third Year Engineering curriculum.

Duration:

Internship is to be completed after semester 5 and before commencement of semester 6 of at least 4 to 6 weeks; and it is to be assessed and evaluated in semester 6.

Internship work Identification:

Student may choose to undergo Internship at Industry/Govt. Organizations/NGO/MSME/Rural Internship/ Innovation/IPR/Entrepreneurship. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with

industry/NGO's/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry [1].

Students must register at Internshala [2]. Students must get Internship proposals sanctioned from college authority well in advance. Internship work identification process should be initiated in the Vth semester in coordination with training and placement cell/industry institute cell/ internship cell. This will help students to start their internship work on time. Also, it will allow students to work in vacation period after their Vth semester examination and before academic schedule of semester VI. Student can take internship work in the form of the following but not limited to:

Working for consultancy/ research project,

Contribution in Incubation/ Innovation/ Entrepreneurship Cell/ Institutional Innovation Council/ startups cells of institute /

Learning at Departmental Lab/Tinkering Lab/ Institutional workshop,

Development of new product/ Business Plan/ registration of start-up,

Industry / Government Organization Internship,

Internship through Internshala,

In-house product development, intercollegiate, inter department research internship under research lab/group, micro/small/medium enterprise/online internship,

Research internship under professors, IISC, IIT's, Research organizations,

NGOs or Social Internships, rural internship,

Participate in open source development.

Internship Diary/ Internship Workbook:

Students must maintain Internship Diary/ Internship Workbook. The main purpose of maintaining diary/workbook is to cultivate the habit of documenting. The students should record in the daily training diary the day-to-day account of the observations, impressions, information gathered and suggestions given, if any. The training diary/workbook should be signed every day by the supervisor. Internship Diary/workbook and Internship Report should be submitted by the students along with attendance record and an evaluation sheet duly signed and stamped by the industry to the Institute immediately after the completion of the training.

Internship Work Evaluation:

Every student is required to prepare a maintain documentary proofs of the activities done by him as internship diary or as workbook. The evaluation of these activities will be done by Programme Head/Cell In-charge/ Project Head/ faculty mentor or Industry Supervisor based on- Overall compilation of internship activities, sub-activities, the level of achievement expected, evidence needed to assign the points and the duration for certain activities.

Assessment and Evaluation is to be done in consultation with internship supervisor (Internal and External – a supervisor from place of internship.

Recommended evaluation parameters-Post Internship Internal Evaluation -50 Marks + Internship Diary/Workbook and Internship Report - 50 Marks

Evaluation through Seminar Presentation/Viva-Voce at the Institute-

The student will give a seminar based on his training report, before an expert committee constituted by the concerned department as per norms of the institute. The evaluation will be based on the following criteria:



Depth of knowledge and skills: Communication and Presentation Skills Team Work Creativity Planning and Organizational skills Adaptability Analytical Skills Attitude and Behavior at work Societal Understanding Ethics Regularity and punctuality Attendance record Diary/Work book Student's Feedback from External Internship Supervisor After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period. Internship Diary/workbook may be evaluated on the basis of the following criteria: Proper and timely documented entries Adequacy & quality of information recorded Data recorded Thought process and recording techniques used Organization of the information The report shall be presented covering following recommended fields but limited to, Title/Cover Page Internship completion certificate Internship Place Details- Company background-organization and activities/Scope and object of the study / Supervisor details Index/Table of Contents Introduction Title/Problem statement/objectives Motivation/Scope and rationale of the study Methodological details Results / Analysis /inferences and conclusion Suggestions / Recommendations for improvement to industry, if any Attendance Record Acknowledgement List of reference (Library books, magazines and other sources) Feedback from internship supervisor(External and Internal) Post internship, faculty coordinator should collect feedback about student with following recommended parameters-Technical knowledge, Discipline, Punctuality, Commitment, Willingness to do the work, Communication skill, individual work, Team work, Leadership..... Reference: [1] https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf

[2] https://internship.aicte-india.org/

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Savitribai Phule Pune University Third Year of Engineering (2019 Course) 310259: Audit Course 6

In addition to credits, it is recommended that there should be audit course, in preferably in each semester starting from second year in order to supplement students' knowledge and skills. Student will be awarded the bachelor's degree if he/she earns specified total credit [1] and clears all the audit courses specified in the curriculum. The student will be awarded grade as AP on successful completion of audit course. The student may opt for one of the audit courses per semester, starting in second year first semester. Though not mandatory, such a selection of the audit courses helps the learner to explore the subject of interest in greater detail resulting in achieving the very objective of audit course's inclusion. List of options offered is provided. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at institute level itself. Method of conduction and method of assessment for audit courses are suggested.

Criteria

The student registered for audit course shall be awarded the grade AP (Audit Course Pass) and shall be included such AP grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself [1]

Guidelines for Conduction and Assessment (Any one or more of following but not limited to):

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports

- Surveys
- Mini-Project

• Demonstrations

• Hands on experience on focused topic

Home

Course Guidelines for Assessment (Any one or more of following but not limited to):

- Written Test
- Demonstrations/ Practical Test
- Presentations, IPR/Publication and Report

Audit Course 6 Options

Audit Course Code	Audit Course Title							
AC6-I	Digital and Social Media Marketing							
AC6-II	Sustainable Energy Systems							
AC6-III	Leadership and Personality Development							
AC6-IV	Foreign Language (one of Japanese/Spanish/French/German). Course contents for Japanese (Module 4) are provided. For other languages institute may design suitably.							
AC6-V	MOOC- Learn New Skills							
Note: It is permi	tted to opt one of the audit courses listed at SPPU website too, if not opted earlier.							
http://collegecirc	http://collegecirculars.unipune.ac.in/sites/documents/Syllabus%202017/Forms/AllItems.aspx							
http://www.unip	http://www.unipune.ac.in/university_files/syllabi.htm							



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AC6-I Digital and Social Media Marketing												
Prerequisites: Internet Technologies												
Course Objectives:												
• To understand the importance of digital marketing												
• To understand the social media and marketing												
• To understand the effective marketing strategies and ways												
Course O	utcom	es:										
On comple	etion of	f the co	ourse, le	arners	will be a	able to						
CO1:	Unders	stand th	e funda	mental	s and in	nportan	ce of dig	gital ma	rketing			
CO2:	Use the	e powe	r of soc	ial med	ia for bi	usiness	marketi	ng				
CO3:	Analyz	the e	ffective	ness of	digital	marketi	ng and	social n	nedia ov	ver tradi	tional	
]	process	3										
					Cour	se Con	tents					
 A Framework for Digital Marketing Domain Names, Email, and Hosting Yes, You need a Website The Three Components of a Modern Website: Mobile, Fast, and Accessible Lock It Down: Digital Privacy, Data Security, and the Law Social Media Email Marketing Online Advertising Reference Books : Avery Swartz, "See You on the Internet: building your small business with Digital Marketing", ISBN 978-1-989603-08-6. Social Media Marketing 1). 												
	<u>@The CO-PO Mapping Matrix</u>											
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	_	1	-	1	_	1	_	_	_	_
<u> </u>		1	2		1						1	+

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CO3



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AC6-II Sustainable Energy Systems

Prerequisites: General awareness of environment and natural resources of energy

Course Objectives:

- To understand the importance of sustainable energy systems development
- To create awareness about renewable energy sources and technologies
- To learn about adequate inputs on a variety of issues in harnessing renewable energy
- To recognize current and possible future role of renewable energy sources

Course Outcomes:

On completion of the course, learners will be able to

CO1: Comprehend the importance of Sustainable Energy Systems

CO2: Correlate the human population growth and its trend to the natural resource degradation and develop the awareness about his/her role towards Sustainable Energy Systems protection **CO3:** Identify different types of natural resource pollution and control measures

CO4: Correlate the exploitation and utilization of conventional and non-conventional resources

Course Contents

- 1. **Wind Energy:** Power in the Wind, Types of Wind Power Plants (WPPs), Components of WPPs, Working of WPPs, Siting of WPPs, Grid integration issues of WPPs.
- 2. Solar Pv and Thermal Systems: Solar Radiation, Radiation Measurement, Solar Thermal Power Plant, Central Receiver Power Plants, Solar Ponds, Thermal Energy storage system with PCM, Solar Photovoltaic systems: Basic Principle of SPV conversion, Types of PV Systems, Types of Solar Cells, Photovoltaic cell concepts: Cell, module, array, PV Module I-V Characteristics, Efficiency and Quality of the Cell, series and parallel connections, maximum power point tracking, Applications.
- 3. Other Energy Sources: Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems. Wave Energy: Energy from waves, wave power devices. Ocean Thermal Energy Conversion (OTEC), Hydrogen Production and Storage. Fuel cell: Principle of working, various types, construction and applications. Energy Storage System, Hybrid Energy Systems.

Reference Books :

- 1. Joshua Earnest, Tore Wizeliu, "Wind Power Plants and Project Development", PHI Learning Pvt.Ltd, New Delhi, 2011.
- 2. D.P.Kothari, K.C Singal, Rakesh Ranjan, "Renewable Energy Sources and Emerging Technologies", PHI Learning Pvt.Ltd, New Delhi, 2013.
- 3. A.K.Mukerjee and Nivedita Thakur, "Photovoltaic Systems: Analysis and Design", PHI Learning Private Limited, New Delhi, 2011

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
CO1	-	-	-	-	-	-	1	-	-	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	1
CO3	-	-	-	-	-	-	1	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	2
		•	•			•		•	•	•		

<u>@The CO-PO Mapping Matrix</u>



AC6-III Leadership and Personality Development

Prerequisites: General awareness of communication and relationship.

Course Objectives:

- To understand the importance of communication
- To create awareness about teamwork and people skills
- To know thyself
- To recognize current and possible future of new-age thinking

Course Outcomes:

On completion of the course, learners will be able to

- **CO1:** Express effectively through communication and improve listening skills
- CO3: Develop effective team leadership abilities.
- **CO4:** Explore self-motivation and practicing creative/new age thinking.
- **CO5:** Operate effectively in heterogeneous teams through the knowledge of team work, people skills and leadership qualities.

Course Contents

1. Communication :

Listening Skills, Communication - 7 C's, Vision and Charisma, Planning and Organizing - Complex Tasks and Ideas --> Actionable Tasks, Presentation Skills.

2. Teamwork and People Skills :

Talent Picking skills, Strong networking and Employee engagement, Coach and Mentor the team, Influencing, Delegate and Empower, Generous, open communicator, Patience and Clarity of Mind, Inspire and Motivate, Ensure Team Cohesion, Empathy, Trust and Reliability.

3. New-age Thinking :

Strategic Thinking, Critical and Lateral Thinking, Problem Solving Skills, Flexibility, Change Management – VUCA.

4. Self-Awareness :

What is Self? – Real, Ideal and Social Self, Concepts related to Self - Self Concept, Self-Presentation, Self-Regulation and Impression Management, Definition and Causes of Prejudice, Relationship between Prejudice, Discrimination and Exclusion, Application – Attitudinal Change and Reducing Prejudices, Self Esteem and Self Awareness, SWOT – JOHARI, Self Esteem Quiz, Introduce Your Partner, Self Introduction - How to sell yourself?-appearance, voice modulation, verbal(simple language), Motivation and Optimism, Positive Emotions and Success.

Reference Books :

- 1. Paul Sloane, "The Leader's Guide to Lateral Thinking Skills Unlocking the Creativity and Innovation in You and Your Team", 2006
- 2. Ronald Bennett, Elaine Millam, "Leadership for engineers : the magic of mindset"
- 3. Urmila Rai and S.M. Rai, "Business Communication", Himalay Publication House
- 4. Baron R, Byrne D, Branscombe N, BharadwajG (2009), "Social Psychology, Indian adaptation", Pearson, New Delhi
- 5. Baumgartner S.R, Crothers M.K. (2009) "Positive Psychology", Pearson Education.

<u>@The CO-PO Mapping Matrix</u>												
CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	1							1	1			
CO1		-	-	-	-	2	-			3	-	2

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http://collegecirculars.unipune.ac.in/sites/documents/Syllabus2020/Forms/AllItems.aspx

Curriculum for Third Year of Computer Engineering (2019 Course), Savitribai Phule Pune University

						, a.					·	
CO2	-	-	-	-	-	-	-	1	-	2	1	2
CO3	-	-	-	-	-	1	-	-	2	1	-	1
CO4	-	-	-	-	-	-	-	1	-	-	2	1
AC6-IV: Foreign Language (Japanese) Module 4												
Prerequisites: We recommend that candidates should have previously completed AC3-V(210251),												
AC4-V (210260) and AC-5(310250)												
Course Objectives:												
To open up more doors and job opportunities												
	 To open up more doors and job opportunities To introduce to Japanese society, culture and entertainment. 											
Com		ouuce	io sapan		cty, cun		cincital					
Cours		les:	1			1 /						
On cor	npletion c	of the c	ourse, le	earner w	ill be ab	ole to						
CC)1: Have t	the abi	lity to co	ommuni	cate con	fidently	and cle	arly in tl	he Japan	iese lang	guage	
CC	D2: Under	stand t	he natui	e of Jap	anese sc	cript						
CC)3: Get in	troduce	ed to rea	ding, w	riting ar	nd listen	ing skill	S				
CC)4: Devel	op inte	rest to p	ursue fu	rther stu	udy, woi	k and le	isure				
r												
					Cou	rse Con	tents					
1. Introduction to types of adjectives (i and na)												
2	2 Formation of adjectives (according to tense / negative / affirmative)											
3	2. Introduction to more particles											
J.	Malring		nore par	vonious	montiala	a / wark	/ adjact	ina				
4.				various		s / verbs			1 17 / 1			
5.	Topic bas	ed voc	abulary	(Places	/ Train t	travel re	lated / T	echnica	l Kataka	ina word	ls)	
6.	More vert	o forms	s (te fori	n, ta for	m, nai f	orm, roc	ot verb e	tc.)				
7.	Question	words										
8.	Further 25	5 Kanji	S									
9.	Scenario I	based c	onversa	tion pra	ctice / sl	kits / rol	e plays ((At the r	narket, A	At the h	ospital e	tc.)
Refer	ence Bool	KS :										
1.	Minna N	o Niho	ngo, "Ja	panese	for Ever	yone", I	Elementa	ary Mair	n Text be	ook1-1 (Indian	
	Edition),	Goyal	Publish	ers and	Distribu	tors Pvt	.Ltd.					
2.	http://ww	w.tcs.	com (htt	p://www	v.tcs.coi	m/news	events/r	press_rel	leases/Pa	ages/TC	S-Inaug	urates-
	Japan-ce	ntric-D	eliverv-	Center-	Pune.as	px) -	1	_		-	U	
3	Kazuko	Karasa	wa Mik	iko Shil	niva "N	Jihongo	Challen	ge N4 N	15 Kann	ii Tomo	ko Kioa	mi"
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<i>a</i> a				<u>@The</u>	<u>CO-P</u>	<u>O Mar</u>	ping N	<u>latrix</u>		-	-	
CO\P	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO	PO
										10	11	12
<u>CO1</u>	-	-	-	-	-	-	-	-	1	3	1	
CO2	-	-	-	-	1	-	-	-	-	3	1	1

AC6-V: MOOC- Learn New Skills

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Prerequisites: Software Engineering (210253)

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CO3

CO4

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Course Objectives:

- To understand the fundamentals of DevOps
- To understand the Agility and ways of Agility
- To understand the software development using Agility approach

Course Outcomes:

On completion of the course, learner will be able to

CO1: Illustrate the agility and principles

CO2: Understand the software development using agile methodology

CO3: Apply DevOps for the software product development

CO4: Develop software products for early delivery through continual feedback and learning

Course Contents

- 1. **THE THREE WAYS :** Agile, continuous delivery and the three ways, The First Way: The Principles of Flow, The Second Way: The Principle of Feedback, The Third Way: The Principles of Continual Learning.
- 2. WHERE TO START : Selecting which value stream to start with, Understanding the work in our value stream..., How to design our organization and architecture, How to get great outcomes by integrating operations into the daily work for development.
- 3. **THE FIRST WAY: THE TECHNICAL PRACTICES OF FLOW :** Create the foundations of our deployment pipeline, Enable fast and reliable automated testing, Enable and practice continuous integration, Automate and enable low-risk releases, Architect for low-risk releases.
- 4. **THE SECOND WAY: THE TECHNICAL PRACTICES OF FEEDBACK :** Create telemetry to enable seeing and solving problems, Analyze telemetry to better anticipate problems, Enable feedback so development and operation can safely deploy code, Integrate hypothesis-driven development and A/B testing into our daily work, Create review and coordination processes to increase quality of our current work.
- 5. **THE THRID WAY: THE TECHNICAL PRACTICES OF CONTINUAL LEARNING :** Enable and inject learning into daily work, Convert local discoveries into global improvements, Reserve time to create organizational learning, Information security as everyone's job, every day, Protecting the deployment pipeline.

Reference Books :

- 1. Gene Kim, Jez Humble, Petrick Debois, "The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations"
- 2. Len Bass, Ingo Weber, Liming Zhu, "DevOps: A Software Architect's Perspective " Publisher(s): Addison-Wesley Professional, ISBN: 9780134049885

<u>@The CO-PO Mapping Matrix</u>												
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	1	1	2	1	3	1	-	1	-	1	-	-
CO2	-	3	2	2	1	-	-	-	1	1	-	1
CO3	2	3	1	1	-	1	1	-	-	-	-	1
CO4	2	1	1	3	1	-	1	1	-	1	1	1



Faculty of Engineering Savitribai Phule Pune University, Pune

Maharashtra, India



Syllabus

for

Fourth Year of Computer Engineering (2015 Course)

(with effect from 2018-19)

www.unipune.ac.in

	Savitribai Phule Pune University Fourth Year of Computer Engineering (2015 Course) (with effect from 2018-19)											
Semester I												
Course Code	Course	Teachin Hours	g Scheme / Week	Ex	aminati	on Sch	eme a	and Ma	rks	Cre	Credit	
		Theory	Practical	In- Sem	End- Sem	TW	PR	OR/ *PRE	Total	TH/ TUT	PR	
410241	High Performance Computing	04		30	70				100	04		
410242	Artificial Intelligence and Robotics	03		30	70				100	03		
410243	Data Analytics	03		30	70				100	03		
410244	Elective I	03		30	70				100	03		
410245	Elective II	03		30	70				100	03		
410246	Laboratory Practice I		04			50	50		100		02	
410247	<u>Laboratory</u> Practice II		04			50		*50	100		02	
410248	<u>Project Work</u> Stage I		02					*50	50		02	
		•						Total	Credit	16	06	
	Total	16	10	150	350	100	50	100	750	22	2	
410249	Audit Course 5									Gra	de	
Elective I Elective II												
410244 (A) Digital Signal Processing 410245 (A) Distributed Systems												
410244 (B) Software Architecture and Design 410245 (B) Software Testing and Quality Assurance												
410244 (C) Pervasive and Ubiquitous Computing 410245 (C) Operations Research												
410244 (I	D) <u>Data Mining and</u>	Warehou	sing	4102	245 (D)	Mobile	Com	munica	tion			

410249-Audit Course 5 (AC5) Options:

AC5-I	Entreprene	eurship Development	AC5-IV:	Industrial Safety and Environment Consciousness
AC5-II:	Botnet of	Things	AC5-V:	Emotional Intelligence
AC5-III:	3D Printin	g	AC5-VI:	MOOC- Learn New Skills
Abbrevia	ations:			
TW: Terr	m Work	TH: Theory	OR: Oral	PR: Practical
Sem: Sei	mester	PRE: Project/ Mini	-Project Presen	tation

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Savitribai Phule Pune University, Pune Fourth Year of Computer Engineering (2015 Course) 410249: Audit Course 5

AC5 – I: Entrepreneurship Development

This Course Aims at Instituting Entrepreneurial skills in the students by giving an overview of, who the entrepreneurs are and what competences are needed to become an entrepreneur.

Course Objectives:

- To introduce the aspects of Entrepreneurship
- To acquaint with legalities in product development
- To understand IPR, Trademarks, Copyright and patenting
- To know the facets of functional plans, Entrepreneurial Finance and Enterprise Management

Course Outcome:

On completion of the course, learner will be able to-

- Understand the legalities in product development
- Undertake the process of IPR, Trademarks, Copyright and patenting
- Understand and apply functional plans
- Manage Entrepreneurial Finance
- Inculcate managerial skill as an entrepreneur

Course Contents:

- 1. Introduction: Concept and Definitions, Entrepreneur v/s Intrapreneur; Role of entrepreneurship in economic development; Entrepreneurship process; Factors impacting emergence of entrepreneurship; Managerial versus entrepreneurial Decision Making; Entrepreneur v/s Investors; Entrepreneurial attributes and characteristics; Entrepreneurs versus inventors; Entrepreneurial Culture; Women Entrepreneurs; Social Entrepreneurship; Classification and Types of Entrepreneurs; EDP Programmers; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs.
- 2. Creating Entrepreneurial Venture : Generating Business idea- Sources of Innovation, methods of generating ideas, Creativity and Entrepreneurship; Business planning process; Drawing business plan; Business plan failures; Entrepreneurial leadership components of entrepreneurial leadership; Entrepreneurial Challenges; Legal issues forming business entity, considerations and Criteria, requirements for formation of a Private/Public Limited Company, Intellectual Property Protection Patents Trademarks and Copyrights.
- **3. Functional plans:** Marketing plan–for the new venture, environmental analysis, steps in preparing marketing plan, marketing mix, contingency planning; Organizational plan designing organization structure and Systems; Financial plan pro forma income statements, Ratio Analysis.
- **4. Entrepreneurial Finance:** Debt or equity financing, Sources of Finance Commercial banks, private placements, venture capital, financial institutions supporting entrepreneurs; Lease Financing; Funding opportunities for Startups in India.
- **5. Enterprise Management:** Managing growth and sustenance- growth norms; Factors for growth; Time management, Negotiations, Joint ventures, Mergers and acquisitions

- 1. Kumar, Arya, `` Entrepreneurship: Creating and Leading an Entrepreneurial Organization'', Pearson ISBN-10: 8131765784; ISBN-13: 978-8131765784 ...
- **2.** Hishrich., Peters, ``Entrepreneurship: Starting, Developing and Managing a New Enterprise'', ISBN 0-256-14147- 9
- 3. Irwin Taneja, "Entrepreneurship," Galgotia Publishers. ISBN: 978-93-84044-82-4
- **4.** Charantimath, Poornima, ``Entrepreneurship Development and Small Business Enterprises,'' Pearson Education, ISBN, 8177582607, 9788177582604.

Savitribai Phule Pune University, Pune Fourth Year of Computer Engineering (2015 Course) 410257: Audit Course 6 AC6 – I: Business Intelligence

Course Objectives:

- To understand the concept of Business Intelligence
- To know the details of Decision Support System
- To inculcate the concepts of Data Warehousing
- To understand the basics of design and management of BI systems

Course Outcome:

On completion of the course, learner will be able to-

- Apply the concepts of Business Intelligence in real world applications
- Explore and use the data warehousing wherever necessary
- Design and manage practical BI systems

Course Contents:

- **1.Concepts with Mathematical treatment :** Introduction to data, Information and knowledge, Decision Support System, Theory of Operational data and informational data, Introduction to Business Intelligence, Determining BI Cycle, BI Environment and Architecture, Identify BI opportunities, Benefits of BI. Role of Mathematical model in BI, Factors Responsible for successful BI Project, Obstacle to Business Intelligence in an Organization
- 2. Decision Making Concepts : Concepts of Decision Making, Techniques of Decision Support System (DSS), Development of Decision Support System (DSS), Applications of DSS, Role of Business Intelligence in DSS.
- **3. Data-Warehouse :** Introduction: Data warehouse Modeling, data warehouse design, data-warehouse technology, Distributed data warehouse, and materialized view
- **4.Data Pre-processing and outliers:** Data Analytics life cycle, Discovery, Data preparation, Preprocessing requirements, data cleaning, data integration, data reduction, data transformation, Data discretization, and concept hierarchy generation, Model Planning, Model building, Communicating Results and Findings, Operationalizing, Introduction to OLAP. Real-world Applications, types of outliers, outlier challenges, Outlier detection Methods, Proximity-Based Outlier analysis, Clustering Based Outlier analysis.
- **5.Designing and managing BI systems :** Determining infrastructure requirements, planning for scalability and availability, managing and maintenance of BI systems, managing BI operations or business continuity

- 1. R. Sharda, D. Delen, and E. Turban, Business Intelligence and Analytics. Systems for Decision Support,10th Edition. Pearson/Prentice Hall, 2015. ISBN-13: 978-0-13-305090-5, ISBN-10: 0-13-305090-4;
- 2. Business Process Automation, Sanjay Mohapatra, PHI.
- 3. Introduction to business Intelligence and data warehousing, IBM, PHI, ISBN: 9788120339279

Savitribai Phule Pune University, Pune Fourth Year of Computer Engineering (2015 Course) 410249: Audit Course 5

AC5 – IV: Industrial Safety and Environment Consciousness

Objective of Industrial Safety, Health Environment and Security covers virtually every important area in administration of SHE. It broadly discusses the major problems in safety management, occupational health and today's dynamic environment management of rapidly changing ambience, technological advances, whole gamut of safety laws, safety policy and it's designing and their meticulous implementation.

Course Objectives:

- To understand Industrial hazards and Safety requirements with norms
- To learn the basics of Safety performance planning
- To know the means of accident prevention
- To understand the impact of industrialization on environment
- To know the diversified industrial requirements of safety and security

Course Outcomes:

On completion of the course, learner will be able to-

- Formulate the plan for Safety performance
- Formulate the action plan for accidents and hazards
- Follow the safety and security norms in the industry
- Consider critically the environmental issues of Industrialization

Course Contents:

1. Introduction: Elements of safety programming, safety management, Upgrading developmental programmers: safety procedures and performance measures, education, training and development in safety.

2. Safety Performance Planning

Safety Performance: An overview of an accident, It is an accident, injury or incident, The safety professional, Occupational health and industrial hygiene. Understanding the risk: Emergency preparedness and response, prevention of accidents involving hazardous substances.

3. Accident Prevention

What is accident prevention?, Maintenance and Inspection, Monitoring Techniques, General Accident Prevention, Safety Education and Training.

4. Safety Organization

Basic Elements of Organized Safety, Duties of Safety Officer, Safe work Practices, Safety Sampling and Inspection, Job Safety Analysis(JSA), Safety Survey, On- site and Off-site Emergency Plan, Reporting of Accidents and Dangerous Occurrences.

5. Environment

Introduction, Work Environment, Remedy, pollution of Marine Environment and Prevention, Basic Environmental Protection Procedures, Protection of Environment in Global Scenario, Greenhouse Gases, Climate Change Impacts, GHG Mitigation Options, Sinks and Barriers,

6. Industrial Security(Industry wise)

General security Systems in Factories, Activation Security, Computer Security, Banking Security, V.I.P. Security, Women Security, Event Security, Security in Open Environments.

- 1. Basudev Panda ,"Industrial Safety, Health Environment and Security",Laxmi Publications, ISBN-10: 9381159432, 13: 978-9381159439
- 2. L.M. Deshmukh, "Industrial Safety Management", TMH, ISBN: 9780070617681

Savitribai Phule Pune University, Pune Fourth Year of Computer Engineering (2015 Course) 410249: Audit Course 5 AC5 – V: Emotional Intelligence

This Emotional Intelligence (EI) training course will focus on the five core competencies of emotional intelligence: self-awareness, self-regulation, motivation, empathy and interpersonal skills. Participants will learn to develop and implement these to enhance their relationships in work and life by increasing their understanding of social and emotional behaviors, and learning how to adapt and manage their responses to particular situations. Various models of emotional intelligence will be covered.

Course Objectives:

- To develop an awareness of EI models
- To recognize the benefits of EI
- To understand how you use emotion to facilitate thought and behavior
- To know and utilize the difference between reaction and considered response

Course Outcomes:

On completion of the course, learner will be able to-

- Expand your knowledge of emotional patterns in yourself and others
- Discover how you can manage your emotions, and positively influence yourself and others
- Build more effective relationships with people at work and at home
- Positively influence and motivate colleagues, team members, managers
- Increase the leadership effectiveness by creating an atmosphere that engages others

Course Contents:

- **1. Introduction to Emotional Intelligence (EI) :** Emotional Intelligence and various EI models, The EQ competencies of self-awareness, self-regulation, motivation, empathy, and interpersonal skills, Understand EQ and its importance in life and the workplace
- 2. Know and manage your emotions: emotions, The different levels of emotional awareness, Increase your emotional knowledge of yourself, Recognize 'negative' and 'positive' emotions. The relationship between emotions, thought and behavior, Discover the importance of values, The impact of not managing and processing 'negative' emotions, Techniques to manage your emotions in challenging situations
- **3. Recognize emotions in others :**The universality of emotional expression, Learn tools to enhance your ability to recognize and appropriately respond to others' emotions, Perceiving emotions accurately in others to build empathy
- **4. Relate to others**: Applying EI in the workplace, the role of empathy and trust in relationships, Increase your ability to create effective working relationships with others (peers, subordinates, managers, clients, Find out how to deal with conflict, Tools to lead, motivate others and create a high performing team.

- 1. Daniel Goleman," <u>Emotional Intelligence Why It Matters More Than IQ</u>,", Bantam Books, ISBN-10: 055338371X13: 978-0553383713
- 2. Steven Stein, "The EQ Edge", Jossey-Bass, ISBN : 978-0-470-68161-9
- 3. Drew Bird, "The Leader's Guide to Emotional Intelligence", ISBN: 9781535176002

Savitribai Phule Pune University, Pune Fourth Year of Computer Engineering (2015 Course) 410257: Audit Course 6 AC6 – V: Conversational Interfaces

Effective information security at the enterprise level requires participation, planning, and practice. It is an ongoing effort that requires management and staff to work together from the same script. Fortunately, the information security community has developed a variety of resources, methods, and best practices to help modern enterprises address the challenge. Unfortunately, employing these tools demands a high degree of commitment, understanding, and skill attributes that must be sustained through constant awareness and training.

Course Objectives:

- To understand the basics of conversation
- To know the interactive environments for conversational skills
- To acquaint with the speech to text and text to speech techniques

Course Outcome:

On completion of the course, learner will be able to-

- Develop an effective interface for conversation
- Explore advanced concepts in user interface

Course Contents:

- **1. Introduction to Conversational Interface:** Preliminaries, Developing a speech based Conversational Interface, Conversational Interface and devices.
- **2.** A technology of Conversation: Introduction, Conversation as Action, The structure of Conversation, The language of Conversation.

3. Developing a Speech-Based Conversational Interface: Implementing Text to Speech: Text Analysis, Wave Synthesis, Implementing Speech Recognition: Language Model, Acoustic Model, Decoding. Speech Synthesis Markup Language.

4. Advanced voice user interface design

- 1. Cathy Pearl, "Designing Voice User Interfaces: Principles of Conversational Experiences"
- 2. Michael McTear, ZoraidaCallejas, David Griol, "The Conversational Interface: Talking to Smart Devices"
- 3. Martin Mitrevski, "Developing Conversational Interfaces for iOS: Add Responsive Voice Control"
- 4. SriniJanarthanam, "Hands-On Chatbots and Conversational UI Development: Build chatbots"

Course	Course Name	Programme	Factor addressed
Code			
206266	Communication Skills		Professional Ethics
206267	Road Safety		Environment and Sustainability
206267	Smart Cities		Environment and Sustainability
206267	Stress Relief: Yoga and Meditation		Human Values
206267	Foreign Language – Japanese /German Module 1		Professional Ethics
206274	Professional Ethics and Etiquettes	Department of Instrumentation and	Professional Ethics
206274	Intellectual Property Rights	Control Engineering	Professional Ethics
206274	Employability Skill Development		Professional Ethics
206274	Foreign Language – Japanese /German Module 2		Professional Ethics
306267	Emotional Intelligence		Human Values
306267	Value Education		Human Values
306267	MOOC-Learn New Skills		Human Values
306267	Foreign Language – Japanese /German Module 3		Professional Ethics
406274	Engineering Management		Professional Ethics
406274	Principles of Management		Professional Ethics
406274	Project Management for Engineers		Professional Ethics
406274	Business Ethics.		Professional Ethics

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

<u>Department of Instrumentation and</u> <u>Control Engineering</u>

Academic Year: 2021-22

SAVITRIBAI PHULE PUNE UNIVERSITY

Syllabus

S. E. Instrumentation & Control (2019 Course- Credit Based)



Board of Studies Instrumentation & Control Engineering (w.e.f. June- 2020)

Savitribai Phule Pune University, Pune

SE Instrumentation and Control (2019 Course) Credit Based System

Subject		Teaching Scheme			Tatal	С	redits					
code	code		DD		1	ГН	DD	Oral	τ\λ/	Iotal	TH	PR/ TUT
		п	РК	Tut	Insem	Endsem		Urai	IVV			
207008	Engineering Mathematics III	3		1	30	70			25	125	3	1
206261	Sensors and Transducers	3	2		30	70	50			150	3	1
206262	Linear Integrated Circuits	3	2	-	30	70	25			125	3	1
206263	Electrical Measurements & Instrumentation	3	2	1. 197	30	70		25	1	125	3	1
206264	Control System Components	3	2	- 1	30	70	-	25	-	125	3	1
206265	Computational Techniques	r l	2	H				-1	25	25	1	1
206266	Communication Skills	5	2	ать 16 3 1	27	rdi <u>ar</u> a y Perantis	-1		25	25	NI.	1
206267	Audit Course- III	E.	1	4					4	1		
		15	12	01	150	350	75	50	75	700	15	07
SEMESTER- II												

SEMESTER-I

Subject	Subject	Teaching Scheme		्र		Credits						
code		тц	DD	Tut	ТН		DD	Oral	T14/	Total	TH	PR/ TUT
		10	PK	Tut	Insem	Endsem	PK	Orai	IVV			
206268	Control Systems	3	2		30	70		25		125	3	1
206269	Digital Electronics	3	2		30	70	25			125	3	1
206270	Process Loop Elements	3	2		30	70	50			150	3	1
206271	Signals and Systems	3	2		30	70			25	125	3	1
206272	Data Structures	3	2		30	70			25	125	3	1
206273	Project based learning		4						50	50		2
206274	Audit Course- IV											
		15	14		150	350	75	25	100	700	15	07

<u>SEMESTER-I</u>

Teaching Scheme:	Examination Scheme:	Total Marks: 25.
Practical: 2 Hrs/ Week	Term Work: 25 Marks	Total Credits: 1
		Term Work=1

Course Outcomes: On completion of the course, student will be able to:

- 1. Effectively communicate through verbal/oral communication and improve the listening skills
- 2. Write precise briefs or reports and technical documents.
- 3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
- 4. Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
- 5. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

MillionsPairs

Term work will consist of any 8 assignments of following exercises:

- 1. SWOT analysis
- 2. Personal & Career Goal setting Short term & Long term
- 3. Presentation Skill
- 4. Letter/Application writing
- 5. Report writing
- 6. Listening skills
- 7. Group discussion
- 8. Resume writing
- 9. Public Speaking
- 10. Stress management
- 11. Team Activity

-- Use of Language laboratory

Teaching Methodology

Each class should be divided into three batches of 20-25 students each. The sessions should be activity based and should give students adequate opportunity to participate actively in each activity. Teachers and students must communicate only in English during the session. Specific details about the teaching methodology have been explained in every activity given below.

स पण्डितः

Practical Assignments (Term work)

Minimum 8 assignments are compulsory and teachers must complete them during the practical sessions within the semester. The teacher should explain the topics mentioned in the syllabus during the practical sessions followed by the actual demonstration of the

exercises. Students will submit report of their exercise (minimum 8) assignments as their term work at the end of the semester but it should be noted that the teacher should assess their assignment as soon as an activity is conducted. The continual assessment process should be followed.

1. SWOT analysis

The students should be made aware of their goals, strengths and weaknesses, attitude, moral values, self confidence, etiquettes, non-verbal skills, achievements etc. through this activity. The teacher should explain to them on how to set goals, SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self esteem. The teacher should prepare a questionnaire which evaluate students in all the above areas and make them aware about these aspects.

2. Personal & Career Goal setting - Short term & Long term

3. Presentation Skills

Students should make a presentation on any informative topic of their choice. The topic may be technical or non-technical. The teacher should guide them on effective presentation skills. Each student should make a presentation for at least 10 minutes.

4. Letter/Application writing

Each student will write one formal letter, and one application. The teacher should teach the students how to write the letter and application. The teacher should give proper format and layouts.

5. Report writing

The teacher should teach the students how to write report. The teacher should give proper format and layouts. Each student will write one report based on visit / project / business proposal etc.

6. Listening skills

The batch can be divided into pairs. Each pair will be given an article (any topic) by the teacher. Each pair would come on the stage and read aloud the article one by one. After reading by each pair, the other students will be asked questions on the article by the readers. Students will get marks for correct answers and also for their reading skills. This will evaluate their reading and listening skills. The teacher should give them guidelines on improving their reading and listening skills. The teacher should also give passages on various topics to students for evaluating their reading comprehension.

7. Group discussion

Each batch is divided into two groups of 12 to 14 students each. Two rounds of a GD for each group should be conducted and teacher should give them feedback

206267: Audit Course- I

In addition to credits course, it is recommended that there should be audit course (noncredit course) preferably in each semester from second year. The student will be awarded grade as AP on successful completion of audit course. The student have to opt for one of the audit courses per semester, starting in second year first semester. Such audit courses can help the student to get awareness of different issues which make impact on human lives and enhance their skill sets to improve their employability. List of audit courses offered in each semester is provided in curriculum. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at institute level. Method of conduction and method of assessment for audit courses is suggested.

The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself.

(Ref-http://www.unipune.ac.in/Syllabi_PDF/revised-2015/engineering/UG_RULE_REGULATIONS_FOR_CREDIT_SYSTEM-2015_18June.pdf)

Guidelines for Conduction (Any one or more of following but not limited to)

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations
- Surveys
- Mini Project
- Hands on experience on specific focused topic
- Any relevant courses from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Guidelines for Assessment (Any one or more of following but not limited to)

- Written Test
- Demonstrations/ Practical Test
- Presentations
- IPR/Publication
- Report
- Assignments from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Audit courses suggested by BoS, Instrumentation Engineering:

- 1. Road Safety
- 2. Smart Cities
- 3. Stress Relief: Yoga and Meditation
- 4. Foreign Language Japanese / German Module 1

SEMESTER-II

206274: Audit Course- II

In addition to credits course, it is recommended that there should be audit course (noncredit course) preferably in each semester from second year. The student will be awarded grade as AP on successful completion of audit course. The student have to opt for one of the audit courses per semester, starting in second year first semester. Such audit courses can help the student to get awareness of different issues which make impact on human lives and enhance their skill sets to improve their employability. List of audit courses offered in each semester is provided in curriculum. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at institute level. Method of conduction and method of assessment for audit courses is suggested.

The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself.

(Ref-http://www.unipune.ac.in/Syllabi_PDF/revised-2015/engineering/ UG_RULE_REGULATIONS_FOR_CREDIT_SYSTEM-2015_18June.pdf)

Guidelines for Conduction (Any one or more of following but not limited to)

- Lectures / Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations
- Surveys
- Mini Project
- Hands on experience on specific focused topic
- Any relevant courses from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Guidelines for Assessment (Any one or more of following but not limited to)

- Written Test
- Demonstrations/ Practical Test
- Presentations
- IPR/Publication
- Report
- Assignments from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Audit courses suggested by BoS, Instrumentation Engineering:

- 1. Professional Ethics and Etiquettes
- 2. Intellectual Property Rights
- 3. Employability Skill Development
- 4. Foreign Language Japanese / German Module 2

SAVITRIBAI PHULE PUNE UNIVERSITY

Syllabus

T. E. Instrumentation & Control (2019 Course- Credit Based)



Board of Studies Instrumentation & Control Engineering (w.e.f. June- 2021)

Savitribai Phule Pune University, Pune

T.E Instrumentation and Control (2019 Course) Credit Based System

		TEACHING SCHEME			EXAMINATION SCHEME							
CODF	SUBIFCT			Pa	aper					Theory	PR/OR/TW	
		тн	PR	In Semester Assessment	End semester Assessment	PR	Oral	тw	Total			
306261	Embedded Systems	3	2	30	70	50	1		150	3	1	
306262	Industrial Automation-I	3	4	30	70	50	V <u>.</u>	1	150	3	2	
306263	Modern Control Theory	3	2	30	70			25	125	3	1	
306264	Operating System	3	0	30	70	121	1	i.	100	3	0	
306265	Elective-I	3	2	30	70		25		125	3	1	
306266	Seminar	0	1	0	0		0	50	50	0	1	
306267	Audit Course-V	9) -	Σ	1			-	-	5	16-00	1 - 10	
	197	15	11	150	350	100	25	75	700	15	6	
		2	5		SEMESTER- II		[] e	42				

SEMESTER- I

SEMESTER- II

	No C	TEACHING SCHEME		EXAMINATION SCHEME							CREDITS	
CODF	SUBJECT	1	2	Pa	aper	1		1		Theory	PR/OR/TW	
		TH	PR	In Semester Assessment	End semester Assessment	PR	Oral	TW	Total		/	
306268	Internet of Things	3	2	30	हटा। २०१न् ।	स-मा	50	11	150	3	1	
306269	Industrial Automation-II	3	2	30	70-	50	i	-	150	3	1	
306270	Digital Signal Processing	3	2	30	70	50			150	3	1	
306271	Elective-II	3	2	30	70	0	25		125	3	1	
306272	Mini Project		2					25	25		1	
306273	Internship		4				-	100	100		4	
306274	Audit Course-VI											
		12	14	120	280	100	75	125	700	12	9	

<u>SEMESTER-I</u>

306267: Audit Course- I

In addition to credits course, it is recommended that there should be audit course (noncredit course) preferably in each semester from second year. The student will be awarded grade as AP on successful completion of audit course. The student must opt for one of the audit courses per semester, starting in second year first semester. Such audit courses can help the student to get awareness of different issues which make impact on human lives and enhance their skill sets to improve their employability. List of audit courses offered in each semester is provided in curriculum. Each student must choose one audit course from the list per semester. Evaluation of audit course will be done at institute level. Method of conduction and method of assessment for audit courses is suggested.

The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself.

(Ref-http://www.unipune.ac.in/Syllabi_PDF/revised-2015/engineering/ UG_RULE_REGULATIONS_FOR_CREDIT_SYSTEM-2015_18June.pdf)

Guidelines for Conduction (Any one or more of following but not limited to)

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations
- Surveys
- Mini Project
- Hands on experience on specific focused topic
- Any relevant courses from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Guidelines for Assessment (Any one or more of following but not limited to)

- Written Test
- Demonstrations/ Practical Test
- Presentations
- IPR/Publication
- Report
- Assignments from NPTEL/ SWAYAM/ MOOCs/ ARPIT etc.

Audit courses suggested by BoS, Instrumentation Engineering:

- 1. Emotional Intelligence
- 2. Value Education
- 3. MOOC-Learn New Skills
- 4. Foreign Language Japanese / German Module 3

SEMESTER-II

406274: Audit Course-VI

The student have to opt for one of the audit courses per semester. Such audit courses can help the student to get awareness of different issues which make impact on human lives and enhance their skill sets to improve their employability. Evaluation of audit course will be done at institute level. Method of conduction and method of assessment for audit courses is suggested. The student registered for audit course shall be awarded the grade AP and shall be included such grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA.

(Ref-http://www.unipune.ac.in/Syllabi_PDF/revised-2015/engineering/UG_RULE_REGULATIONS_FOR_CREDIT_SYSTEM-2015_18June.pdf)

Guidelines for Conduction and Assessment (Any one or more of following but not limited to)

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations
- Surveys
- Mini Project

• Hands on experience on specific focused topic Guidelines for Assessment (Any one or more of following but not limited to)

- Written Test
- Demonstrations/ Practical Test
- Presentations
- IPR/Publication

Audit courses suggested by BoS, Instrumentation Engineering:

- 1. Engineering Management
- 2. Principles of Management
- 3. Project Management for Engineers
- 4. Business Ethics.

Course	Course Name	Programme	Factor addressed
Code			
214450	Ethics and values in IT	Information Technology	Professional Ethics
(A)			
214450	Quantitative Aptitude and Logical Reasoning	Information Technology	Professional Ethics s
(B)			
214450	Language Study Japanese -Module I	Information Technology	Human Values
(C)			
214450	Cyber Security and Law	Information Technology	Professional Ethics
(D)			
214459	Water Supply and Treatment	Information Technology	Enviroment And Sustainability
(A)			
214459	Language Study- Japanese- Module II	Information Technology	Human Values
(B)			
214459	Waste Management and Pollution Control	Information Technology	Enviroment And Sustainability
(C)			
214459	Intellectual Property Right	Information Technology	Human Values
(D)			
314450	Banking and Insurance	Information Technology	Professional Ethics
(A)			
314450	Startup Ecosystems	Information Technology	Environment and Sustainability
(B)			
314450	Foreign Language- (Japanese Language-III)	Information Technology	Human Values
(C)			
314459	Green and Unconventional Energy	Information Technology	Enviroment And Sustainability
(A)			
314459	Leadership and Personality Development	Information Technology	Professional Ethics
(B)			

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

314459	Foreign Language-(Japanese Language- IV)	Information Technology	Human Values
(C)			
414461	Emotional Intelligence	Information Technology	Human Values
А			
414461	Green Computing	Information Technology	Enviroment and sustainabiltiy
В			
414461	Critical Thinking	Information Technology	Human Values
C			
414461	Statistical Learning Model using R	Information Technology	Professional Ethics
D			
414469	IoT Applications in Engineering field.	Information Technology	Professional Ethics
А			
414469	Entrepreneurship	Information Technology	Professional Ethics
В			
414469	Cognitive computing	Information Technology	Human Values
C			
414469	AI and Robotics	Information Technology	Professional Ethics
D			

Department of Information Technology

Faculty of Science & Technology Savitribai Phule Pune University, Pune Maharashtra, India



Curriculum

for

Second Year of Information Technology (2019 Course) (With effect from AY 2020-21)

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		Sav	itriba	ai Ph	ule	Pune	- Uni	versi	itv					
	Second Year of Information Technology Engineering(2019 Course)													
(With effect from Academic Year 2020-21)														
Semester-III														
Course Code	Course Name	Te S (Hou	eachir chem ırs/W	ng e eek)	E	Examination Scheme and Marks					Credit			
		Theory	Practical	Tutorial	IN-Sem	End-Sem	ΤW	PR	OR	Total	Ħ	РК	TUT	Total
<u>214441</u>	Discrete Mathematics	03	-	01	30	70	25	-	-	125	03		01	04
<u>214442</u>	Logic Design and Computer Organization	03	-	-	30	70	-	-	-	100	03	-	-	03
<u>214443</u>	Data Structures and Algorithms	03	-	-	30	70	-	-	-	100	03	-	-	03
<u>214444</u>	Object Oriented Programming	03	-	-	30	70	-	-	-	100	03	-	-	03
<u>214445</u>	Basics of Computer Network	03	-	-	30	70	-	-	-	100	03	-	-	03
<u>214446</u>	Logic Design Computer Organization Lab	-	02	-	-	-	25	25	-	50	-	01	-	01
<u>214447</u>	Data Structures and Algorithms Lab	-	04	-	-	-	25	25	-	50	-	02	-	02
<u>214448</u>	Object Oriented Programming Lab	-	04	-	-	-	25	25	-	50	-	02	-	02
<u>214449</u>	Soft Skill Lab	-	02	-	-	-	25	-	-	25	-	01	-	01
<u>214450</u>	Mandatory Audit Course 3	-	-	-	-	-	-	-	-	-	Non Credit -			
	Total	15	12	01	150	350	125	75		700	15	06	01	22
Abbreviations: TH: Theory TW: Term Work PR: Practical														

OR: Oral TUT: Tutorial

Note: Students of S.E. (Information Technology) can opt any one of the audit course from the list of audit courses prescribed by BoS (Information Technology)

#Mandatory Audit Course 3:

214450A- Ethics and values in IT **214450B** - Quantitative Aptitude and Logical Reasoning **214450C**- Language Study- Japanese- Module **214450D**-Cyber Security and Law

Savitribai Phule Pune University, Pune														
Second Year of Information Technology Engineering (2019 Course)														
(With effect from Academic Year 2020-21)														
Semester-IV														
Course Code	ame (H	Teaching Scheme (Hours/Week)					Credit							
	ŀ	Theory	Practical	Tutorial	IN-Sem	End-Sem	ΤW	PR	OR	Total	Ŧ	PR	TUT	Total
207003 Mathematics	- 111)3	-	01	30	70	25	-	-	125	03		01	04
214451 Processor Architecture	0)3	-	-	30	70	-	-	-	100	03	-	-	03
214452 Management	0 System)3	-	-	30	70	-	-	-	100	03	-	-	03
214453 Computer Gra	aphics 0)3	-	-	30	70	-	-	-	100	03	-	-	03
214454 Software Engi	ineering 0)3	-	-	30	70	-	-	-	100	03	-	-	03
214455 Development	Skill - Lab	-	02	-	-	-	25	25	-	50	-	01	-	01
Database <u>214456</u> Management Lab	System	-	04	-	-	-	25	25		50	-	02	-	02
214457 Lab	aphics -	-	02	-	-	-	-	25	-	25	-	01	-	01
214458 Learning	-	-	04	-	-	-	50	-	-	50	-	02	-	02
214459 Course 4	udit -	-	-	-	-	-	-	-	-	-	Nor	n Cred	lit	-
Total 15 12 01 150 350 125 75 - 700 15 06 01 22														
Abbreviations: [H: Theory TW: Term Work PR: Practical Oral TUT: Tutorial Note: Students of S.E. (Information Technology) can opt any one of the audit course from the list of														

audit courses prescribed by BoS (Information Technology)

#Mandatory Audit Course 4:

214459A - Water Supply and Treatment

214459B - Language Study- Japanese- Module II

<u>214459C</u> - Waste Management and Pollution Control

214459D - Intellectual Property Rights

Savitribai Phule Pune University. Pune							
Second Year Information Technology (2019 Course)							
214450 (A): Mandatory Audit Course 3:							
Ethics and Values in Information Technology							
Teaching Scheme: Credit Scheme: Examination Scheme:							
01hrs/week Non Credit Audit Course							
Prerequisite Courses, if any:							
 Course Objectives: To understand and implement the values and principles in the field of Information Technology. To nurture honest and responsible professionals in Information Technology. To develop student's understanding about social/ professional ethical issues related to Information Technology. To inculcate professional ethics in the field of IT. Course Outcomes: Co1: Adapt the global ethical principles and modern ethical issues. CO2: Apprehend ethics in the business relationships and practices of IT. 							
CO3: Implement trustworthy co	omputing to manage risk and secur	ity vulnerabilities.					
CO4: Analyse concerns of priva	cy, privacy rights in information-ga	thering practices in IT.					
Unit -I	An Overview of Ethics	03hrs					
An overview of Ethics: Brief about et	hics, Ethics in the Business World,	Ethics in IT.					
Ethics for IT professionals and IT users: IT professionals: Changing Professional Services, Professional Relationships, Codes of Ethics, awareness of IT malpractices, IT Users: Common Ethical Issues for IT Users, Supporting the Ethical Practices of IT Users.							
Mapping of Course Outcomes for CO1, CO2 Unit I							
Unit- II	Computer And Internet Crime	03hrs					
Introduction: IT security incidents, Types of Exploits, Types of Perpetrators, Laws for Prosecuting Computer Attacks, Implementing Trustworthy Computing, Risk and Vulnerability Assessment, Educating Employees, Contractors, and Part-Time Workers, Establishing a Security Policy							
Privacy: The right of Privacy, Privacy Protection and the Law, Key Privacy and Anonymity Issues Identity Theft, Consumer Profiling, Treating Consumer Data Responsibility, Workplace Monitoring							
Freedom of Expression: Defamation and Hate Speech, Key issues, Controlling Access to Information on the Internet, Anonymity on the Internet, Corporate Blogging, Pornography							
Napping of Course Outcomes for CO3, CO4 Init II							

Unit- III	Social Networking & Ethics of					
	IT Organization	03 hrs				
Social Networking: Brief about Social Networking, Social Networking Ethical Issues: Cyber bullying, Cyber stalking, Encounters with Sexual Predators, Uploading of Inappropriate Material,						
Online Virtual Worlds : Crime in Virtu	al Worlds, Educational and Business U	ses of Virtual Worlds.				
Ethics of IT Organization: Key Ethical Issues for Organizations, of Workers, Outsourcing, Whistle- blowing, Code of Ethics and Professional Conduct.						
Mapping of Course Outcomes for Unit III	CO2, CO3, CO4					
Unit - IV	Case Study	03hrs				
Malware, Medical Implants, Abusive Workplace Behaviour, Automated Active Response Weaponry, Malicious Inputs to Content Filters.						
Mapping of Course Outcomes for Unit IV	CO1, CO2, CO3, CO4					
	Text Books:					
 George Reynolds, "Ethics in Infor R. Subramanian, "Professional Ethics 	 George Reynolds, "Ethics in Information Technology", Cengage learning, 5th Edition R. Subramanian, "Professional Ethics", OXFORD University Press, Second Edition 					
	Reference Books:					
 William Lillie, "An Introduction to Ethics", Allied Publishers Charles b. Fleddermann, "Engineering Ethics", Prentice Hall M.Govindarajan, S. Natarajan & V.S. Senthilkumar, "Engineering Ethics & Human Values", PHI Learning "ACM Code of Ethics and Professional Conduct Case Studies" <u>https://www.acm.org/code-of-ethics/case-studies</u> "Case Studies of Ethics", <u>https://flylib.com/books/en/4.269.1.115/1/</u> "UNODC Case Studies" <u>https://www.unodc.org/e4j/en/integrity-ethics/module-12/exercises/case-studies.html</u> 						
Evaluation :						
Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.						

Savitribai Phule Pune University, Pune								
Second Year Information Technology (2019 Course)								
214450 (B) : Mandatory Audit Course3:								
Quantitative Aptitude & Logical Reasoning								
Teaching Scheme: Credit Scheme: Examination Scheme: Others (word) New Gradity Autility Gradity								
U1hrs/week Non Credit Audit Course								
Frerequisite Courses, if any:								
Course Objectives:								
1. To develop the quantitative, logi	1. To develop the quantitative, logical and verbal abilities.							
2. To enable learners to interpret t	he data accurately.							
3. To build logical thinking ability a	mong the learners.							
4. To enable students to comprehe	nd the English text.							
Course Outcomes:								
On completion of the course, learne	r will be able to							
CO1: Apply basic concepts of quan	titative abilities							
CO2: Use logical reasoning for solv	ing real world problems							
CO3: Compete in examinations like	internships, industry placements, p	ostgraduate admissions,						
civil services etc.								
COURSE CONTENTS								
Unit I Fundamental Quantitative 03 hrs 03 hrs								
Concepts and Problems on Number System, HCF and LCM, Average, Ratio and Proportion, Percentage, Year month days counting, SI units and measurements								
Mapping of Course Outcomes for Unit I	CO1, CO2, CO3							
Unit II	Arithmetic Quantitative Abilities	02 hrs						
Concepts and Problems on Ages, Profit and loss, Simple and Compound interest, Time value of money, Time and distance, Time and Work, Geometry and Coordinate Geometry, logarithms								
Mapping of Course Outcomes for CO1, CO2, CO3 Unit II								
Unit III	Unit III Logical Reasoning Ability 02 hrs							
Number Series, Pattern recognition, Alpha Numerical, Letter & Symbol Series, Numerical and Alphabet Puzzles, Seating Arrangement								
Mapping of Course Outcomes for CO2,CO3 Unit III								
Unit IV Thinking and Reasoning 02 hrs								
Objective Reasoning, Graph and Plots, Data sufficiency, Blood Relation, Coding deductive logic, Logical word sequence								

Curriculum for Second Year of Information Technology (2019 Course), Savitribai Phule Pune University

Mapping of Course Outcomes for Unit IV	CO2, CO3					
Unit V	Verbal Ability	03 hrs				
Synonyms, Antonyms, Contextual Vocabulary, Error Identification, Sentence Correction, Sentence Improvement, Subject-Verb agreement, Tenses and Articles, Reading Comprehension, Preposition & Conjunction						
Mapping of Course Outcomes	CO1, CO2, CO3					
for Unit V						
Text Books:						
1. Quantitative abilities by Arun Sharma, Motilal Uk Books Of India, 2012						
2. Quantitative Aptitude for Comp	2. Quantitative Aptitude for Competitive Examinations by R S Agrawal					
3. Verbal and Non-Verbal reasonir	3. Verbal and Non-Verbal reasoning by R S Agrawal					
Evaluation :						
Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.						

Savitribai Phule Pune University, Pune								
Second Year Information Technology (2019 Course)								
214450 (C) : Mandatory Audit Course 3:								
Language Study Japanese -IVIOQUIE I Teaching Scheme: Credit Scheme: Evamination Scheme:								
	Credit Scheme.	Examination Scheme.						
01hrs/week	Non Credit	Audit Course						
Prerequisite Courses, if any: Audit Course 4: Language Study Japanese: Module-II								
 Course Objectives: To teach pronunciation and intonation of Japanese sounds. To enable students to comprehend and speak simple sentences in Japanese. To introduce Japanese language at the basic level, to enable students to read and write the phonetic scripts, <i>Hiragana</i> and <i>Katakana</i>, and approx.100 <i>Kanji.</i>, To teach some aspects of Japanese society and culture. Course Outcomes: On completion of the course, learner will be able to CO1: Converse with simple sentences in Japanese. CO2: Recognize and read simple sentences in Japanese. CO3: Write simple sentences in Japanese. CO4: Be aware about Japanese society and people. 								
Unit I	Japanese Oral Expression	(02 hrs + 04 hrs Self Study)						
Oral practice of pronunciation and intonation of Japanese sounds, Japanese greetings, self- introduction, identifying things, time of the day, calendar; counting using Japanese numerical classifiers; describing things; making comparisons; talking of daily activities, kinship terms used for address and reference, seasons, giving and receiving, shopping; making requests, talking of one's likes and dislikes								
Mapping of Course Outcomes for Unit I	C01							
Unit II	Japanese Kana and Kanji	(02 hrs + 04 hrs Self Study)						
Introduction of the Japanese writing system, i.e. <i>Hiragana</i> , <i>Katakana</i> and <i>Kanji</i> (100-120), word- building, writing foreign names and loan words in Katakana								
Mapping of Course Outcomes for CO2, CO3								
Unit III	Japanese Greetings	(02 hrs + 04 hrs Self Study)						
Basic sentence patterns to be applied in self-introduction, identifying things; time of the day; calendar; counting using Japanese numerical classifiers; describing things; making comparisons; talking of daily activities; kinship terms used for address and reference; seasons; giving and receiving; shopping; making requests; talking of one's likes and dislikes								

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Mapping of Course Outcomes for Unit III	C01			
Unit IV	Japanese Comprehension	(02 hrs+ 04 hrs Self Study)		
Extensive practice of basic patterns a	t the elementary level through drills	and exercises		
Mapping of Course Outcomes for Unit IV	CO1, CO2			
Unit V	Speaking Japanese	(02 hrs + 4 hrs Self Study)		
Simple conversation in situations su activities, giving and receiving of gif requests, talking of one's likes and dis Mapping of Course Outcomes for	ich as describing things, making controls, talking of illnesses and visit to slikes, talking on telephone etc.	omparisons, talking of daily a doctor, shopping, making		
Unit V Unit VI	Social Environment of Japan	(02 hrs + 4 hrs Self Study)		
An introduction to some aspects of people and their love for nature; Japa and the world etc. The objective is to Mapping of Course Outcomes for	Japanese culture such as festivals, anese food, sports; society; geograp create general awareness in studen CO4	Japanese seasons, Japanese hy; education system; Japan ts about life in Japan.		
Unit VI	acquirage for Loorning Supports			
a. https://www.duolingo.com/cou	rse/ja/en/Learn-Japanese	<u>_</u> _		
b. <u>https://www.freejapaneselessor</u>	ns.com/			
	Text Books:			
 Taeko Kamiya, Japanese For Fun Phrasebook & Dictionary: The Easy Way to Learn Japanese Quickly, Rev Edition 2017 Tuttle Publishing, (ISBN 10- 4805313986, ISBN 13 -9784805313985) Eri Banno, Genki I: An Integrated Course in Elementary Japanese, 3rd Edition 2020, The Japan Times, (ISBN13: 9784789017305) Sushama Jain, Japan : The Living Culture, Har-anand Publications, 2009, (ISBN 10: 8124114870 / ISBN 13: 9788124114872) 				
Reference Books:				
 Kanji Power Handbook for the Japanese Language Proficiency Test, 1994, ARC Press (ISBN: 9784872343144) Yukiko Ogata, Kana Sumitani, Yasuko Hidari, Yukiko Watanabe, Nihongo fun and Easy -I Survival Japanese Conversation for Beginners, Eriko Sato, Japanese Demystified: A Self-Teaching Guide, 2008, McGraw-Hill Companies, 				
MicGraw-Hill Demystified Series (I	SBIN 10-00/14//268, ISBN 13-9/800 Fvaluation ·	J/14//26U)		
Students should select any one of the topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.				

Savitribai Phule Pune University, Pune Second Year Information Technology (2019 Course) 214450 (D) : Mandatory Audit Course 3: Cyber Security and Law					
Teaching Scheme:	Credit Scheme: Examination Scheme:				
01hrs/week	Non Credit Audit Course				
Prerequisite Courses, if any: Basics of Computer Course Objectives: 1. Understand basics of computer and cyber security. 2. To study the information technology law. 3. To understand reasons for cybercrime. 4. To learn investigation techniques. Course Outcomes: On completion of the course, learner will be able to C01: Understand the basic concepts of cyber security and its abilities C02: Analyse and evaluate the cyber security needs of an organization. C03: Understand the importance of cyber laws and its practices. C04: Determine and analyse software vulnerabilities and security solutions to reduce the risk					
	COURSE CONTENTS				
Unit I	Unit I Basics of Cyber Security 04 hrs				
Information Security Definition and Concepts, Overview of Security Threats , Goals of Security , Limitations and Challenges in cyber security , Types of Security attacks, Network Security, Malicious Codes, Intrusion detection systems, Hacking Techniques, Password cracking , Insecure Network Connections ,Concept of Firewall and Security.Mapping of CourseCO1, CO2					
Outcomes for Unit I					
Unit II	Cyber Laws		04 hrs		
Introduction, Definition and origin, Cybercrime and Information security, Classification of Cybercrimes, The legal perspectives- Indian perspective- IT Act 2000, Global perspective, Categories of Cybercrime, Reasonable Security Practices					
Mapping of CourseCO2, CO3, CO4Outcomes for Unit II					
Unit III	Cyber Crime		04 hrs		
Definition of Cyber Crime & Computer related Crimes, Classification & Differentiation between traditional crime and cybercrimes, Data Theft, Hacking, Spreading Virus & Worms, Phishing, Cyber Stalking/ Bullying, Identity Theft & Impersonation, Credit card & Online Banking Frauds, Denial of Service Attacks, Cyber terrorism etc, Search and Seizure Procedures of Digital Evidence- Data					

Acquisition ,Data Analysis, Reporting, Cybercrime Scenario in India			
Mapping of Course Outcomes for Unit III	CO2, CO3, CO4		
	Text Books:		
1. William Stallings, "Comp 335469-0	uter Security: Principles and Practices", Pearson 6th Ed, ISBN: 978-0-13-		
2. Nina Godbole, Sunit B	elapure, "Cyber Security- Understanding Cyber Crimes, Computer		
3. Nina Godbole , "Informat	ion Systems Security", Wiley India Pvt. Ltd, ISBN -978-81-265-1692-6		
4. Mark Merkow, "Informa 1288-7	tion Security-Principles and Practices", Pearson Ed., ISBN- 978-81-317-		
5. Bernard Menezes, "Network Security and Cryptography", Cengage Learning, ISBN-978-81-315- 1349-1			
6. "The Information Techno	logy Act, 2000; Bare Act" – Professional Book Publishers		
	Evaluation :		
Students should select any or report and make a presenta	one of the topic in a group of 3 to 5. Students should submit a written ation on the topic. The task should not be repeated among students.		

Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.

Savitribai Phule Pune University, Pune					
Second Ye	ar Information Technology	(2019Course)			
21	214459 (A) : Mandatory Audit course 4:				
Taashina Cahamaa	Water Supply and Manageme	nt Formingstion Column			
Teaching Scheme:	Credit Scheme:	Examination Scheme:			
UINrs/week	Non Credit	Audit Course			
Prerequisite Courses: Basi	c knowledge of environmental science	e and mathematics			
Course Objectives:					
1. Enable the student to u	nderstand the various components of	environment in and are	ound the		
earth crust and understa	and the effects of it over plants, anima	is, etc			
2. Understand the importa	int concepts of good water supply systemeters	em to a city/town or a v	village		
3. Understand the need of	conservation of rain water and its app	lications			
4. Understand the sources	s, effects, prevention and control mea	sures of water pollutio	n and its		
legislative aspects.					
Course Outcomes:					
On completion of the course	e, learner will be able to				
CO1: Relate the relations	between the environment and ecology	, estimating water requ	uirement		
for public water sup	ply scheme.				
CO2: Assess the quality of	water as per BIS and select the appro	priate treatment metho	d		
required for the wat	distribution system for a locality and	know the appurturance			
CO4: Summarize the arra	ngement of water supply and fittings i	n a huilding	s useu.		
CO5: Determine the need	of conservation of water and rural wa	iter supply.			
CO6: Identify the sources	of water pollution and suitable contro	ol measures.			
,	COURSE CONTENTS				
Unit I	Introduction To Environment, Water	Requirement And	02 hrs		
	Water Sources				
ENVIRONMENT AND ECO	LOGY: Atmosphere, Lithosphere, Hy	drosphere, Biosphere.	Relation		
between Plant, Animals and	Environment. Eco System, Man and E	cology.			
WATER REQUIREMENT:	Necessity of water supply, Methc	ds of population for	recasting		
(Arithmetical, Geometrical and Incremental Increase method), Water Requirements for a)					
Domestic Purpose b) Industrial Use c) Fire Fighting d) Public Purpose e) Losses. Per Capita Demand					
and Factors affecting it. Total Quantity of Water Required for a Town.					
SOURCES OF WATER: Surface Sources - Lakes, Streams, Rivers. Impounded Reservoirs.					
Underground Sources - Infiltration Galleries, Infiltration Wells and Springs					
Outcomes for Unit I	01				
			00.1		
		water	UZ nrs		
QUALITY OF WATER: Impurities of water - organic and inorganic classification and examination of					
water. Physical - temperature, color, turbidity, taste and odour. Chemical - pH Value, Total Solids,					
Hardness, Chlorides, Iron ar	nd Manganese, Fluoride and Dissolved	Oxygen. Bacteriologica	l- E-coli,		
Most Probable Number (MF	N), Quality Standards for Domestic pu	rpose as perBIS.			

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Curriculum for Second Year of Information Technology (2019 Course), Savitribai Phule Pune University

TREATMENT OF WATER:	Flow diagram of different units of treatment, brief des	scription of			
constructional details, wo	rking and operation of the following units - plain sed	imentation,			
sedimentation with coagul	ation, flocculation, filtration-Slow sand filters, Rapid sand	I filters and			
pressure filters (nodesign) [Disinfection of water, Chlorination				
Mapping of Course	CO2				
Outcomes for Unit II					
Unit III	Water Distribution System	02 hrs			
DISTRIBUTION SYSTEM:	General Requirements, Systems of Distribution- Gravi	ty System,			
Combined System, Direct F	Pumping. Maintenance of required pressure in Distribution	on Systems.			
Storage- Underground	l, Ground Level And OverheadService	Reservoirs–			
Sketch, Necessity and Access	ories.Typesoflay- out : dead end, grid iron, radial and rir	ng systems,			
their merits and demerits a	nd their suitability				
APPURTENANCES IN DIST	RIBUTION SYSTEM: Use of Sluice Valves, Check Valves,	Air Valves,			
Scour Valves, Zero Velocity	Valves, Fire Hydrants, Water Meter				
Mapping of Course	CO3				
Outcomes for Unit III					
Unit IV	Unit IV Water Supply In Buildings 02 hrs				
Water Supply	arrangement in Buildings: Genera	al lay-			
Water Supply outofwatersupplyarrangem	arrangement in Buildings: Generation of public dentification of public dentification of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of public dentification of the storied buildings as per B.I.S code of the storied buildings as	al lay- practice. Pipe			
Water Supply outofwatersupplyarrangem Materials- Plastic Pipes, H	arrangement in Buildings: Generation entforsingleandmulti-storiedbuildingsasperB.I.S code of p igh Density Polythene Pipes, Densified cast iron pipes,	al lay- practice. Pipe Merits and			
Water Supply outofwatersupplyarrangem Materials- Plastic Pipes, H Demerits. Connections from	arrangement in Buildings: Generation nentforsingleandmulti-storiedbuildingsasperB.I.S code of p igh Density Polythene Pipes, Densified cast iron pipes, n water main to buildings. Water supply fittings - their des	al lay- practice. Pipe Merits and scription and			
Water Supply outofwatersupplyarrangem Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p	arrangement in Buildings: General nentforsingleandmulti-storiedbuildingsasperB.I.S code of p igh Density Polythene Pipes, Densified cast iron pipes, n water main to buildings. Water supply fittings - their des pipes, supply pipe, distribution pipe, domestic storage tan	al lay- ractice. Pipe Merits and scription and k, stop cock,			
Water Supply outofwatersupplyarranger Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water	arrangement in Buildings: General nentforsingleandmulti-storiedbuildingsasperB.I.S code of p igh Density Polythene Pipes, Densified cast iron pipes, in water main to buildings. Water supply fittings - their des pipes, supply pipe, distribution pipe, domestic storage tank tap, Modern systems of Potable water purification-(RO, U	Merits and Scription and k, stop cock,			
Water Supply outofwatersupplyarrangem Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water carbon), Hot water supply -	arrangement in Buildings: General nentforsingleandmulti-storiedbuildingsasperB.I.S code of p igh Density Polythene Pipes, Densified cast iron pipes, n water main to buildings. Water supply fittings - their des pipes, supply pipe, distribution pipe, domestic storage tank tap, Modern systems of Potable water purification-(RO, U electric and solar waterheaters.	Merits and Scription and k, stop cock,			
Water Supply outofwatersupplyarranger Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water carbon), Hot water supply - Mapping of Course	arrangementinBuildings:Generalnentforsingleandmulti-storiedbuildingsasperB.I.Scode of pigh Density Polythene Pipes, Densified cast iron pipes,n water main to buildings. Water supply fittings - their despipes, supply pipe, distribution pipe, domestic storage tanktap, Modern systems of Potable water purification-(RO, Uelectric and solar waterheaters.CO4	Merits and Merits and Scription and k, stop cock, IV, Activated			
Water Supply outofwatersupplyarranger Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water carbon), Hot water supply - Mapping of Course Outcomes for Unit IV	arrangementinBuildings:Generalbentforsingleandmulti-storiedbuildingsasperB.I.Scode of pigh Density Polythene Pipes, Densified cast iron pipes,in water main to buildings. Water supply fittings - their desbipes, supply pipe, distribution pipe, domestic storage tanktap, Modern systems of Potable water purification-(RO, Uelectric and solar waterheaters.CO4	al lay- practice. Pipe Merits and scription and k, stop cock, IV, Activated			
Water Supply outofwatersupplyarrangem Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water carbon), Hot water supply - Mapping of Course Outcomes for Unit IV Unit V	arrangementinBuildings:Generalnentforsingleandmulti-storiedbuildingsasperB.I.Scode of pigh Density Polythene Pipes, Densified cast iron pipes,n water main to buildings. Water supply fittings - their despipes, supply pipe, distribution pipe, domestic storage tanktap, Modern systems of Potable water purification-(RO, Uelectric and solar waterheaters.Water Conservation	al lay- practice. Pipe Merits and scription and k, stop cock, JV, Activated 02hrs			
Water Supply outofwatersupplyarranger Materials- Plastic Pipes, H Demerits. Connections from uses, water main, service p ferrule, goose neck, water carbon), Hot water supply - Mapping of Course Outcomes for Unit IV Unit V WATER CONSERVATION: C	arrangementinBuildings:Generalnentforsingleandmulti-storiedbuildingsasperB.I.Scode of pigh Density Polythene Pipes, Densified cast iron pipes,n water main to buildings. Water supply fittings - their descriptionpipes, supply pipe, distribution pipe, domestic storage tanktap, Modern systems of Potable water purification-(RO, Uelectric and solar waterheaters.CO4Water Conservationonservation of rain water, roof water harvesting, recharging	al lay- practice. Pipe Merits and scription and k, stop cock, JV, Activated 02hrs ng of ground			
WaterSupplyoutofwatersupplyarrangemMaterials-PlasticPipes,HDemerits.Connections fromuses, water main, service pferrule, goose neck, watercarbon), Hot water supply -Mapping of CourseOutcomes for Unit IVUnit VWATER CONSERVATION: Cwater.RURAL WATER SUPP	arrangementinBuildings:Generalnentforsingleandmulti-storiedbuildingsasperB.I.Scode of pigh Density Polythene Pipes, Densified cast iron pipes,n water main to buildings. Water supply fittings - their despipes, supply pipe, distribution pipe, domestic storage tanktap, Modern systems of Potable water purification-(RO, Uelectric and solar waterheaters.CO4Water Conservationonservation of rain water, roof water harvesting, recharginLY: Rural water supply systems, Disinfection of well water.	al lay- practice. Pipe Merits and scription and k, stop cock, IV, Activated 02hrs ng of ground			
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Manning of Course	50 5		
Outcomes for Unit V			
Outcomes for Unit V			
	Reference Books :		
1. S.K.Garg, Water Supply	Engineering Vol-I, Khanna Publishers		
2. G.S.Birdie, Water Supply	/ & Sanitary Engineering-including Environmental Engineering, water		
And air pollution and E	cology, Dhanpat RaiandSons publishers,ISBN:81-87433-31-0		
3. Dr. P.N. Modi, Environm	ental EnggVol-I, Standard BookHouse		
4. A.K.Chatterji,WaterSup	ply,WasteDisposalandEnvironmentalPollution Engineering, Khanna		
publishers			
SUGGE	STED LIST OF CASE STUDIES/STUDENTACTIVITIES		
1. Collect the information	about biotic and a biotic component of surrounding environment and		
frame relation among t	nem		
2. Estimatethetotalquanti	tyofwaterrequiredforatown/locality/Institute		
3. Prepare map and written report for surface and underground sources of water in the			
neighborhood			
4. Visit nearby Certified Water testing laboratories and identify various tests conducted on water			
5. Visit Water Treatment Plant and collect details of unit operations and processes involved in it.			
6. Study the distribution system of water supply of your locality			
7. Visit a newly constructe	d building and study plumbing work		
8. Study a rooftop rain wa	ter harvesting system of existing building		
9. Study a Solar water hea	ting system and collect necessary data		
10. Collect a necessary da	ta/information about issues related to water pollution and Prepare		
report/presentation			
	Evaluation:		
Students should select any	one of the above topic in a group of 3 to 5. Students should submit a		
written report and make a	presentation on the topic. The task should not be repeated among		
students. Report will be ev	aluated by the faculty as per rubrics defined by him/her/them at start		

of course.

Savitribai Phule Pune University, Pune					
Second rear information Technology (2019Course)					
Z14459 (B J: Wandatory Audit course 4 :					
Teaching Scheme:	Language Study Japanese : Module - II				
01hrs/week	Credit Scheme: Examination Scheme: Non Credit Audit Course				
Prereguisite Courses: A	udit Course 3: Language Study Japanese: N	Adule-I			
Course Objectives :					
1. To develop the Jap	anese communicative competence of	tudents with small sentence			
formation.to make pr	imitive social conversation in Japanese.				
2. To enable students w	ith comprehension ability of Japanese gra	nmar.			
3. To enable students t	o translate simple conversations from E	nglish to Japanese and vice a			
versa.					
4. To make students aw	are about Japanese Culture and Customs.				
Course Outcomes :					
On completion of the cou	ırse, learner will be able to				
CO1: Have Japanese C	ommunicative competence for primitive S	ocial conversation in Japanese			
CO2: Comprehend Gra	mmar of Japanese Script				
CO3: Translate simple	sentences from Japanese to English and vi	ce a versa			
CO4: Be aware about J	apanese society and people				
COURSE CONTENTS					
Unit I	Japanese Conversation	(02 hrs +04hrs Self Study)			
Oral practice of convers	ation in situations such as declining an	invitation, reporting an event,			
narrating a story, short	formal speeches on occasions such a	s welcoming, introducing and			
thanking a guest, talking	about Japanese and Indian festivals, hoste	l life etc			
Mapping of Course	CO1				
Outcomes for Unit I		1			
Unit II	Japanese Text and Kanji	(02hrs +04 hrs Self Study)			
Diverse texts based on Japanese culture, customs, history, food habits, and science etc, for the					
-		labits, and science etc, for the			
development of commu	inicative competence of students; skim	ming, scanning of texts with			
development of commu emphasis on advanced s	unicative competence of students; skim entence patterns, grammatical structures	ming, scanning of texts with and idiomatic phrases, reading			
development of commu emphasis on advanced s and writing of approxima	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> .	ming, scanning of texts with and idiomatic phrases, reading			
development of commu emphasis on advanced so and writing of approxima Mapping of Course	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> . CO2,CO3	ming, scanning of texts with and idiomatic phrases, reading			
development of commu emphasis on advanced so and writing of approxima Mapping of Course Outcomes for Unit II	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> . CO2,CO3	and idiomatic phrases, reading			
development of commu emphasis on advanced so and writing of approxima Mapping of Course Outcomes for Unit II Unit III	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> . CO2,CO3 Japanese Grammar and Composition	(02 hrs +04 hrs Self Study)			
development of commu emphasis on advanced se and writing of approxima Mapping of Course Outcomes for Unit II Unit III Basic sentence patterns	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> . CO2,CO3 Japanese Grammar and Composition to be applied in self introduction, ident	(02 hrs +04 hrs Self Study) fying things; time of the day;			
development of commu emphasis on advanced so and writing of approxima Mapping of Course Outcomes for Unit II Unit III Basic sentence patterns calendar; counting using	unicative competence of students; skim entence patterns, grammatical structures tely 400 <i>kanji</i> . CO2,CO3 Japanese Grammar and Composition to be applied in self introduction, ident Japanese numerical classifiers; describing	(02 hrs +04 hrs Self Study) fying things; time of the day; things; making comparisons;			
development of commu emphasis on advanced si and writing of approxima Mapping of Course Outcomes for Unit II Unit III Basic sentence patterns calendar; counting using talking of daily activities	unicative competence of students; skim entence patterns, grammatical structures tely 400 kanji. CO2,CO3 Japanese Grammar and Composition to be applied in self introduction, ident Japanese numerical classifiers; describing s; kinship terms used for address and re-	(02 hrs +04 hrs Self Study) fying things; time of the day; things; making comparisons; eference; seasons; giving and			

Tome

Mapping of Course	CO2, CO3			
Outcomes for Unit III				
Unit IV	Japanese – English Translation	(02hrs +04 hrs Self Study)		
Practice in English to Ja	Practice in English to Japanese and Japanese to English translation of short passages on various			
topics such as culture, s	ociety, religion and life style taken from bo	oks, newspapers, magazines,		
internet etc.				
Mapping of Course	CO3			
Outcomes for Unit IV				
Unit V	Language and Literature of Japan	(02 hrs.)		
History of Japanese lang	uage, literary trends, religions, spread of Ch	inese influence, development		
of art and culture in Japa	an.			
Mapping of Course	CO4			
Outcomes for Unit V				
	E-Resources for Learning Support:			
1. <u>https://www.duolin</u>	ngo.com/course/ja/en/Learn-Japanese			
2. <u>https://www.freeja</u>	paneselessons.com/			
3. <u>https://minato-jf.jp</u>	(Japan Foundation)			
	Text Books:			
1. EriBanno, Genki I: An Integrated Course in Elementary Japanese , 3rd Edition 2020, The Japan				
Times, (ISBN13: 9784789017305)				
2. George Trombley, Yukari Takenaka, Japanese From Zero, 6th Edition, Learn From Zero				
Publishers (ISBN10- 0976998122, ISBN13-9780976998129)				
3. Tae Kim, A Guide to Japanese Grammar, 2012, CreateSpace Publishing, (ISBN-1469968142,				
ISBN13-9781469968148) http://www.guidetojapanese.org/learn/grammar				
	Reference Books:			
1. Yukiko Ogata, Kana Sumitani, Yasuko Hidari, Yukiko Watanabe, Nihongo fun and Easy -II, Basic				
Grammar for Conversation				
2. Nobuo Akiyama, Car	2. Nobuo Akiyama, Carol Akiyama, Japanese Grammar (Barron's Grammar), 3 rd edition 2012,			
Barrons Educational Series				
3. Storry Richard, A His	tory Of Modern Japan, 1973, Penguin Books	; Ltd,		
4. James W. Heisig, Re	4. James W. Heisig, Remembering the Kanji 1 : A Complete Course on How Not To Forget the			
Meaning and Writing of Japanese Characters, 6h Edition, University of Hawai'i Press (ISBN10-				
0824835921, ISBN13-9780824835927)				
	Evaluation:			
Students should select a	ny one of the above topic in a group of 3 to	5. Students should submit a		
written report and mak	e a presentation on the topic. The task sho	ould not be repeated among		
students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start				
of course.				

S	avitribai Phule Pune Uni	iversity, Pune	
Second Year Information Technology (2019Course)			
214459 (C): Mandatory Audit course 4 :			
е	-Waste Management and Po	ollution Control	
Teaching Scheme:	Credit Scheme:	Examination Schem	e:
01hrs/week	Non Credit course	Audit Course	
Prerequisite Courses:	f any:		
Course Objectives :			
. To make the students	aware about importance of envir	onmental study.	
 To study impact of pro 	ofessional engineering products in	societal contexts.	
 To understand impact 	of professional engineering produ	ucts in environmental context	ts.
I. To learn e-waste man	agement and e-waste recycling pr	OCESS.	
5. To understand causes	, effects and control measures of	environment pollutions.	
5. To learn impact of env	vironment controlling methods on	human health.	
Course Outcomes :			
On completion of the co	urse learner will be able to		
CO1 . Discuss various	types of e-waste sources		
CO2: Understand imr	act of various e-wastes		
CO3: Identify charact	eristics of various e-Waste polluta	ants	
CO4 : Understand pro	cess of e-Waste Becycling and rel	evant technologies	
CO5: Discuss causes.	effects and control measures of d	ifferent environment pollutio	n.
CO6: Demonstrate Sa	ife methods for disposal of e-wast	te and controlling the pollutio	n.
	1		
	COURSE CONTENT	S	
Unit I	E-Waste Overvie	ew and Sources	02 hrs
e-waste Overview: What	at is e-waste, E-waste growth- An	overview, hazards of e-waste	e Sources
of e-wastes: Discarded	computers, televisions. VCRs. st	ereos, copiers, fax machines	s, electric
lamps, cell phones, aud	o equipment and batteries if impr	roperly disposed.	
Mapping of Course	CO1		
Outcomes for Unit I			
Unit II	Impact of vari	ous e-wastes	02 hrs
Solder in printed circuit	boards, glass panels and monite	ors, Chip resistors and semic	onductors,
Relays and switches, P	inted Circuit Boards, Cabling and	d computer housing, Plastic	housing of
electronic equipment a	nd circuit boards, Front panel of C	RTs, Motherboards.	
Mapping of Course	CO2		
Outcomes for Unit II			
Unit III	E- Waste pollutants	and Characteristics	02 hrs
Digital dump yard, ho	w to minimize e-waste, Hazaro	lous substances waste Elec	trical and
Electronic Equipment,	characteristics of pollutants,	batteries, electrical and	electronic

components, plastic and flame retardants, circuit boards, pollutants in waste electrical and				
electronic equipment.				
Mapping of Course	CO3			
Outcomes for Unit III				
Unit IV	E-Waste Recycling	02 hrs		
Overview of e-Waste re	cycling, Technologies for recovery of resources from electron	c waste,		
resource recovery poten	tial of e-waste, steps in recycling and recovery of materials-me	echanical		
processing, technologies	for recovery of materials			
Mapping of Course	CO4			
Outcomes for Unit IV				
Unit V	Environmental Pollution	02 hrs		
Causes and effects and c	ontrol measures of: Air pollution, Water pollution, Soil pollutior	i, Marine		
pollution, Noise pollutior	n, Thermal pollution, nuclear hazards, Role of an individual in pr	evention		
of pollution, Pollution ca	ase studies: Pollution caused because of electronic waste mat	erial and		
measures for controlling.				
Mapping of Course	CO5			
Outcomes for Unit V				
Unit VI	Impact on human health and Pollution Controlling	02 hrs		
Impact of products from	e-waste in human health, Current disposal methods of e-waste	, e-waste		
recycling technologies and	nd methods recycling pose a risk to environmental and huma	n health.		
Safe methods for dispose	al of e-waste and controlling relevant pollution.			
Mapping of Course CO6				
Outcomes for Unit VI				
E-Resources from Learning Support				
1. <u>https://nptel.ac.in/courses/105/105/105105169/</u>				
2. <u>https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf</u>				
	Text Books			
1. E-Waste Managing	the Digital Dump Yard, Edited by Vishakha Munshi,ICFAI U	niversity		
Press,2007.				
2. Text Book of Environmental Studies for undergraduate Courses by Bharucha Erach, University				
Press, II- Edition 2013 Available online free edition.				
Reference Books				
1. E-waste: Implications, Regulations and Management in India and Current Global Best				
Practices, Edited by Rakesh Johri, The Energy and Resources Institute, New Delhi,2008				
Evaluation:				
Students should select any one of the above topic in a group of 3 to 5. Students should submit a				
written report and make a presentation on the topic. The task should not be repeated among				
students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start				
of course.				

Savitribai Phule Pune University, Pune					
Second Year Information Technology (2019Course)					
	214459 (D): Mandatory Audit course 4 :				
	In	tellectual Property Rights			
Teaching Scheme:		Credit Scheme: Examination S	cheme:		
01hrs/week		Non Credit Audit Course			
Prerequisite Courses, if a	any:				
Course Objectives					
1. To introduce fundam	ental aspe	cts of Intellectual property Rights (IPR)			
2. To disseminate know	ledge abou	it types of IP like Patents, Copyrights, Trade Secrets			
3. To make students aw	are about	current trends in IPR and their importance			
4. To motivate students	s for innova	tive thinking and making inventions			
Course Outcomes					
On completion of the co	urse, learne	er will be able to			
CO1: Exhibit the conce	epts of Inte	llectual Property Rights			
CO2: Differentiate am	ong differe	nt IPR			
CO3: Formulate and characterize innovative ideas and inventions into IPR					
CO4: Demonstrate knowledge of advances in patent law and IP regulations					
COURSE CONTENTS					
Unit I		Overview Of Intellectual Property	02 hrs		
Introduction and the ne	eed for int	ellectual property right (IPR) - Types of Intellectu	al Property		
Rights: Patent, Copyright	t, Trade Ma	ark, Design, Geographical Indication, Plant Varieties	and Layout		
Design – Genetic Resour	ces and Tra	ditional Knowledge – Trade Secret.			
Mapping of Course	CO1, CO2				
Outcomes for Unit I					
Unit II		Patents	04 hrs		
What is invention? Pate	entability c	riteria: Novelty, Non-Obviousness (Inventive Steps), Industrial		
Application, Non-Patent	Application, Non- Patentable Subject Matter, Patent Search, Patent Registration Procedure, Rights				
and Duties of Patentee,	Assignment	and license, Infringement.			
Mapping of Course	CO3, CO4				
Outcomes for Unit II					
Unit III		Copyrights	02 hrs		
Concept of Copyright -	-Copyright	Subject matter: original literary, dramatic, music	al, artistic		
works; cinematograph films and sound recordings - Registration Procedure, Term of protection,					
Ownership of copyright, Assignment and license of copyright - Infringement					
iviapping of Course	03				
Outcomes for Unit III					

Curriculum for Second Year of Information Technology (2019 Course), Savitribai Phule Pune University

Unit IV Trademarks 02 hrs Nature of Trademarks - Different kinds of trademarks (, logos, signatures, symbols, well known marks, brand names, certification and service marks) - Trademarks that can't be registered- Trademarks registration procedure - Rights of holder and assignment and licensing of marks - Infringement Mapping of Course CO3 Outcomes for Unit IV Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Care Opportunities in IP - IPR in current scenario Mapping of Course CO4 CO4 Outcomes for Unit V Exat Books Infringament 1. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI India, IN: 2. Nithyananda K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited Evaluation: 3. Mishra, "An introduction to Intellectual property Rights", Central Law Publications 2. 3. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at					
Nature of Trademarks - Different kinds of trademarks (, logos, signatures, symbols, well known marks, brand names, certification and service marks) - Trademarks that can't be registered- Trademarks registration procedure - Rights of holder and assignment and licensing of marks - Infringement Mapping of Course CO3 Mapping of Course Outcomes for Unit IV CO3 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Care 02 hrs Opportunities in IP - IPR in current scenario CO4 Mapping of Course Outcomes for Unit V Reference Books 1. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI India, IN: Cengage Learning India Private Limited Reference Books India, IN: Cengage Learning India Private Limited 1. Mishra, "An introduction to Intellectual property Rights", Central Law Publications India, IN: Lexis Nexis 2. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis Evaluation: Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined b	Unit IV	Trademarks	02 hrs		
marks, brand names, certification and service marks) – Trademarks that can't be registered– Trademarks registration procedure - Rights of holder and assignment and licensing of marks - Infringement Mapping of Course Outcomes for Unit IV CO3 Unit V Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Care Opportunities in IP - IPR in current scenario Mapping of Course Outcomes for Unit V CO4 CO4 I. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited I. Mishra, "An introduction to Intellectual property Rights", Central Law Publications Intellectual Property Rights". India, IN: Lexis Nexis I. Mishra, "An introduction to Intellectual Property Rights". India, IN: Lexis Nexis Evaluation: Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.	Nature of Trademarks - Different kinds of trademarks (, logos, signatures, symbols, well known				
Trademarks registration procedure - Rights of holder and assignment and licensing of marks - Infringement Mapping of Course Outcomes for Unit IV CO3 Unit V Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Career Opportunities in IP - IPR in current scenario Mapping of Course Outcomes for Unit V CO4 CO4 Mapping of Course Outores for Unit V CO4 Intellectual Property Rights", PHI 1. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI India, IN: Cengage Learning India Private Limited Reference Books India, IN: Cengage Learning India Private Limited India, IN: Central Law Publications 2. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis Evaluation: Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.	marks, brand names, co	ertification and service marks) – Trademarks that can't be r	egistered-		
Infringement Mapping of Course Outcomes for Unit IV CO3 Unit V Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Career Opportunities in IP - IPR in current scenario 02 hrs Mapping of Course Outcomes for Unit V CO4 Image: Comparison of the transmission of the transmission of transmission of transmission of the transmission of the transmission of the transmission of transmissind transmission of transmis of transmission of tra	Trademarks registration	procedure - Rights of holder and assignment and licensing of	of marks -		
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Outcomes for Unit IV Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Care Opportunities in IP - IPR in current scenario Mapping of Course CO4 Outcomes for Unit V CO4 I. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI India, IN: Cengage Learning India Private Limited I. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI India, IN: Cengage Learning India Private Limited I. Mishra, "An introduction to Intellectual property Rights", Central Law Publications India, IN: Lexis Nexis I. Mishra, "An introduction to Intellectual Property Rights. India, IN: Lexis Nexis Evaluation: Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.	Mapping of Course	CO3			
Unit V Advances in IP Laws and Government policies 02 hrs Amendments and India's New National IP Policy, Promoting IPR policy for Start-ups, Career Opportunities in IP - IPR in current scenario Mapping of Course CO4 Outcomes for Unit V Text Books 1. Niraja Pandey, Khush deep Dharni (2014), "Intellectual Property Rights", PHI Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited Reference Books Intellectual property Rights. India, IN: Lexis Nexis 1. Mishra, "An introduction to Intellectual property Rights. India, IN: Lexis Nexis Evaluation: Students should select any one of the above topic in a group of 3 to 5. Students should submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics defined by him/her/them at start of course.	Outcomes for Unit IV				
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	course.				

Faculty of Science & Technology

Savitribai Phule Pune University, Pune,

Maharashtra, India



Curriculum For

Third Year of Information Technology

(2019 Course)

(With effect from AY 2021-22)

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	Savitribai Phule Pune University													
Third Year of Information Technology (2019 course)														
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	Semester-V													
Course		Teaching												
Code	Course Name	Sc (Hour	hem	e ook)	Exa	minati	ion Sch	eme	and	Marks	Cre	edit S	cher	me
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		sory	tica	oria	Ser	Sen	N N	tica	ral	tal	ture	tica	oria	tal
		The	Prac	Tut	Mid	End	erm	Prac	0	To	Lec	Prac	Tut	То
<u>314441</u>	Theory of Computation	03	-	-	30	70	-	-	-	100	3	-	-	3
<u>314442</u>	Operating Systems	03	-	-	30	70	-	-	-	100	3	-	-	3
<u>314443</u>	Machine Learning	03	-	-	30	70	-	-	-	100	3	-	-	3
21////	Human Computer	03	-	-	30	70	-	-	-	100	3	-	-	3
<u>514444</u>														
<u>314445</u>	Elective-I	03	-	-	30	70	-	-	-	100	3	-	-	3
<u>314446</u>	Operating Systems Lab	-	04	-	-	-	25	25	-	50	-	2	-	2
<u>314447</u>	Human Computer Interaction- Lab	-	02	-	-	-		-	50	50	-	1		1
<u>314448</u>	Laboratory Practice-I	-	04	-	-	-	25	25		50	-	2	-	2
<u>314449</u>	Seminar	-	01	-	-	-	50	-	-	50	-	1	-	1
<u>314450</u>	Audit Course 5	-	-	-	-	-	-	-	-	-	-	-	-	-
							1	То	tal Cı	redit	15	06	-	21
	Total	15	11	-	150	350	100	50	50	700	15	06	-	21
Abbreviat	tions: TH: Theory, TW: T	۲erm ۱	Nork	, PR:	Prac	tical , (OR: Or	al ,Tl	JT: T	utorial				
Elective-I						4	Audit C	ours	e 5:					
<u>314445A</u> -	Design and Analysis of Al	gorith	m		_	3	<u>14450</u>	A-Ba	nkin	g and Ir	nsura	nce		
314445B-	Advanced Database and I	vlanag	geme	nt Sy	ster		14450 14450	<u>0</u> -3ta C- Fo	reigr	Langu	age-) (lan:	anes	ρ
<u>314445C</u> -	Design I ninking						angua	ge-II		Langu	uge-	Gabo	1163	
Laborato	314445D- Internet of Things Language- III) Laboratory Practice-I: Language- III)													
Assignme	nt from Machine Learning	g and E	lecti	ve l										
Note: Stu	dents of T.E. (Information	Techr	nolog	y) ca	n op	t any c	one of t	he a	udit o	ourse	from	the l	ist o	f
audit courses prescribed by BoS (Information Technology)														

Savitribai Phule Pune University Third Year of Information Technology (2019 Course)														
	(With eff	ect f	from	Aca	dem	ic Yea	r 202	1-22	<u>2)</u>					
	1	1	Se	mes	ster-\	/I								
Course Code	Course Name	Т(S	Teaching Scheme (Hours/ week) Examination Scheme and Marks Credit Scher					chen	ne					
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term Work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
<u>314451</u>	Computer Networks& Security	03	-	-	30	70	-	-	-	100	03			03
<u>314452</u>	Data Science and Big Data Analytics	03	-	-	30	70	-	-	-	100	03			03
<u>314453</u>	Web Application Development	03	-	-	30	70	-	-	-	100	03			03
<u>314454</u>	Elective-II	03	-	-	30	70	-	-	-	100	03			03
<u>314455</u>	Internship	-	04	-	-	-	100	-	-	100		04		04
<u>314456</u>	Computer Networks& Security-Lab	-	04	-	-	-	25	-	50	75		02		02
<u>314457</u>	DS & BDA-Lab	-	02	-	-	-	25	25	-	50		01		01
<u>314458</u>	Laboratory Practice-II	-	04	-	-	-	50	25	-	75		02		02
<u>314459</u>	Audit Course 6	-	-	-	-	-	-	-	-	-	-	-	-	-
				n				n		Total	12	09	-	21
	Total	12	14	-	120	280	200	50	50	700	12	09	-	21
Abbreviatio	ons: TH: Theory, TW: Tern	n Wo	rk, PR	: Pra	ctical	, OR:	Oral, T	UT: 1	luto	rial				
Elective-II:	utificial totallinesses			Audi	it Cou	rse 6:		1						
<u>314454A</u> - A 314454B- Ci	vher Security			3144	<u>+59A</u> - 159R -	- Greei - Leade	ershin	and I	Perso	nality l	Deve	5y Ionm	nent	
<u>314454C</u> -Cl	oud Computing			3144	159C-	Foreig	gn Lan	guag	e-(Ja	panese	Lang	guage	e-IV)	
<u>314454D</u> - Se	oftware Modeling and De	sign				-	-			-	-		-	
Laboratory	Practice-II:													
Assignment	s from Web Application D)evel	opme	ent a	nd Ele	ctive-	II.		al:+				h <i>c</i> f	
audit course	Note: Students of T.E. (Information Technology) can opt any one of the audit course from the list of audit courses prescribed by BoS (Information Technology)													

Savitri	bai Phule Pune University, Pune	:						
Inird Year Information Technology (2019 Course)								
Mandatory Audit Course 5								
314450 (A) : Banking and Insurance								
Teaching Scheme:	Credit Scheme:	Examina	ition Scheme:					
Theory (TH):1 hrs/week	No Credits	Audit Co	urse					
Prerequisite Courses : If any								
Course Objectives: -								
L. To understand banking system in Ind	dia.							
2. To understand negotiable instrumer	nts.							
3. To learn attributes of different types	s of insurance policies.							
 To create awareness about nature a 	nd functioning of annuities.							
Course Outcomes: -								
On completion of the course, students	s will be able to-							
CO1: Differentiate between types of b	anks and their working.							
CO2: Carry out banking transactions o	n their own.							
CO3: Decide which insurance policy th	ey should buy.							
CO4: Handle investing in annuities and	d claim settlements.							
	COURSE CONTENTS							
Unit I	INTRODUCTION TO BANKING	i	(03 hrs)					
Definition of Bank - Basic functions of	Banker							
Banking System in India : Banker ar	nd Customer: Relationship between	n Banke	r and Customer, Specia					
Types of Customers, Retail & Wholesa	le Banking, Deposit Accounts – Sav	ngs Acco	ounts, Current Account					
ixed Deposit Accounts, Opening and	operation of Accounts, Nominatio	n, KYC re	equirements, Pass Bool					
Vinors, Partnerships & Companies.								
Mapping of Course Outcomes C	01							
for Unit I								
Unit II	BANK FUNDS AND INSTRUMENTS	5	(03 hrs)					
Employment of Bank Funds: Liquid	Assets-Cash in Hand, Cash with	RBI &	Cash with other Bank					
nvestment in securities, Advances - S	Secured and Unsecured, Loans, Ter	n Loans	, Cash Credit, Overdraf					
Discounting of Bills of Exchange, Mode	es of creating charge on Securities, 1	ypes of	Securities.					
		 . –						
Negotiable Instruments: Definition &	Characteristics of Cheques, Bills o	r Exchan	ige & Promissory Note					
crossings, Endorsements, Collection a	nd payment of Cheques, Liabilities c	of Parties	5.					

Manning of Course Outcomes	CO2						
for Unit II							
Unit III	INTRODUCTION TO INSURANCE	(03 hrs)					
Concept of Insurance, Need for Insur	ance.						
Brief history of Insurance industry	in India: (a) Enactment of Insurance Act,	1938. (b) Nationalization of					
Life Insurance Companies in 1955.	Life Insurance Companies in 1955. (c) Nationalization of General insurance Companies in 1972. (d)						
Malhotra Committee Report – Opening up of Insurance sector to Private Companies in 2000. (e) Setting							
up of Insurance Regulatory and Deve	lopment Authority in 1999.						
Life Insurance: Present Organization	onal set-up of Insurance Companies in	ı India – L.I.C. and Private					
Companies with foreign joint venture	es, selling Insurance through Agents and B	Banks.					
Objectives of Life Insurance – Protec	tion and Investment, Different types of Li	ife Insurance Policies – Chief					
characteristics and similarity. Online	vs Offline policies						
Basic Pre-requites for Life Insurance -	- Insurable Interest and utmost Good Fait	h.					
Procedure for taking a policy: (a) Se	lection of the Plan. (b) Consultation of Pi	remium tables. (c) Filling up					
of Proposal Form. (d) Document reg	arding proof of age. (e) Important clause	es of the Policy – eg. Suicide					
Clause. (f) Nomination							
Mapping of Course Outcomes for	СОЗ						
Unit III							
Unit IV	ULIPS AND POLICY MATTERS	(03hrs)					
Annuities and Unit Linked Policies:	Concept of Annuity, Objectives of Annu	uity, Procedure followed for					
obtaining Annuities, Meaning of U	nit Linked Insurance Policies, Procedur	e for obtaining Unit linked					
insurance Policies.							
General Insurance: General Insuranc	e companies, types of general insurance						
Post - Issue Matters: Lapse of the Po	olicy due to Non-Payment of Premium, Re	evival of the Lapsed Policies,					
Surrender of the Policy – Payment o	f surrender value, Assignment of the Poli	cies, Settlement of claims –					
Procedure to be followed.							
Mapping of Course Outcomes	CO4						
for Unit IV							
Text Books:							
1. Sunil Kumar, Essentials of Banki	ng and Insurance, JSR PUBLISHING HOUS	SE LLP; 2ndEd edition, ISBN-					
10:938768461X.							
2. D.D. Chaturvedi, Arun Mittal, Sa	iumya Chaturvedi, Banking and Insurance	e, Scholar Tech Press, ASIN :					
	1 https://onlinecourses.swayam2.ac.in/coc21_go04/proview						
1 https://onlinecourses.cu.oucre2	a_{1} a_{2} a_{2} a_{3} a_{4} a_{1} a_{2} a_{3} a_{4} a_{4						

Si	avitribai Phule Pune University, Pu	ne	
Third Y	ear Information Technology (2019	Course)	
	Mandatory Audit Course 5		
	314450 (B) : Startup Ecosystems		
Teaching Scheme:	Credit Scheme:	kaminat	on Scheme:
Theory (TH):1 hrs/week	No Credits A	udit Cou	rse
Prerequisite Courses: NA			
Course Objectives:			
To familiarize students-			
 New venture creation opportu 	nities, its resources, and requirements	for Ente	rprise Startup
 Legal requirements for new version 	ntures		
3. Financial issues and strategies	related to startups		
Course Outcomes:			
completion of the course, stud	ents will be able to–		
CO1: Identify Startup opportunition	es		
CO2: Explain legal and other requ	irements for new ventures		
CO3: Analyze financial Issues of st	artups		
	COURSE CONTENTS		
Unit I	STARTUP OPPORTUNITIES		(04 hrs)
Current industrial revolution, Idea venture, the rise of Startup e ecosystem, Indian government ini	Generation with brainstorming, Busir conomy, forces of change, startup tiatives, Entrepreneurship in India, Cas	ess Star equatio e Study:	tup, ideation, choices of n, the entrepreneurial MEITY Startup Hub
Mapping of Course Outcomes	CO1		
for Unit I			
Unit II	STARTUP ECOSYSTEM		(04 hrs)
Startups ecosystem: Support org	anizations, big companies, universities	s, fundin	g organizations, service
providers, research organization	s, Startup development phases: Ide	ating, c	onception, committing,
validating, scaling, establishing, St	artup business partnering, Startup cul	ture, Co-	founders, FFF (Fools,
friends and family), Angels			
Mapping of Course Outcomes	CO2		
for Unit II			
Unit III	STARTUP CAPITAL REQUIREMENTS LEGAL ENVIRONMENT	AND	(04 hrs)
Identification of capital resource	requirements of startup. estimating	startur	finance requirements
deciding a process map, Position	ing the venture in the value chain –	Framing	risk reduction strategy
Startup financing metrics, Legal	perspectives- New Ventures approv	al proce	dures- Taxes or duties
payable for new ventures, Case S	tudy: Technology Incubation and Deve	lopment	of Entrepreneurs
(TIDE)			

Ma for	pping of Course Outcomes CO3 Jnit III					
	Text Books:					
1.	Kathleen R Allen, "Launching New Ventures, An Entrepreneurial Approach", Cengage Learning,					
	2016.					
2.	Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International,					
	2010.					
3.	S.R. Bhowmik and M. Bhowmik, Entrepreneurship, New Age International, 2007.					
4.	Steven Fisher, Ja-nae Duane, The Startup Equation -A Visual Guidebook for Building Your Startup,					
	Indian Edition, Mc Graw Hill Education India Pvt. Ltd, 2016.					
	Reference Books:					
1.	Donald F Kuratko, Jeffrey S. Hornsby, New Venture Management: The Entrepreneurs Road Map,					
	2e, Routledge, 2017.					
2.	Vijay Sathe, Corporate Entrepreneurship, 1e, Cambride, 2009.					
3.	Bruce R. Barringer, R.Duane Ireland, Entrepreneurship successfully, launching new					
	ventures.Pearson,2019					

Sav	itribai Phule Pune University	, Pune				
Third Year Information Technology (2019 Course)						
Mandatory Audit Course 5						
314450 (C) :Foreign Language- (Japanese Language-III)						
Teaching Scheme:	Credit Scheme:	Examinat	tion Scheme:			
Theory (TH) :1 hrs/week	Non Credit	Audit Co	urse			
Prerequisite Courses, if any:						
1. Students must have already st	udied can read/write Hiragana and	l Katakana	script			
 Students must have studied Ja Module 1 and 2 	apanese for beginners that include	es the sylla	bus of Audit course			
Course Objectives:						
To familiarize students with-						
1. Japan Market needs: To meet	the needs of ever growing indust	ry with res	spect to the Japanese			
language support.						
 Japanese Culture and Mindset language. 	To get introduced to Japanese sc	ciety and	culture through			
 Career opportunities: To know 	more about Higher studies, Caree	r opportur	nities in Japan /			
Japanese companies across the	world.					
Soft skills and self-development confidence by gaining the know	it: To learn the manners, business	s culture a	nd develop the			
Course Outcomes:						
On completion of the course, stud	ents will be able to-					
CO1: Ability of basic communicati	on.					
CO2: Knowledge of Japanese scrip	ot (reading, writing and listening sk	ills).				
CO3: Knowledge about Japanese of	ulture, life style, manners and etic	uettes.				
CO4: Develop interest to pursue p	rofessional Japanese Language co	urse.				
	COURSE CONTENTS					
l Init I		/FI	(3 hrs Lecture + 3 hrs			
Ontr	JAPANLSL-DEGINNERS EEV		Self-study)			
Greeting, Self-introduction, Natio	nality, Languages, Hiragana, Katak	ana rules,	History of Kanji, Numbers,			
Days and Dates, Time, Age, Mobile number, Places, Relatives, Colors, Things, Vehicles. Introduction to						
grammar of basic particles, verbs and adjectives, Culture/Others: Business card exchange, Seasons and						
festivals in Japan, Kanjis: 1 to 10, Listening practice, Vocabulary and conversation practice.						
Reference:						
a. Revision of beginner level studied in Module1-2						

b. Nihongo Challenge Kanji - Lesson 1

Mapping of Course Outcomes for Unit I	CO1					
Unit II	JAPANESE SCRIPT					
Introduction to Demonstrative pronouns (ko-so-a-do), Asking/requesting for something, Making						
sentences using various question	n words, Stating/asking age, nationality, prof	fession ,Culture/Others:				
Information about Japanese sta	andardized test (JLPT, NAT etc.),Kanjis:11 t	o 20,Listening practice				
Vocabulary and conversation pra	ctice.					
Reference:						
a. Minna no Nihongo I: Lesson 1	and 2 (Text book + Audio and Video)					
b. Nihongo Challenge Kanji - Le	sson 2					
Mapping of Course Outcomes	CO2					
for Unit II						
Unit III	BASIC JAPANESE GRAMMAR	(3 hrs Lecture + 3 hrs Self-study)				
How to buy train tickets, Train m 30,Listening practice Vocabulary Reference: a. Minna no Nihongo I : Lesson 3 b. Nihongo Challenge Kanji - Les	anners, Introduction to social issues and Japa and conversation practice. 3 and 4 (Text book + Audio and Video) sson 3	nese society,Kanjis:21to				
Mapping of Course Outcomes	СО3					
for Unit III						
Unit IV	JAPANESE FOR DAILY COMMUNICATION	(3 hrs Lecture + 3 hrs Self-study)				
Directions and heading towards	s (use of particle de, he and relevant vocab	ulary) , Actions (use of				
particle wo and relevant	vocabulary), Types of adjectives (root,	negative, past, past				
negative),Culture/Others: Party, gifts related conversation, Gifting culture in Japan, Introduction to						
Japanese economy and market needs ,Kanjis:31 to 40,Listening practice, Vocabulary and conversation						
practice.						
Reference:						
a. Minna no Nihongo I : Lesson 5 and 6 (Text book + Audio and Video)						
b. Nihongo Challenge Kanji - Le	sson 4					

Ma for	pping of Course Outcomes CO4 Unit IV					
	Text Books:					
1.	Minna no Nihongo I – Main Text book with audio and video files (Books by Goyal Publishers - Available in shops / Online)					
2.	Minna no Nihongo - Translation and grammatical notes for self-study (Books by Goyal Publishers - Available in shops / Online)					
3.	 Nihongo Challenge – Kanji (Available with Japanese Language schools/teachers) 					
	Reference Books:					
1.	Nihongo Shoho: For better understanding and practice of Basic Japanese Grammar					
2.	Marugoto : For scenario based Japanese conversation practice					
	E -Books / E- Learning References :					
1.	nihongo ichiban					
	 a. https://nihongoichiban.com/home/jlpt-n5-study-material/ 					
2.	jlpt sensei					
	 https://jlptsensei.com/how-to-pass-jlpt-n5-study-guide/ 					

SEMESTER – VI

Savitribai Phule Pune University, Pune							
Third Y	ear Information Technology (201	9 Course)					
Mandatory Audit Course 6							
314459 (A) : Green and Unconventional Energy							
Teaching Scheme:	Credit Scheme:	Examination Scheme:					
Theory (TH): 1 hrs/week	Non Crodit	Audit Course					
Iutorial(IUI): 3 hrs/week	Non Credit	Audit Course					
Prerequisite Courses, if any:							
Course Objectives:							
1 To know the importance	of the energy and the the basic	infrastructures for the economic					
development of the country							
2. To know about the most	important renewable energy re	sources and the technologies fo					
harnessing these resources	within the framework of a broad r	ange of simple to state- of -the-ar					
energy systems.		C .					
3. To understand the application	on of non-conventional energy techr	ologies.					
Course Outcomes:							
On completion of the course, stud	lents will be able to-						
CO1: List and explain the main	sources of energy and their prim	ary applications in the India, and					
theworld.	d problems associated with the u	se of various energy sources and					
itsconservation.	in problems associated with the c	se of various energy sources and					
CO3: List and describe the primar	y renewable energy resources and t	echnologies.					
CO4: Collect and organize inform	ation on renewable energy technolo	gies as a basis for further analysis					
and evaluation.							
	COURSE CONTENTS						
11	INTRODUCTION TO GREEN A	ND (Of here)					
Unit I	UNCONVENTIONAL ENERGY ST	JDIES (04 hrs)					
Various Non-Conventional energy	y sources. Need, Availability, Classifi	cation. Relative merits &					
demerits, Global energy scenario,	Indian energy scenario, Energy Stor	age, Distribution and Conservation					
Mapping of Course Outcomes	CO1, CO2						
for Unit I							
Unit II SOLAR and WIND ENERGY (04 hrs)							
Solar energy: Introduction, Conservation of Solar energy							
Applications: Solar Energy - solar water heater- Solar Cooker-Roy type- Solar dryer solar green house							
Summer and winter greenhouse-s	olar electric power generation-Sola	photovoltaic					
Wind Energy: Introduction- Basic	Principles of Wind energy conversion	on-The nature of wind- The power					
inthe wind. Wind energy conversion	on system (WECS), Advantages & Li	mitations of WECS					
Environmental aspect. Government Schemes.							

HOME

Mapping of Course Outcomes	CO2, CO3						
for Unit II							
Unit III	BIOMASS ENERGY, GEO THERMAL & TIDAL ENERGY.	(04 hrs)					
Biomass Energy: Introduction- E affecting biogas Generation, urban w	liomass conversion techniques -Biogas aste to energy conversion.	Generation-Factors					
Geothermal Sources: Hydro thermal conversion	Geothermal Sources: Hydro thermal Source (Vapor &Liquid dominated systems), geothermalenergy conversion						
Tidal Energy-Basic Principles of Tidal Limitations of Tidal power.	Power, Schematic Layout of Tidal Power hou	se, Advantages &					
Mapping of Course Outcomes for Unit III	CO3, CO4						
Guidelines for Conduct	ion (Any one or more of following but not lim	ited to)					
Guest Lectures / Group Activitie Guidelines for Assessment (Any one Presentation / Paper / (Theory asse	es / Assignments / Taking up small proje or more of following but not limited to) / Pr essment test) / Report	ct for short duration actical Test /					
SUGO	GESTED LIST OF STUDENT ACTIVITYS						
 conserved 2. Conduct an energy audit of your utilization can be minimized. Sug 3. Visit solar power plant /wind pounderstand different elements, w 4. Visit government website for ren 	 Prepare a of monthly energy consumption of your institute and find the ways now it can be conserved Conduct an energy audit of your institute; suggest the ways how the conventional energy resources utilization can be minimized. Suggest the areas ,where the non-conventional energy may be used Visit solar power plant /wind power plant available in your locality/ nearer to your institute and understand different elements, working, and note the power generation by these plants 						
	Text Books:						
 Non-Conventional Energy Sources by G.D. Rai, Khanna Publication Renewable Energy (2nd edition). Oxford University Press, 450 pages (ISBN: 0-19- 926178-4). Renewable Energy Sources & Emerging Technologies, D P Kothari, K C Singal & Rakesh Ranjan, Prentice Hall India. 							
	Reference Books:						
 http://www.ener-supply.eu/downloads/ENER_handbook_en.pdf Energy opportunities and social responsibility. Satyesh C. Chakraborty, Jaico publications Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press, 619 pages (ISBN: 0-19-926179-2) Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997. 							
E-	Books / E- Learning References :						
 RENEWABLE ENERGY SOURCE http://www.ifeed.org/pdf/me http://nptel.ac.in/courses/112 	S AND THEIR APPLICATIONS: dia/BOOK_Renewable-Energy-Sources-and-the 2105051/	eir-Applications.pdf					

Savitribai Phule Pune University, Pune Third Year Information Technology (2019 Course)							
Mandatory Audit Course 6 214459 (B): Loadorship and Borsonality Dovelopment							
314459 (D) Teaching Scheme:	Credit Scheme:	Jevelopr Evaminati	nent on Scheme:				
Theory (TH) :1 hrs/week							
Tutorial(TUT): 3 hrs/week	Non Credit	Audit Cou	rse				
Prerequisite Courses: if Any							
 Course Objectives: To develop inter personal ski To develop personalities of responsibilities in personal lift To develop professionals with To develop professionals with To re-engineer attitude and u To help students to evolve a the dynamic environment. Course Outcomes: On completion of the course, stud Practice responsible decision CO2: Demonstrate an understandi CO3: Develop a range of leaders 	Ils and be an effective goal oriented students in order to empower the fe to build better human being. In leadership quality along with ideal understand its influence on behavior is leaders who can effectively hand ents will be able to— -making and personal accountability ng of group dynamics and effective to hip skills and abilities such as effec	leader. em and ge listic, prac r. dle real life y. teamwork	t better insights into self- tical and moral values. e challenges in and across ling change, resolving				
conflict, and motivating othe CO4: Develop multi-dimensional p	rs. ersonality.						
	COURSE CONTENTS						
Unit I PERSONALITY DEVELOPMENT (03 hrs)							
Laws of Personality Developmer Influence of Thought, Take the Wh Factors influencing Attitude, Challe Skills, Decision-Making, Negotiatio Confidence, Self Esteem, Creativity Mapping of Course Outcomes	nt, Different Layers of Personality nole Responsibility on Yourself, Self- enges and lessons from Attitude, Pe on and Problem-Solving. Importance v: Out of box thinking, Lateral Thinking	y, How to -analysis: J ersonality ce of Self ng	o Change Our Character, Iohari 's Window, Attitude: Traits, Sharpening Memory				
for Unit I							
Unit II TECHNIQUES IN PERSONALITY DEVELOPMENT (03 hrs)							
Techniques for better Time Man Self-acceptance, and self-growth, G Long Term, Lifetime Goals. Confide building videos of motivational spe	agement, Meditation and concent Goal setting: Wish List, SMART Goal ence Building: Case studies, Confide eakers.	ration tec s, Blueprir nce	hniques, Self- hypnotism, nt for success, Short Term,				

Unit III LEADERSHIP SKILLS (03 hrs) Working individually and in a team, Levels of Leadership, Making of a leader, Types of leadership Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation, Introduction to Interpersonal Relations, Virtual Leadership: Introduction, Essential Skills for Managing Remote Teams and challenges of virtual leadership. Mapping of Course Outcomes CO3, CO4 for Unit III Unit IV Transce of groups in organization and Team Interactions in group, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts., How to build a good team? Teamwork & Team building Interpersonal skills, Virtual team dynamics: issues and resolutions Mapping of Course Outcomesfor CO2,CO4 Unit IV Ederence Books: 1. Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; OxfordPublishers.2E, ISBN: 780199459742, ISBN: 0199459746. 2. SKILLS, 2015, Career Development Centre, Green Pearl Publications.						
Working individually and in a team, Levels of Leadership, Making of a leader, Types of leadership Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation, Introduction to Interpersonal Relations, Virtual Leadership: Introduction, Essential Skills for Managing Remote Teams and challenges of virtual leadership. Mapping of Course Outcomes CO3, CO4 for Unit III CO3, CO4 Importance of groups in organization and Team Interactions in group, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts., How to build a good team? Teamwork & Team building Interpersonal skills, Virtual team dynamics: issues and resolutions Mapping of Course Outcomes for Unit IV CO2,CO4 Int IV Reference Books: 1. Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; Oxford Publishers.2E, ISBN: 780199459742, ISBN: 0199459746. 2. SKILLS, 2015, Career Development Centre, Green Pearl Publications.						
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ISBN: 780199459742, ISBN: 0199459746. 2. SKILLS, 2015, Career Development Centre, Green Pearl Publications.						
2. SKILLS, 2015, Career Development Centre, Green Pearl Publications.						
3. Shallniverma (2014); "Development of Life Skills and Professional Practice"; First Edition; Suitan						
4 John C Maxwell (2014): "The 5 Levels of Leadership" Centre Street A division of Hachette Book						
Group Inc, ISBN: 9789350098714, ISBN: 9350098717.						
5. Basic Managerial Skills for All by E. H. McGrath, S. J., PHI Personality Development and Soft Skill,						
Mitra, Barun, Oxford University Press, ISBN: 9788120343146, ISBN:812034314X.						
6. Personality Development by Rajiv K. Mishra. Rupa& Co.						
7. How to deal with Stress by Stephen Palmer & Cary Cooper, Kogan Page India Pvt. Ltd., South						
Asian Edition Successful Time Management by Patrick Forsyth, Kogan Page						
9 Gaiendra Singh Chauhan Sangeeta Sharma: Soft Skills – An Integrated Approach to Maximize						
Personality, Wiley India, ISBN:13:9788126556397						
E-BOOKS/ E-Learning References:						
1. Developing Soft Skills and Personality: By Prof. I. Ravichandran, III Kanpur						
2 Leadershin:Prof KalvanChakravatti IIT Kharagnur						
https://nptel.ac.in/courses/122/105/122105021/						
3. Virtual leadership <u>https://youtu.be/SNeTzgBE93o</u>						
4. Motivation and Confidence building videos of motivational speakers like Shiv Khera, Sandeep						
Maheshwari , Sonu Sharma , Vivek Bindra , B.K.Shivani						

Third Year Information Technology (2019 Course) Mandatory Audit Course 6 314459 (C): Foreign Language-(Japanese Language- IV) Teaching Scheme: Credit Scheme: Examination Scheme: Theory (TH) :1 hrs/week Non Credit Audit Course Tutorial(TUT): 3 hrs/week Non Credit Audit Course Prerequisite Courses: 1. Students must have already studied can read/write Hiragana and Katakana script								
Mandatory Audit Course 6 Mandatory Audit Course 6 S14459 (C): Foreign Language-(Japanese Language- IV) Teaching Scheme: Credit Scheme: Examination Scheme: Theory (TH) :1 hrs/week Non Credit Audit Course Tutorial(TUT): 3 hrs/week Non Credit Audit Course (Assignments and Self-study) Prerequisite Courses: 1. Students must have already studied can read/write Hiragana and Katakana script	Third Year Information Technology (2019 Course)							
314459 (C): Foreign Language-(Japanese Language- IV) Teaching Scheme: Credit Scheme: Examination Scheme: Theory (TH) :1 hrs/week Non Credit Audit Course Tutorial(TUT): 3 hrs/week Non Credit Audit Course (Assignments and Self-study) Prerequisite Courses: I. Students must have already studied can read/write Hiragana and Katakana script	Mandatory Audit Course 6							
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Prerequisite Courses: 1. Students must have already studied can read/write Hiragana and Katakana script								
 Students must have already studied can read/write Hiragana and Katakana script 								
2. Students must have studied Japanese for beginners that includes the syllabus of Audit cou	urse							
Module 1 to 3								
Course Objectives:								
1. Japan Market needs: To meet the needs of ever growing industry with respect to the Japanese	e							
language support.								
2. Japanese Culture and Mindset: To get introduced to Japanese society and culture throughlang	uage.							
3. Career opportunities: To know more about Higher studies, Career opportunities in Japan /Japa	anese							
 4 Soft skills and self-development. To learn the manners, business culture and develop the confi 	idence							
4. Soft skins and sen-development: To learn the manners, business culture and develop the confidence by gaining the knowledge of global perspective and cross-cultural studies.								
Course Outcomes:								
On completion of the course, students will be able to-								
CO1: Do Better Communication in Japanese language.								
CO2: Demonstrate knowledge of Japanese Language Scripts (Reading, Writing, etc).								
CO3: Demonstrate knowledge of Japanese culture, lifestyle, etc.								
CO4: Pursue advanced Professional Japanese Language course.								
COURSE CONTENTS								
Unit I JAPANESE GRAMMAR (3 hrs Lecture +	+ 3 hrs							
Self-study	//							
Culture (Others: Conversation /Essay about some place. Introduction to the tourism in lange. Introduction	aduction							
to Rusiness (Work culture in Japan Kapiis, 41 to EQ listening practice. Vershulary and cap	vorsation							
oractice								
a Minna no Nihongo L. Lesson 7 and 8 (Text book + Audio and Video)								
b Nihongo Challenge Kanii - Lesson 5								

Mapping of Course	CO1						
Outcomes for Unit I							
Unit II	INTERACTIVE JAPANESE						
Adverbs of degree, Stating like / dislike, Living and Non-living things, Stating wish/desire, Stating the							
present action (verb te form), Culture/Others: Introduction to Career Opportunities, Education and							
Higher studies in Japan, Kanjis: 51 to 60, Listening practice, Vocabulary and conversation practice							
Reference:							
a. Minna no Nihongo I : Less	on 9 and 10 (Text book + Audio and Video)						
 b. Nihongo Challenge Kanji - Lesson 6 							
Mapping of Course Outcomes	pping of Course Outcomes CO2						
for Unit II							
Lipit III		(3 hrs Lecture + 3 hrs					
offic in	FORMALJAPANLSL	Self-study)					
Counters , Making comparisons, Past tense of verbs ,Past tense of adjectives, Combining adjectives (i							
+ i, na+i), Culture/Others: Info	rmation about career forums and Job Fairs Int	roduction about Japanese					
companies recruitment process	s, Kanjis: 61 to 70, Listening practice, Voca	abulary and conversation					
practice							
Reference:							
c. Minna no Nihongo Lesson	L1 and 12 (Text book + Audio and Video)						
d. Nihongo Challenge Kanji -	Lesson 7						
Mapping of Course Outcomes	СО3						
for Unit III							
Unit IV	LIFE IN JAPAN	(3 hrs Lecture + 3 hrs					
		Self-study)					
Stating wish/desire (ga hoshi, ver	b tai form), Stating / combining multiple action	ons (verb te form), Stating					
the order of multiple actions (ve	rb te kara form), Expressing "Permission" and	"Prohibition" (te mo ii, te					
wa ikenai forms),Culture/Others:	Preparation of a job interview for a Japanese	company, Do's and Don'ts					
in a Job Interview ,Kanjis: 71 to 80),Listening practice, Vocabulary and conversat	ion practice					
Reference:							
a. Minna no Nihongol : Lo	esson 13 and 14 (Text book + Audio and Video)						
b. Nihongo Challenge Ka	nji - Lesson 8						
Mapping of Course	CO4						
Outcomes for Unit IV							
	Text Books:						
1. Minna no Nihongo I–MainTe	ext book with audio and video files(Books by	r Goyal Publishers –					
Available in shops / Online)							
2. Minna no Nihongo - Translat	ion and grammatical notes for self-study(Book	s by Goyal Publishers					
3. Available in shops / Online)							

4. Nihongo Challenge – Kanji(Available with Japanese Language schools/teachers)

Reference Books:

- 1. Nihongo Shoho: For better understanding and practice of Basic Japanese Grammar
- 2. Marugoto : For scenario based Japanese conversation practice

E-Books / E- Learning References :

- 1. nihongo ichiban
 - a. https://nihongoichiban.com/home/jlpt-n5-study-material/
- 2. jlpt sensei
 - a. https://jlptsensei.com/how-to-pass-jlpt-n5-study-guide/

FACULTY OF ENGINEERING

Syllabus

B.E. (Information Technology) 2015 Course (With effect from Academic Year 2018-2019)

SAVITRIBAI PHULE PUNE UNIVERSITY The syllabus is prepared by B.O.S. in Information Technology, Savitribai Phule Pune University

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B.E. (Information Technology) 2015 Course to be implemented from Academic Year 2018-19

Subject Code	Subject	Teaching Scheme				Examination Scheme			Total Marks	Credits	
		Lecture	Practical	Tutorial	In- Sem	TW	PR	OR	End- Sem		
414453	Information and Cyber Security	3			30				70	100	3
414454	Machine Learning and Applications	4			30				70	100	4
414455	Software Design and Modeling	3			30				70	100	3
414456	Elective-I	3			30				70	100	3
414457	Elective -II	3			30				70	100	3
414458	Computer Laboratory- VII		4			50	50			100	2
414459	Computer Laboratory- VIII		4			50		50		100	2
414460	Project Phase-I			2		50				50	2
414461	Audit Course-V									G	rade
Total		16	8	2	150	150	50	50	350	750	22
Total of P	Part-I		26					750			22

SEMESTER -- I

Abbreviations: TW: Term Work TH: Theory OR: Oral PR: Practical Sem: Semester

Computer Laboratory-VII (Information and Cyber Security+ Machine Learning and Application) Computer Laboratory-VIII (Software Design and Modeling)

	Elective I		Elective II
414456 A	1. Wireless Communications	414457A	1. Software Defined Networks
414456B	2. Natural Language Processing	414457B	2. Soft Computing
414456C	3. Usability Engineering	414457C	3. Software Testing and Quality Assurance
414456D	4. Multicore and Concurrent Systems	414457D	4. Compiler Construction
414456E	5. Business Analytics and Intelligence	414457E	5. Gamification

Audit Course-V					
414461A	<u>1. Emotional Intelligence</u>				
414461B	2. Green Computing				
414461C	3. Critical Thinking				
414461D	4. Statistical Learning model using R.				

2015 Course

Subject Code	Subject	Teaching Scheme			Examination Scheme				Total Marks	Credits	
		Lecture	Practical	Tutorial	ln- Sem	TW	PR	OR	End- Sem		
414462	Distributed Computing System	3			30				70	100	3
414463	Ubiquitous Computing	3			30				70	100	3
414464	Elective-III	3	2		30	25		25	70	150	4
414465	Elective-IV	3			30				70	100	3
414466	Computer Laboratory-IX		4			50	50			100	2
414467	Computer Laboratory-X		2			25		25		50	1
414468	Project Work			6		50		100		150	6
414469	Audit Course-VI									G	rade
Total		12	8	6	120	150	50	150	280	750	22
Total of P	Part-II		26					750			22

SEMESTER -II

Abbreviations: TW: Term Work TH: Theory OR: Oral PR: Practical Sem: Semester

Computer Laboratory-IX (Distributed Computing System)

Computer Laboratory-X (Ubiquitous Computing)

	Elective III		Elective IV
414464A	<u>1. Internet of Things (IoT)</u>	414465A	1. Rural Technologies and Community Development
414464B	2. Information storage and retrieval	414465B	2. Parallel Computing
414464C	3. Multimedia Techniques	414465C	3. Computer Vision
414464D	4. Internet and Web Programming	414464D	4. Social Media Analytics
414464E	5. Computational Optimization	414465E	5. Open Elective

	Audit Course-VI
414469A	<u>1. IoT – Application in Engineering field</u>
414469B	2. Entrepreneurship
414469C	3. Cognitive Computing
414469D	4. AI and Robotics

Audit Course V Options

Course Code	Audit Course Title
414461A	1. Emotional Intelligence
414461B	2. Green Computing
414461C	3. Critical Thinking
414461D	4. Statistical Learning model using R.
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Fourth Year of Information Technology Engineering (2015 Course)

414461A: Audit Course-V

Emotional Intelligence

This Emotional Intelligence (EI) training course will focus on the five core competencies of emotional intelligence: self-awareness, self-regulation, motivation, empathy and interpersonal skills. Participants will learn to develop and implement these to enhance their relationships in work and life by increasing their understanding of social and emotional behaviors, and learning how to adapt and manage their responses to particular situations. Various models of emotional intelligence will be covered.

Course Objectives:

- 1) To develop an awareness of EI models.
- 2) To recognize the benefits of EI.
- 3) To understand how you use emotion to facilitate thought and behaviour.
- 4) To know and utilize the difference between reaction and considered response.

Course Outcomes:

By the end of the course, students should be able to,

- 1) Expand your knowledge of emotional patterns in yourself and others.
- 2) Discover how you can manage your emotions, and positively influence yourself and others.
- 3) Build more effective relationships with people at work and at home.
- 4) Positively influence and motivate colleagues, team members, and managers.
- 5) Increase your leadership effectiveness by creating an atmosphere that engages others.
- 6) Apply EI behaviours and supports high performance.

Unit I Introduction to Emotional Intelligence (EI).

Emotional Intelligence and various EI models, The EQ competencies of self-awareness, self-regulation, motivation, empathy, and interpersonal skills, Understand EQ and its importance in life and the workplace

Unit II Know and manage your emotions.

Emotions, The different levels of emotional awareness, Increase your emotional knowledge of yourself, Recognize 'negative' and 'positive' emotions. The relationship between emotions, thought and behavior, Discover the importance of values, The impact of not managing and processing 'negative' emotions, Techniques to manage your emotions in challenging situations.

Unit III Recognize Emotions in others.

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The universality of emotional expression, Learn tools to enhance your ability to recognize and appropriately respond to others' emotions, Perceiving emotions accurately in others to build empathy 4

Unit IV Relate to others.

Applying EI in the workplace, the role of empathy and trust in relationships, Increase your ability to create effective working relationships with others (peers, subordinates, managers, clients, Find out how to deal with conflict, Tools to lead, motivate others and create a high performing team.

Books

- 1) Daniel Goleman," Emotional Intelligence Why It Matters More Than IQ,", Bantam Books,
- 2) ISBN-10: 055338371X13: 978-0553383713 2. Steven Stein , "The EQ Edge" , Jossey-Bass, ISBN : 978-0-470-68161-9
- 3) Drew Bird , "The Leader's Guide to Emotional Intelligence" , ISBN: 9781535176002

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Fourth Year of Information Technology Engineering (2015 Course)

414461B: Audit Course-V

Green Computing

Green computing is the study and practice of using computing resources efficiently. Green computing or green IT, refers to environmentally sustainable computing or IT. The goals of green computing are similar to green chemistry; reduce the use of hazardous materials, Maximize energy efficiency during the product's lifetime, and promote the recyclability or biodegradability of defunct products and factory waste.

Course Objectives:

- 1) To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
- 2) To examine technology tools that can reduce paper waste and carbon footprint by user.
- 3) To understand how to minimize equipment disposal requirements.
- 4) To gain skill in energy saving practices in their use of hardware

Course Outcomes:

By the end of the course, students should be able to,

- 1) Understand the concept of green IT and relate it to sustainable development.
- 2) Apply the green computing practices to save energy.
- 3) Discuss how the choice of hardware and software can facilitate a more sustainable operation,
- 4) Use methods and tools to measure energy consumption

Unit I Fundamentals of Green IT.

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot Print - Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power.

Unit II Green Assets and Power Problems.

Green Assets: Buildings, Data Centers, Networks, and Devices, Green Information Systems : Design and Development Models, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Low-Power Computers and peripheral devices.

Unit III Green Information Systems.

Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling.

Unit IV Green Grid Framework.

Virtualizing of IT systems, Role of electric utilities, Telecommuting, teleconferencing and teleporting, Materials recycling, Best ways for Green PC, Green Data center Case Studies, Applying Green IT Strategies and Applications to a Home Hospital, Packaging Industry and Telecom Sector.

Reference Books

1. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August2009, ISBN: 978-0-470-46745-9

2. Alvin Galea, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM rebook, 2011. ISBN: 10: 1-933742-05-4; 13: 978-1-933742-05-2

3. John Lamb, "The Greening of IT", Pearson Education, 2009, ISBN 10: 0137150830

4. Jason Harris, "Green Computing and Green IT- Best Practices on regulations & industry", Lulu.com, 2008, ISBN: 1558604898

5. Bud E. Smith, "Green Computing Tools and Techniques for Saving Energy, Money and Resources", CRC Press, 2014, 9781466503403

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Fourth Year of Information Technology Engineering (2015 Course)

414461C: Audit Course-V

Critical Thinking

Thinking about one's thinking in a manner designed to organize and clarify, raise the efficiency of, and recognize errors and biases in one's own thinking. Critical thinking is not 'hard' thinking nor is it directed at solving problems (other than 'improving' one's own thinking). Critical thinking is inward-directed with the intent of maximizing the rationality of the thinker. One does not use critical thinking to solve problems—one uses critical thinking to improve one's process of thinking.

Course Objectives:

- 1) Critical thinking is considered among the most important "higher order cognitive skills" expected from students graduating with professional degrees (e.g. engineering, management, etc.)
- 2) This course will make you a better thinker, it will sharpen your mind, clarify your thoughts, and help you make smarter decisions (especially about your career). It will help you argue assertively and hence make you a forceful communicator – both in public speaking and in one-on-one situations.
- 3) Most employers complain that fresh graduates need too much of direction and they are incapable of "independent decision making". We intend to overcome this shortcoming

Course Outcomes:

By the end of the course, students should be able to,

- 1) If students whole-heartedly participate in the course, they can expect to be smarter, stronger and more confident thinkers.
- 2) They can embark on a life-long journey of "self-directed learning".

Unit I	Introduction to Critical Thinking.				
What is Critical Thinking o It's role in problem solving o The difference between a critical thinker and on who is not, Barriers that prevent us from thinking critically					
Unit II	Importance of being logical.				
Key concepts or "statistically"	f "Thinking fast and slow" - Logical fallacies & Mistakes we make when do no	t think			
Unit III	Pattern in deductive logic.				
Unit III Hypothetical syl maths, based o	Pattern in deductive logic. logism - Categorical syllogism(Set theory concepts), Argument by elimination, ba n definition, Evaluating deductive arguments validity & soundness	sed on			
Unit III Hypothetical syl maths, based or Unit IV	Pattern in deductive logic. logism - Categorical syllogism(Set theory concepts), Argument by elimination, bain definition, Evaluating deductive arguments validity & soundness Argumentation – Foundation of Critical Thinking.	sed on			

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Reference Books

- 1) "Thinking Fast and Slow"- Daniel Kahneman Penguin Books
- 2) "Critical Thinking Students Introduction" Bassham, Irwin, Nardone, Wallace McGraw Hill

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Fourth Year of Information Technology Engineering (2015 Course)

414461D: Audit Course-V

Statistical Learning Model using R

Statistical learning theory is a framework for machine learning drawing from the fields of statistics and functional analysis Statistical learning theory deals with the problem of finding a predictive function based on data. Statistical learning theory has led to successful applications in fields such as computer vision, speech recognition, bioinformatics and baseball.

Course Objectives:

- 1) To get familiar With the explosion of "Big Data" problems, statistical learning /machine learning has become a very hot field.
- 2) To learn statistical learning and modelling skills which are in high demand also cover basic concepts of statistical learning / modelling methods that have widespread use in business and scientific research.
- 3) To get hands on the applications and the underlying statistical / mathematical concepts that are relevant to modelling techniques. The course are designed to familiarize students in implementing the statistical learning methods using the highly popular statistical software package R.

Course Outcomes:

By the end of the course, students should be able to,

- Students will be familiar with concepts related to "data science", "analytics", "machine learning", etc. These are important topics, and will enable students to embark on highly rewarding careers.
- 2) Students will capable of learning "big data" concepts on their own
- Unit I

Introduction to Statistical Learning.

What is Statistical Learning, Various issues to consider while "modeling"

Unit II Getting started with R programming.

Introduction to the R-Studio, user-interface, Basic commands, Data Structures in R, Graphics, Reading data into R.

Unit III Linear Regression models including Lab.

Instructor should select a problem statement and design the assignment for Linear Regression.

Unit IV Classification models (Logistic Regression and LDA) with Lab.

Instructor should select a problem statement and design the assignment for Logistic Regression and LDA.

Unit VI Tree based methods (regression trees, classification tree) with Lab.

Instructor should select a problem statement and design the assignment for Tree based methods (regression trees, classification tree) with lab.

2015 Course

Reference Books

1) An Introduction to Statistical Learning with Applications in R Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani – 6th edition- Springer Publications. Audit Course V Options

Course Code	Audit Course Title
414469A	1. IoT – Application in Engineering field
414469B	2. Entrepreneurship
414469C	3. Cognitive Computing
414469D	4. AI and Robotics

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Fourth Year of Information Technology Engineering (2015 Course) 414469A: Audit Course-VI

IoT Applications in Engineering field.

IOT as a game changer in several fields of applications and poised for phenomenal growth. This course introduces Students to IOT applications in various Engineering disciplines: Civil, Chemical, Electrical, E&TC, Mechanical and Metallurgical Engineering This 20 hour course is aimed at covering various components involved in IOT, concepts, definitions and mainly Engineering Applications associated with IOT/IIOT.

Course Objectives:

- 1. To get the detailed insight of Internet of Things.
- 2. To learn the IoT terms in Engineering.
- 3. To understand how IoT concepts can be implement.
- 4. To know the protocols, Sensors and other elements for IoT implementation.

Course Outcomes:

By the end of the course, students should be able to,

- 1. Expand your knowledge of Internet of Things.
- 2. Discover how can you use IoT in your Engineering applications.
- 3. Build more effective hands on with IoT elements.
- 4. Expand the practical knowledge of using IoT components like sensors, processors.
- 5. Expand the understanding of using different protocols.

Unit I	sics of IOT – Difference between IOT and IIOT.							
Overview of System Components of IOT.								
Unit II	Architecture.							
Importance, Advantages & Disadvantages								
Unit III	Unit III Sensors, Transducers, Special requirements for IIOT sensors, Actuators, Types of Sensors, Actuators.							
Sensors, Transducers, Special requirements for IIOT sensors, Actuators, Types of Sensors, Actuators.								
Unit IV	Protocols - HART, MODBUS-Serial & Parallel, Ethernet, BACNet							
Protocols -	HART, MODBUS-Serial & Parallel, Ethernet, BACNet							
Unit V	Introduction to HOT Cloud Platform and Security Aspects Importance and likely Risk Elements							
Introductio	n to IIOT Cloud Platform and Security Aspects Importance and likely Risk Elemen	ts						

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Unit VI Quiz, Case Studies and Student Presentations

Illustrative IIOT applications in Engineering Disciplines – Civil, Chemical, Electrical, E & TC, Mechanical and Metallurgical.

References

1. Internet of Things (A Hands-on-Approach) ISBN: 978-0996025515 - by ArshdeepBahga and Vijay Madisetti

2. Inside the Internet of Things (IoT), Deloitte University Press

3. Internet of Things- From Research and Innovation to Market Deployment; By Ovidiu& Peter; River Publishers Series

4. Five thoughts from the Father of the Internet of Things; by By Phil Wainewright - Kevin Ashton, who coined the word IoT

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Fourth Year of Information Technology Engineering (2015 Course) 414469B: Audit Course-VI

Entrepreneurship

Today Entrepreneurship & Start -Ups are Key Words. Developing Entrepreneurs & Jobs is National Requirement. Separate PPT - presentation from our EEC Group can be Guideline as Reference Though reference books are available, it is best to see - Google Search videos and films that elaborate most of these concepts. You tube is a rich source of such content on each of these topics. This module also helps students get better prepared for interviews and group discussions.

Course Objectives:

- 1. To get the detailed about Entrepreneurship.
- 2. To understand the abilities to become a Entrepreneur.
- 3. To understand how Business Finance concepts can be implement.

Course Outcomes:

By the end of the course, students should be able to,

- 1. Expand your knowledge of Entrepreneurship & Startups.
- 2. Discover how you can use Entrepreneur Qualities.
- 3. Expand the practical knowledge of Finance, Legal-Patents, Intellectual Property, and Business Associations.
- 4. Expand the understanding of Deliverables & Achieving Target.

Unit I	Introduction To Entrepreneurship & Favorable Environment for Startups
Unit II	Entrepreneur - Qualities, Strengths & Challenges - Govt. Regulations &
	Taxes
Unit III	Road Map - Goal Setting & Methodology, Case Studies
	Skill Sets Various Skills - Communication, Linguistic, Analytical & Abstract
Onitiv	Thinking. Engineering etc.
References	\$
Burns, Paul	l, 1949- author. Title: Entrepreneurship and small business :
Hisrich R D	and Peters M P; "Entrepreneurship"; 5th Edition Tata McGraw-Hill.

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Fourth Year of Information Technology Engineering (2015 Course) 414469C: Audit Course-VI

Cognitive computing

This course explores the area of cognitive computing and its implications for today's world of big data analytics and evidence-based decision making. Topics covered include: cognitive computing design principles, natural language processing, knowledge representation, Students will have an opportunity to build cognitive applications, as well as explore how knowledge-based artificial intelligence and deep learning are impacting the field of data science.

This course is open to students in Business Intelligence and Analytics, Information Systems, and Masters of Business Administration, or with the permission of the instructor

Course Objectives:

- 1. To develop algorithms that use AI and machine learning along with human interaction and feedback to help humans make choices/decisions
- 4. To get the detailed about appealing new model for application development.
- 5. To understand how to evaluate patterns and complex relationships in large unstructured data sets.
- 6. To understand how Cognitive computing supports human reasoning by evaluating data in context and presenting relevant findings along with the evidence that justifies the answers.

Course Outcomes:

By the end of the course, students should be able to,

- 1. Understand and discuss what cognitive computing is, and how it differs from traditional approaches.
- 2. Plan and use the primary tools associated with cognitive computing.
- 3. Plan and execute a project that leverages cognitive computing.
- 4. Understand and discuss the business implications of cognitive computing.

Unit I	Introduction to Cognitive Systems and computation, Knowledge based AI:		
Cognitive s	ystems, Different modes of Computing: Turning machine Lambda, Calculus,	Hyper	
Computing, Super Computing, Pan Computing and Interactive Computing.			
Unit II	Cognitive Functioning:		
Learning, M Judgement.	lemorising, Adaptation, Self Origination, Control, Thinking, Reasoning, Decision Ma	aking &	
Unit III	Mental States:		

Belief Desire Intention (BDI) emotion and feeting. Computation of Cognitive Functioning in machines:

Robotics, Human Robotics Interaction, Hepatic.

Unit IV Perception and sensing:

Hardware machines of vision and audition with reference to human and machine.

References:

Hurwitz, Kaufman, and Bowles, Cognitive Computing and Big Data Analytics, Wiley, Indianapolis, IN, 2005, ISBN: 978-1-118-89662-4.

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Fourth Year of Information Technology Engineering (2015 Course)

414469D: Audit Course-VI

AI and Robotics

Robotics is a branch of AI, which is composed of Electrical Engineering, Mechanical Engineering, and Computer Science for designing, construction, and application of robots. The robots have mechanical construction, form, or shape designed to accomplish a particular task. They have electrical components which power and control the machinery. They contain some level of computer program that determines what, when and how a robot does something.

Course Objectives:

- 1. To get the detailed robotics and rapid development.
- 2. To understand the robots functions.
- 3. To understand how mechanical devices converting into intelligent machines through a branch of computer science called artificial intelligence (AI)

Course Outcomes:

By the end of the course, students should be able to,

- 1. The goal of this course is to familiarize the students with the basic concepts of robotics, artificial intelligence and intelligent machines.
- 2. It will help students to understand and apply principles, methodology and techniques of intelligent systems to robotics

Unit I Intelligent Robotics:

Automation and Robots, Robot Classification, Robot Specifications, Sensory perception, Robot control and Intelligence.

Unit II Direct Kinematics:

Coordinate Frames, Rotations, Homogeneous Coordinates, The arm Equation, (DK analysis of - 2 Axis and 3 Axis Planar robot, Four axis SCARA Robot, Five axis Articulated robot).

Unit III Inverse Kinematics:

General Properties of Solutions, Tool Configuration, (IK analysis of - 2 Axis and 3 Axis Planar robot, Four axis SCARA Robot, Five axis Articulated robot).

Unit IV Workspace Analysis and Trajectory Planning:

Workspace analysis, Work envelope of 4-axis SCARA Robot, Work envelope of 5-axis articulated Robot, Workspace Fixtures, The pick-and-place operation, Continuous-Path Motion, Interpolated Motion, Straight Line Motion.

References:

1. Robotics and AI", Andrew Staugaard, PHI

2. Fundamentals of Robotics- Analysis and Control", Robert Schilling, Pearson Education

B.E. (Information Technology) Syllabus

2015 Course

- 3. Introduction to Robotics", J. J. Craig, Pearson Education.
- 4. "Robotics", Fu, Gonzales and Lee, McGraw Hill.
- 5. "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", George F. Luger, Pearson Education.
- 6. "Industrial Robotics- Technology, programming, and applications", Groover, Weiss, Nagel and Odrey, McGraw Hill
- 7. Elaine Rich and Kevin Knight, "Artificial Intelligence", TMH

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

Course	Course Name	Dept Name	Factor addressed
Code			
204189	Electronics Skill Development	Electronics & Telecommunication	Leadership Skills
204199	Employability Skill Development	Electronics & Telecommunication	Professional Ethics
304190	Skill Development	Electronics & Telecommunication	Leadership Skills
Audit Course 5 (1)	Human Behavior	Electronics & Telecommunication	Human Values
Audit Course 5 (2)	Green Energy	Electronics & Telecommunication	Environment & Sustainability
Audit Course 6 (1)	Team Building, Leadership and Fitness	Electronics & Telecommunication	Human Values & Leadership Skills
Audit Course 6 (2)	Environmental issues and Disaster Management	Electronics & Telecommunication	Environment & Sustainability

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Faculty of Science and Technology



Syllabusfor

S.E (Electronics /Electronics & Telecommunication Engineering)

(Course 2019)

(w.e.f. June 2020)

	Savitribai Phule Pune University, Pune S.E. (Electronics / E&TC Engineering) 2019 Course (With effect from Academic Year 2020-21)													
			S	emes	ster-l	II								
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks					nd	Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
207005	Engineering Mathematics	04	-	01	30	70	25	-	-	125	04	-	01	05
204181	Electronic Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204182	Digital Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204183	Electrical Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204184	Data structures	03	-	-	30	70	-	-	-	100	03	-	-	03
204185	Electronic Circuit Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
204186	Digital circuits Lab		02					50		50		01		01
204187	Electrical Circuit Lab	-	02	-	-	-	25	-	-	25	-	01	-	01
204188	Data Structures Lab	-	02	-	-	-	-	-	25	25	-	01	-	01
204189	Electronic Skill Development	-	02	-	-	-	25	-	-	25	-	01	-	01
204190	Mandatory Audit Course 3 &	-	-	-					-	-	-	-	-	-
Total		16	10	01	150	350	75	100	25	700	16	05	01	22

	Savitribai Phule Pune University, Pune													
	S.E. (Electro	nics	/ E&		Engi	inee	ring)	201	19 C	ours	е			
	Semester-IV													
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
204191	Signals & Systems	03	-	01	30	70	25	-	-	125	03	-	01	04
204192	Control Systems	03	-		30	70		-	-	100	03	-	-	03
204193	Principles of Communication Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
204194	Object Oriented Programming	03	-	-	30	70	-	-	-	100	03	-	-	03
204195	Signals & Control System Lab		02				50			50		01		01
204196	Principle of Communication Systems Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
204197	Object Oriented Programming Lab	-	02	-	-	-	-	-	50	50	-	01	-	01
204198	Data Analytics Lab		02				-		25	25		01		01
204199	Employability Skill Development	02	02	-	-	-	50	-	-	50	02	01	-	03
204200	Project Based Learning ^η	-	04				50		-	50		02		02
204201	Mandatory Audit Course 4&	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	14	14	01	120	280	175	50	75	700	14	07	01	22
Abbreviations: in-Sem: In semester End-sem: End semester TH : Theory TW : Term Work PR : Practical OR : Oral TUT : Tutorial														

Note: Interested students of S.E. (Electronics/E&TC) can opt any one of the audit course from the list of audit courses prescribed by BoS (Electronics & Telecommunications Engineering)

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Second Year of Electronics / E & Tc Engineering (2019 Course) 204189: Electronic Skill Development Lab

Teaching Scheme:	Credit	Examination Scheme:
Practical: 02 hrs. / week	01	Term Work: 25 Marks

Prerequisite Courses, if any: Basic Electronics Engineering, Fundamentals of Programming, Open- source electronics platform based on easy-to-use hardware and software (preferably Arduino)

Companion Course, if any: Any one of the following:

- 1. Jeremy Blum PCB tutorials.
- 2. OrCAD basic Tutorials.

	List of Assignments [Min. 10 has to be completed]
	Group A: Application of Electronics Principles in Practice
1.	Electronic Components and Connections (Bread boarding).
2.	Introduction and applications using Arduino and micro python.
3.	Using Sensors & Actuators and their interfacing with Arduino (Motor Driver with relays , Reversible motor, SSR).
4.	Wireless Connectivity to Arduino .
Grou	ıp B: Hardware Design, Fault Finding, Testing, Repair and Measuring
5.	Drawing layout of PCB using PCB design software.
6.	Single layer PCB design for a simple electronic circuit.
7.	Using test equipment for testing, fault finding & repair etc.

8.	Use of measuring equipment for measurement of signals.				
9.	Using Simulation software for design & testing of electronic circuits.				
Group C: Assembly, SMD Overview, Power Budgeting, Batteries (Lead Acid ,					
	LiPo), Solar				
10.	Assemble and utilize mechanical parts such as DC Motor, AC Motor, Stepper motor Solenoid, sensors etc., connect and assemble mechanical parts to form a working unit , Wire and form cables. industry standards				
11.	Assemble and use various types of parts and surface mounted devise parts, Assemble parts to standard determined by IPC-A-610, Work to correct sequences and tolerances, Accurately solder components using lead free solder to comply with				
12.	Calculation of Power budget for an electronic circuit.				
13.	Study & Use of various types of Batteries.				
14.	Study of various solar power generation systems.				
	Learning Resources				
Referen	ce Books:				
1. R S Khan	dpur, "Printed Circuit Boards: Design - Fabrication and Assembly", Tata McGraw Hill				

2. Simon Monk "Hacking Electronics", McGraw Hill

Web resources:

1. <u>https://github.com/arduino/Arduino</u>

2. <u>https://spoken-tutorial.org/tutorialsearch/?search_foss=Arduino&search_language=English</u>

3. <u>https://worldskillsindia.co.in/worldskill/file/2019/Electronics.pdf</u>

4. <u>https://worldskills.org/what/projects/wsss/</u>

Savitribai Phule Pune University Second Year of <mark>Electronics / E & Tc Engineering</mark> (2019 Course) 204199: Employbility Skills Development												
Teaching Scheme:CreditExamination Scheme:												
Cheory:02 hrs. / week02 + 01 = 03Term work:50 MarksPractical:02 hrs. / week02 + 01 = 03100 model												
Prerequisite Courses, if any:		·										
Companion Course, if any:												
Course Objectives:												
Develop good communicati	on skills – both oral as	well as written.										
Encourage creative and crit	ical thinking among st	udents.										
Nurture collaborative behave	vior to work efficiently	in groups.										

Course Outcomes: On completion of the course, learner will be able to -

CO1: Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.

CO2: Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.

CO3: Be a part of a multi-cultural professional environment and work effectively by enhancing interpersonal relationships, conflict management and leadership skills.

CO4: Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.

CO5: Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.

Course Contents

Unit I

Understanding Self and Soft Skills

(04 Hrs)

Introduction to introspective methods, SWOC Analysis, Understanding the importance of soft skills, soft skill vs hard skill, interdisciplinary relevance, emotional quotient and emotional intelligence, personal and career goal setting, aligning aspirations with individual"s skill sets, understanding self-esteem and critically evaluating oneself.

Mapping of Course Outcomes for Unit I	CO1: Define personal and career goals using introspective skills and SWOC assessment. Outline and Evaluate short-term and long-term goals.									
Unit II	Communication Skills	(04 Hrs)								
Essentiality of good com Barriers in communicatio augmentation to verbal c Learning to skim and sca	munication skills, Importance of feedback, Different types of com on and how to overcome these barriers, Significance of non-verb ommunication, Group Discussion, Listening Vs Hearing, Reading n to extract relevant information, Effective digital communicatio	imunication, al messages as to comprehend, n.								
Mapping of Course Outcomes for Unit II	CO2: Develop effective communication skills (listenin writing, and speaking), self - management attribu solving abilities and team working & building ca order to fetch employment opportunities and fur in the workplace.	g, reading, ıtes, problem pabilities in ther succeed								

Unit III	Language & Writing Skills	(04 Hrs)										
Fundamentals of English Grammar, improve Lexical resource, essential steps to improve spoken and written English, Business vocabulary, Writing - Email, Resume, Formal letter, Official Communication, Essay, Presentation – Planning, Organizing, Preparing and Delivering Professional presentation, Resume writing: Resume content, identification of carrier objective, characteristics of good resume, different formats of resume-chronological, Functional, Hybrid Effective letter and cover letter writing, Application writing, Report writing.												
Mapping of Course Outcomes for Unit III	Mapping of Course Dutcomes for Unit IICO2: Develop effective communication skills (listening, reading, writing, and speaking), self - management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace											
Unit IV	Leadership Skills and Group Dynamics	(04 Hrs)										
Understanding Corporate Culture and Leadership skills, difference between a leader and a manager, Importance of resilience in a professional surrounding, Developing empathy and emotional intelligence, being assertive and confident, 4-Ds of decision making, Creative and solution-centric thinking, Resolving conflicts, Working cohesively as a team to achieve success, 5 Qualities of an Effective team - Positivity, respect for others, trust, goal-focused, supportiveness.												
Mapping of Course	CO3: Be a part of a multi-cultural professional environ	ment and										
Outcomes for Unit IV	work effectively by enhancing inter- personal relation of the second sec	ationships,										

Unit V	Professionalism & Ethics	(04 Hrs)
Understanding ethics and	l morals, Importance of Professional Ethics, hindrances due to a	bsence of Work
ethics, Professional etiqu	ette – Introductions, with colleagues, attire, events, dinning, tele	phone, travelling,
netiquette, social media,	writing.	

Stress as integral part of life, Identifying signs and sources of stress, Steps to cope with stress – open communication, positive thinking, Belief in oneself, ability to handle failure, Retrospective thinking for future learning, Organizing skills to enhance time management, Focusing on goals, smart work vs hard work, Prioritizing activities, Perils of procrastination, Daily evaluation of "to-do" list.

Mapping of Course	04: Comprehend the importance of professional ethics, etiquettes									
Outcomes for Unit V	& morals and demonstrate sensitivity towards it throughout									
	certified career.									
	CO5: Develop practically deployable skill set involving critical									
	thinking, effective presentations and leadership qualities to									
	hone the opportunities of employability and excel in the									
	professional environment.									
Unit VI	Quantitative Ability & Logical Reasoning (04 Hrs)									

Numbers, HCF and LCM, Time and distance, Time and work, Clock, Simple interest and compound interest, Boats and steams, Number series, Ratio and proportion, probability, profit and loss, odd man out series, permutations, height and distance, square and cube rootmatching, selection, verbal reasoning, logical games, logical deductions, logical problems, cause and effect.

Mapping of Course	CO2: Develop	effective communication skills (listening, reading,
Outcomes for Unit VI	writing,	and speaking), self - management attributes, problem
	solving	abilities and team working & building capabilities in
	order to fetch	employment opportunities and further succeed
	in the workpl	ace.

Learning Resources

Text Books:

- 1. R. S. Agarwal "Quantitative Aptitude for Competitive Examinations" S. Chand Publications.
- **2.** R.Gajendra Singh Chauhan and Sangeeta Sharma, "Soft Skills-An integrated approach to maximize personality", Wiley Publication, ISBN: 987-81-265-5639-7

Reference Books:

- 1. Indrajit Bhattacharya, "An Approach to Communication Skills", Dhanpat Rai.
- 2. Simon Sweeney, "English for Business Communication", Cambridge University Press.
- 3. Sanjay Kumar and Pushpa Lata, "Communication Skills", Oxford University Press.
- **4.** Atkinson and Hilgard's, "Introduction to Psychology", 14th Edition.
- 5. Kenneth G. Mcgee, "Heads Up: How to Anticipate Business Surprises & Seize Opportunities

First", Harvard Business School Press, Boston, Massachusetts.

6. Krishnaswami, N. and Sriraman, "Creative English for Communication", Macmillan.

MOOC / NPTEL Courses:

1. NPTEL Course "Developing Soft skills & Personality"

https://nptel.ac.in/courses/109/104/109104107/

2. NPTEL Course "Communication Skills"

https://nptel.ac.in/courses/109/104/109104030/

3. NPTEL Course "Effective Writing"

https://nptel.ac.in/courses/109/107/109107172/

4. NPTEL Course "Interpersonal Skills"

https://nptel.ac.in/courses/109/107/109107155/

Savitribai Phule Pune University

Faculty of Science and Technology



Syllabusfor

T.E (Electronics & Telecommunication Engineering)

(Course 2019)

(w.e.f. June 2021)

Savitribai Phule Pune University, Pune
T.E. (Electronics& Telecommunication Engineering) 2019 Course
(With effect from Academic Year 2021-22)

			S	emes	ter-V	V								
Course		Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
Code	Course Name	Theory	Practical	Tutorial	In-Sem	End-Sem	ΤW	PR	OR	Total	ТН	PR	TUT	Total
304181	Digital Communication	03	-	-	30	70	-	-	-	100	03	-	-	03
304182	Electromagnetic Field Theory	03	-	01	30	70	25	-	-	125	03	-	01	04
304183	Database Management	03	-	-	30	70	-	-	-	100	03	-	-	03
304184	Microcontrollers	03	-	-	30	70	-	-	-	100	03	-	-	03
304185	Elective - I	03	-	-	30	70	-	-	-	100	03	-	-	03
304186	Digital Communication Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
304187	Database Management Lab	-	02	-	-	-	-	-	25	25	-	01	-	01
304188	Microcontroller Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
304189	Elective I Lab	-	02	-	-	-	-	25	-	25	-	01	-	01
304190	Skill Development	-	02	-	-	-	25	-	-	25	-	01	-	01
304191A	Mandatory Audit Course 5 &	-	-	-	-	-	-	-	-	-			-	
	Total	15	10	01	150	350	50	125	25	700	-		-	-
			I	ı	Tot	al Cr	edit	<u> </u>	·		15	05	01	21

Elective -I

- 1) Digital Signal Processing
- 2) Electronic Measurements
- 3) Fundamentals of JAVA Programming

4) Computer Networks

	Savitribai Phule Pune University, Pune T.E. (Electronics& Telecommunication Engineering) 2019 Course (With effect from Academic Year 2021-22)													
	Semester-VI													
6		Teaching Scheme (Hours/Week)			Examination Scheme and Marks					Credit				
Code	Course Name	Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
304192	Cellular Networks	03	-	-	30	70	-	-	-	100	03	-	-	03
304193	Project Management	03	-	-	30	70	-	-	-	100	03	-	-	03
304194	Power Devices & Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
304195	Elective-II	03	-	-	30	70	-	-	-	100	03	-	-	03
304196	Cellular Networks Lab	-	02	-	-	-	-	-	50	50	-	01	-	01
304197	Power Devices & Circuits Lab	-	02	-	-	-	-	50	-	50		01		01
304198	Elective-II Lab	-	02	-	-	-	-	25	-	25	-	01	-	01
304199	Internship**	-	-	-	-	-	100	-	-	100	-	-	04	04
304200	Mini Project	-	04	-	-	-	25	-	50	75	-	02	-	02
304191 B	Mandatory Audit Course 6 &	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	12	10	00	120	280	125	75	100	700				
				1	То	tal Cı	redit				12	05	04	21
Abbrevia t In-Sem: In PR: Practio	t ions: semester End-Sem cal OR: Oral	ı: End	seme	ster	T	T UT: Tı	H: Th itoria	neory		TW	: Term	Work		
Note: Stud the	lents of T.E. (Electronics & T list of audit courses prescrib	eleco ed by	mmu 7 BoS	nicatio (Elect	ons) ronic	have t s & To	to op eleco	t any o mmu	one of nicati	the au	udit co Igineei	urse f ing)	rom	

Elective -II

- 1) Digital Image Processing
- 2) Sensors in Automation
- 3) Advanced JAVA Programming
- 4) Embedded Processors
- 5) Network Security

SEMESTER - V

	Savitribai Phule Pune University Third Year of <mark>E & Tc Engineering</mark> (2019 Course) 304190: Skill Development											
T	Teaching Scheme:CreditExamination Scheme:											
Prac weel	Practical: 02 hrs. / 01 Term work: 25 Marks veek											
Prere	quisite Courses, if any:											
1.	1. Basics of Electronics Components											
2.	2. Working of Operational amplifier											
3.	Basics of Electronics measu	rement instrument:	s and Tools									
Compa	anion Course, if any:											
Cours	e Objectives:											
•	To build and upgrade pract	ical knowledge ofan	individual.									
•	To make students Employa	ble with required sk	till set.									
•	To promote youth work to	assist "Make in India	a" initiative.									
•	To grow and build confider	ice among students	on specific skill sets.									
•	To cultivate Entrepreneur	nindset after getting	z required experience.									
•	To improve professional sk learning etc.	ills such as moral/e	thics/team work/communication skill/lifelong									

Course Outcome: After Successfully completing the course,

CO1: Student should recognize the need to engage in independent and life-long learning in required skill sets CO2: Student needs to experience the impact of industries on society by visiting different industries and understand the importance of industrial products for analog and digital circuits and systems. CO3: Student has to make use of the modern electronic and IT Engineering Tools and Solving electronic engineering problems.

CO4: Student would be able to communicate effectively at different technical and administrative levels.CO5: Student will exhibit leadership skills both as an individual and as a member in a team in multidisciplinary environment.

Savitribai Phule Pune University Faculty of Science & Technology



B.E. (Electronics & Telecommunication) (2015 Pattern) Syllabus

(With effect from Academic Year 2018-19)

Savitribai PhulePune University Final Year E&TC Engineering (2015 Course) (With effect from Academic Year 2018-19)

				S	Semes	ter I						
Course	Course	Teachi Hour	'eaching Scheme Hours / Week			ester I	Exami Ma	inatio arks	on Sch	eme of	Credits	
Code		Theor y	Tut	Pract	In- Sem	End- Sem	TW	PR	OR	Total	TH/TW	PR+OR
404181	VLSI Design& Technology	3			30	70				100	3	
404182	Computer Networks & Security	4			30	70				100	4	
404183	Radiation & Microwave Techniques	3			30	70				100	3	
404184	Elective I	3			30	70				100	3	
404185	Elective II	3			30	70				100	3	
404186	Lab Practice -I (CNS+ RMT)			4			50		50	100		2
404187	Lab Practice -II (VLSI + Elective I)			4			50	50		100		2
404188	Project Stage I	-	2				-		50	50		2
	Audit Course 5										-	
	Total	16	2	8	150	350	100	50	100	750	16	6
		,	Tota	Credi	ts							22
Electiv	<u>ve I</u>		БТ							G	_	
l Digit	tal Image and Video		<u>Elec</u>	tive II					Audit	t Course	5	
Processing				avelet	S · D	1 (D			1. Gre	en Energ	gy	
2. Indu	Istrial Drives and Con	trol	2. E	lectron	ics Pro	oduct L	esign		2. Hu	man Beh	av10ur	
3. Emb	bedded Systems & RT	OS	3.0	ptimiza	ation I	echnic	lues					
4. Inter	rnet of Things		4. A 5. E	rtificia lectron	ו Intell ics in נ	agricul	ture					

Final Year E&TC Engineering (2015 Course)

(With effect from Academic Year 2018-19)

				Sei	neste	r II						
	Course	Teach	ing Sc	ng Scheme Semester Examination Scheme of								
		Hou	rs / W	eek			N	Credit				
Course Code		Theory	Tut	Pract	In-	End-	TW	PR	OR	Total	TH/TW	PR+OR
					Sem	Sem						
404189	Mobile Communication	3			30	70				100	3	
404190	Broadband	4			30	70				100	4	
	Communication											
	Systems											
404191	Elective III	3			30	70				100	3	
404192	Elective IV	3			30	70				100	3	
404193	Lab Practice –III			4			50	50		100		2
	(MC+BCS)											
404194	Lab Practice –IV			2					50	50		1
	(Elective III)											
404195	Project Stage II		6	-			150		50	200		6
	Audit Course 6											
	Total	13	6	6	120	280	200	50	100	750	13	9
									Tota	l Credits	2	2
Elective II		Elect	ive-IV					<u>Audit</u>	Course 6	<u>)</u>		
1. Machine		1. Robotics						1. Team Building, Leadership and				
3. Audio a	nd Automation nd Speech Processi	ng	2. Bit 3. Wi	reless :	ai Ele Senso	r Netv	vorks	5	2. Environmental issues and			
4. Softward	e Defined Radio	-	4. Rei	newabl	le Ene	ergy S	ysten	ns	Disast	er Manag	ement	
5. Audio V	ideo Engineering		з. Ор	en Ele	uve*							

*Any one course from the list of Elective IV of computer/IT/Electrical/Instrumentation or Institute can offer elective IV based on any industry need with prior approval from BoS(Electronics & Telecommunication). Repetition of course or topics should be avoided.

Audit Course 5 (1):Green Energy

About the course

This course provides an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternate energy sources and their technology and application. The students will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternate, renewable energy sources such as solar, biomass (conversions), wind power, geothermal, and hydro. Energy conservation methods will be emphasized

Course Objectives:

- To understand the conventional and non conventional energy sources
- To understand different renewable energy sources and their generation
- To understand the various applications & benefits of renewable energy sources
- To enable student to understand project management, energy audit and Installation

Course Outcomes:

After the successful completion of this course, the student is expected to have/be able to:

1. List and generally explain the main sources of energy and their primary applications in the India, and the world.

2. Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.

3. Discuss remedies/potential solutions to the supply and environmental issues associated with fossil fuels and other energy resources.

- 4. List and describe the primary renewable energy resources and technologies.
- 5. Describe/illustrate basic electrical concepts and system components.

6. Convert units of energy—to quantify energy demands and make comparisons among energy uses, resources, and technologies.

7. Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

Unit 1: Introduction of conventional & renewable energy sources:

Environment aspects, Energy Efficient materials, Pollution Control techniques, Energy conservation, Energy Audits

Unit II: Details of renewable energy sources & various systems Solar,

Wind, Hydro, Bio-power, Waste to Power

Unit III: Various applications & benefits

Renewable power projects for smart cities & rural electrification, Power conversion techniques, Offgrid/Stand-alone systems, Grid connected systems, Design of Grid-tied & off-grid Solar PV systems, Design of Grid-tied & off-grid Wind systems, Design of Grid-tied & off-grid Hybrid systems, Storage technologies

Unit IV: Project management

Installation & commissioning techniques & standards, Remote monitoring & control techniques, Performance optimization & control, Practical's / Hands-on exposure, Maintenance & Service of plants, Government policies

Guidelines for Conduction (Any one or more of following but not limited to)

- Guest Lectures
- Group Activities
- Assignments
- Taking up small project for short duration

Guidelines for Assessment (Any one or more of following but not limited to)

Practical Test

- Presentation
- Paper / (Theory assessment test) Report
Sources/ References:

1. Boyle, Godfrey. 2004. Renewable Energy (2nd edition). Oxford University Press, 450 pages (ISBN: 0-19- 926178-4).

2. Boyle, Godfrey, Bob Everett, and Janet Ramage (eds.) 2004. Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press, 619 pages (ISBN: 0-19-926179-2) 3. Ashok Desai V, *Non-Conventional Energy*, Wiley Eastern Ltd, 1990.

4. Mittal K.M, *Non-Conventional Energy Systems*, Wheeler Publishing Co. Ltd, 1997.

5. Ramesh R, Kurnar K.U, *Renewable Energy Technologies*, Narosa Publishing House, New Delhi, 1997.

6. Renewable Energy Resources by John Twidell and Tony Weir.

Audit Course 5 (2) :Human Behavior

About the Course:

Human behavior is the responses of individuals or groups of humans to internal and external stimuli. It refers to the array of every physical action and observable emotion associated with individuals, as well as the human race. Social behavior is a subset of human behavior and includes the study of considerable influence of social interaction and culture. Additional influences include ethics, encircling, authority, rapport, hypnosis, persuasion and coercion.

The behavior of humans falls within a range with some behavior being common, some unusual, some acceptable, and some beyond acceptable limits. The acceptability of behavior depends heavily upon social norms and is regulated by various means of social control. Human behavior is experienced throughout an individual's entire lifetime. It includes the way they act based on different factors such as genetics, social norms, core faith, and attitude. An attitude is an expression of favor or disfavor toward a person, place, thing, or event.

Course Objectives:

- To develop understanding of Behavioral Aspects.
- To identify and develop Attitude and Core Faith values

• To expose students to Family Relations, time and career management To enable student to understand Creative Thinking and Problem solving To enable students to understand

Humanistic Education.

On completion of the course, society will observe –

1. Change in awareness levels, knowledge and understanding of student

2. Change in attitudes / behavior of students with regards to their education improved teamwork,

institutional leadership and other life skills

3. Improvement in social health and attitude.

Unit 1:

Why Human Relations are so important? Understanding Behavior, Human Relations, and Performance, Personality, Stress, Learning, and Perception, Attitudes, Self-Concept, Natural acceptance of human values, and Ethics, Dealing with Conflict, Leading and Trust.

Unit 2:

Time and Career Management, Interpersonal Communication, Organizational Structure and Communication, Team Dynamics and Leadership, Teams and Creative Problem Solving and Decision Making

Unit 3:

Understanding Harmony in the Family and Society, Harmony in Human Relationship, Understanding the meaning of *Vishwas*; Difference between intention and competence, Understanding the meaning of *Samman*; Difference between respect and differentiation. Understanding the harmony in the society: *Samadhan, Samridhi, Abhay, Sahasttva*as comprehensive Human Goals.

Unit 4:

Justice in Humankind, Nurturing and Exploitation, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics.

Reference Books:

1. —Human Relations in Organizations Applications and Skill Building RobartLussier, eighth edition, McGraw-Hill (2014).

2. Atkinson and Hilgard's, —Introduction to psychology Nolen-Hoeksema, S., Fredrickson, B. L., Loftus, G. R., & Lutz, C., Cengage Learning EME.

3. —A Foundation Course in Human Values and Professional Ethics R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi and Teacher's Manual, R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi 4. A Nagraj, 1998, JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak. 5. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

Audit Course 6 (1) Team Building, Leadership and Fitness

About the course

Team building allows students to work together in social situations just as they would in the classroom, their daily lives, or down the road in the workplace. Team building challenges students to solve problems and execute working with others. It shows them how to be accountable. It allows team members to stay motivated and energized to work on the project together. They work on jobs and tasks cohesively, rather than working alone without interaction. By working together, members of the team can —work together, stay together, and achieve together I. Trust and communication issues can also be noticed from team building exercises. Team building is known to improve performance in teams; members will remain motivated and can easily overcome indifferences to see the strengths in all team members.

Leadership is about the art of motivating, influencing and directing people so that they work together to achieve the goals of a team or broader organization. It's important for students to experience leadership opportunities during their schooling, to learn the art of building relationships within teams, defining identities and achieving tasks effectively. It also provides an opportunity to learn to identify and display effective communication and interpersonal skills. Leadership begins with identifying and understanding our values. Our values are our fundamental beliefs – those principles we consider to be worthwhile and desirable. Fitness does not only refer to being physically fit, but also refers to a person's mental state as well. If a person is physically fit, but mentally unwell or troubled, he or she will not be able to function optimally. Mental fitness can only be achieved if your body is functioning well. You can help relax your own mind and eliminate stresses by exercising regularly and eating right. People who are physically fit are also healthier, are able to maintain their most optimum weight and are least prone to cardiac and other health problems. In order to maintain a relaxed state of mind, a person should be physically active. A person who is fit both physically and mentally strong enough to face the ups and downs of life, and is not affected by drastic changes if they take place.

Course Objectives:

- To develop understanding of team skills and dynamics
- To identify and develop personal skills to become a more effective team member
- To introduce to the students the social change model of leadership
- To expose students to the leadership skills and imbibe within them that the fact that Leadership is a process, not a characteristic associated with an individual or role.
- To enable student to understand principles of fitness training and exercise
- To enable students to understand human posture, nutritional values and mental fitness

Course Outcomes:

On completion of the course, society will observe -

- 1. Change in awareness levels, knowledge and understanding of today's youth
- 2. Change in attitudes / behavior of students with regards to their improved teamwork, institutional leadership and other life skills
- 3. Increase in the body's fitness levels and also reduced health problems
- 4. Improvement in social health and attitude.

Unit 1: Team Building

Types of Teams, Characteristics of a Team, Stages of Team Development (Forming, Storming, Norming, Adjourning), Systematic Approach to Team Work, High Performing Team (Characteristics, Maintenance, Causes of low performance Why Teams Fail, People, Communication, Resources, Objectives)

Unit II: Leadership Defining Leadership, Personal Leadership Profile, Leadership in the Context of Community, Leadership Theory, Leadership Concepts, Foundations of Group Behavior: The Meaning of Group, Group behavior & Group Dynamics, Types of Groups, The Five -Stage Model of Group Development Managing Organizational Change, Leadership Styles leading to Authenticity, Learning and Development, Positive Responses to Aggressive Behavior, Professionalism, Team Building **Unit III: Educational Leadership** Key challenges for educational leaders, Characteristics, Capabilities of authentic leader, values and ethics in decision making, Continuous professional Development suitable for 21st century pedagogy, Emotional intelligence for educational leaders. Need of Educational research for educational leadership **Unit IV: Fitness for Engineers** Fundamentals of Exercise Science: Skeletal, muscular, cardiovascular, nervous system, nutrition, flexibility, special population and injuries, Basics of fitness, Weight management and supplementation Guidelines for Conduction (Any one or more of following but not limited to) Guest Lectures Group Activities Assignment Taking up assisted Health challenge for short duration (ex. Yoga and Pranayam, Weight management , stability in mental health) Guidelines for Assessment (Any one or more of following but not limited to)

- Practical Test
- Presentation
- Paper / (Theory assessment test) •• Report

Sources/ References:

- 1. Organizational Behavior by Fred Luthans
- 2. Organizational Behavior by M N Mishra
- 3. Leadership Development Activities, John Adair, 2nd Edition Jaico Publication
- 4. Leadership Games, Stephen S Kogan,
- 5. Mastering Leadership, 2nd Edition, Michael Williams, Viva Books
- 6. Sculpt and Shape: The Pilates Way by YasminKarachiwala
- 7. Total Fitness: The LeenaMogre Way by LeenaMogre
- 8. Don't Lose Your Mind, Lose Your Weight: RutujaDiwekar
- 9. Yog Its Philosophy and Practice English by Swami Ramdevji

Audit Course 6 (2) Environmental Issues And Disaster Management

About the Course:

The importance of environmental science and environmental studies cannot be disputed. The need for sustainable development is a key to the future of mankind. Continuing problems of pollution, loss of forget, solid waste disposal, degradation of environment, issues like economic productivity and national security, Global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues.

It is clear that no citizen of the earth can afford to be ignorant of environment issues. Environmental management has captured the attention of health care managers. Managing environmental hazards has become very important. In spite of the deteriorating status of the environment, study of environment has so far not received adequate attention in our academic programmes.

Course objective :

- To develop understanding of Environment Issues and Biodiversity
- To introduce to the students the environment, Disaster Management
- To enable students to understand ecosystem and preservation of environment
- To understand Disaster Management and handling them

Course Outcomes :

On completion of course students will be able:

- 1. To learn the different environmental issues and disasters.
- 2. To deal with problems associated with environment and effectively handle the disasters.

Unit 1: Environmental Pollution

A) Definition, Cause, effects and control measures of :-

Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management, urban and industrial wastes.

Role of an individual in prevention of pollution. Pollution case studies. B)

Social Issues and the Environment:

Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns.

Unit 2 : Ecosystems, Biodiversity and its conservation A)

Concept of an ecosystem.

Structure and function of an ecosystem, Producers, consumers and decomposers, • Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Structure and function of the following ecosystem :

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity at global, National and local levels, India as a mega-diversity nation

Hot-sports of biodiversity, Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 3 : Disaster Management

- a) Causes Natural disaster and Manmade disaster
- b) Speed of onset Sudden and Slow Natural Disasters
- These types of disaster naturally occur in proximity to, and pose a threat to, people, structures or economic assets.

Examples are Storm, Flood, Earthquake, Tsunamis Manmade

Disasters

Accidents: Road, Rail, Air, Sea, Building collapse.

Industrial Mishaps: Gas leak, Explosion, Safety.

Fire: Building, Coal, Oil.

Forest Fire (In tropical counters, forest fires are often manmade) Speed

of onset

1 Sudden onset: little or no warning, minimal time to prepare. For example, an earthquake, tsunami, cyclone, volcano, etc.

2 Slow onset: adverse event slow to develop; first the situation develops; the second level is an emergency; the third level is a disaster.

For example, drought, civil strife, etc.

Unit 4: Case Studies

- Environmental ethics: Awareness, Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air and Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act and Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Role of an individual in prevention of pollution and case studies.

References: 1. Disaster Management: Disaster Manager's Handbook by W. Nick Carter, Asian Development Bank.

2. An Introduction To Disaster Management EBook By S. Vidyanathan - Publisher: IKON

3. Textbook for environmental studies ,ErachBharucha For UGC.

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

Course Code	CourseName	Programme	Factoraddressed
101007	EVS - I	First Year Engineering Department	Environment and Sustainability
101014	EVS - II	First Year Engineering Department	Environment and Sustainability

FIRST YEAR ENGINEERING DEPARTMENT ACADEMIC YEAR 2021-22

(Choice Based Credit System)(2019 Course) (With Effect from Academic Year 2019-20)

TABLE -1 First Engineering _Structure for Semester-I														
Course Code	Course Name	Te Sc (Hou	achi chem urs/V k)	ng ie Wee	Examination Scheme andMarks				-	Credits				
		Theory	Practical	Tutorial	ISE	ESE	ΤW	PR	OR	Total	TH	PR	TUT	Total
107001	Engineering Mathematic s-I	03		01	30	70	25			125	03		01	04
107002 / 107009	Engineering Physics / Engineering Chemistry	04	02		30	70		25		125	04	01		05
102003	Systems in Mechanic al Engineering	03	02		30	70		25		125	03	01		04
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02		30	70		25		125	03	01		04
110005 / 101011	Programming andProblem Solving / Engineering Mechanics	03	02		30	70		25		125	03	01		04
111006	Workshop@		02					25		25		01		01
	Total	16	10	01	150	350	25	125		650	16	05	01	22
101007	Audit Course 1 ^{&}	02	D2 Environmental Studies-I											
Induction semester	on Program : 2 weeks r-II	at the	begi	nnin	g of s	emest	ter-I a	and 1	week	at the	e begi	nning	of	
	TABLE -2	2 First	t Eng	ginee	ring_ II	Stru	cture	e for S	Seme	ster-				
Course Code	Course Name	Te So (Hou	Teaching SchemeExamination Scheme andMarksCreditK)				dits							
		Theory	Practica	Tutorial	ISE	ESE	МТ	PR	OR	Total	ΗT	PR	TUT	Total
107008	Engineering Mathematics-II	04		01	30	70	25			125	04		01	05
107002 / 107009	Engineering Physics/ Engineering Chemistry	04	02		30	70		25		125	04	01		05
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02		30	70		25		125	03	01		04

110005 / 101011	Programming andProblem Solving / Engineering Mechanics	03	02		30	70		25		125	03	01		04
102012	Engineering Graphics	01	02	01		50	2	5		75	01	0	1	02
110013	Project Based Learning§		04				25	50		75		02		02
	Total	15	12	02	120	330	75	125		650	15	05	02	22
101014		02]	Envir	onme	ntal S	Studies	s-II			
107015	Audit Course 2 ^{&}				Pł	iysica	l Edu	cation Acti	1-Exe	rcise a	and Fi	eld		
		101()07:	Envi	ronr	nenta	al Stu	idies	- I)				
Т	H:02 Hrs./week	101		(Ma	ndat	ory I	Non-(Co	Credi ourse	t)					
Course	Objectives:								,					
1. T	o explain the concept	ts an	d stı	ateg	ies r	elate	d to	susta	inabl	e dev	elopi	nent	and	
Vä	ariouscomponents of e	enviro	onme	ent.										
2. T	o examine biotic and a	biotio	c fact	orsv	vithi	n an e	ecosys	stem,	to id	entify	food	chai	1S,	
W	ebs, aswell as energy f	flow a	and r	elati	onshi	ps.								
3. T	o identify and analyze	vario	ous c	onse	rvatio	on m	ethoc	is and	the	r effe	ctivei	ness i	n	
	a gain an understandin	a of th		ewar luo o	f bioc	livore	ity or	ul ces	ront	offort	s to			
	onservebiodiversity on	natio	ne va	and l		scale.	ity al	iu cui	Tent		5 10			
Course	Outcomes:On comple	tion c	of the	e cou	rse. le	earne	r will	be a	ble to)—				
CO1 :Der	nonstrate an integrati	ve ap	proa	ch to	o envi	ronn	nenta	l issu	es wi	th a fo	ocus o	on		
sustaina	bility.	1	6.11.						- C	. 1.0	r			
CO2: EX	plain and identify the i	role o hetw	of the	orga and	nrov	i in ei ide e	nergy	tran	sters	in difi Newah	teren de an	t d		
nonrene	wable resources &an	alyze	pers	sonal	cons	ump	tion c	of res	Jurce	es.	ic an	u		
CO4: Id	entify key threats to k	oiodiv	versi	ty an	d de	velop	app	ropria	ate p	olicy	optio	ns fo	r	
conserv	ingbiodiversity in diffe	erent	setti	ngs.										
	Course Contents													
Unit I	Unit IIntroduction to environmental studies(02 Hrs)													
Multidis	ciplinary nature of en	viron	imen	ital st	tudie	s; con	npon	ents (of env	vironr	nent	-		c
atmospr	lere, hydrosphere, lith	osph	ere a	and	biosp	nere.	Scop	e an	d im	porta	nce;	Lonce	ept o	f
sustaina	ble development.													
Unit II			Eco	osyst	ems							(06	Hrs])
What is foodcha	an ecosystem? Struct in, food web and ecolo	ure a gical	nd fi succ	uncti essio	on of n. Ca	ີ ecos se stເ	syster 1dies	n; En of the	ergy e foll	flow owing	in an ; ecos	ecos ysten	ysten ns:	1:
a) Fores	st ecosystem													
b) Grass	sland ecosystem													
c) Dese	c) Desert ecosystem													
d) Aqua	Natural Posor	s, stre	uns,		$\frac{S}{hlo}$	ers, o	ceans	s, esti		Doco	urco	c (00) Urc	
Unit IIINatural Resources: Renewable and Non-renewable Resources (08 Hrs)Land Resources and land use change; Land degradation, soil erosion and desertification.Deforestation: Causes and impacts due to mining, dam building on environment, forests,biodiversity and tribal populations.														
Water: Use and over-exploitation of surface and ground water, floods droughts, conflicts overwater (international & inter-state).							ts							
Fnerov	Heating of earth and circulation of air; air mass formation and precipitation.													
Sources	growing energy needs		stuc	dies	wabit		1 gy 30	Juite	.s, us				ergy	
	Sources, frowing energy needs, case studies.													

Unit I	V Biodiversity and Conservation (08 Hrs)						
Levels	s of biological diversity: genetic, species and ecosystem diversity; Biogeography						
zones	zones ofIndia; Biodiversity patterns and global biodiversity hot spots. India as a mega-						
biodiv	piodiversity nation; Endangered and endemic species of India. Threats to biodiversity:						
habita	nabitat loss, poaching ofwildlife, man-wildlife conflicts, biological invasions; Conservation of						
biodiv	versity; In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity						
servic	es: Ecological, economic,						
social	, ethical, aesthetic and Informational value.						
Sugge	ested Readings:						
1.	Carson, R. 2002. Silent spring. Houghton Mifflin Harcourt.						
2.	Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of						
	California Press.						
3.	Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.						
4.	Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment						
	&Security. Stockholm Env. Institute, Oxford Univ. Press.						
5	Groom, Martha L Garv K. Meffe, and Carl Ronald carroll, Principals of						
0.	ConservationBiology						
	Sunderland: Sinauer Associates, 2006.						
6	Grumbine R Edward and Pandit MK 2013 Threats from India's Himalaya dams						
0.	Science 339.36-37						
7	McCully P 1996 Rivers no more: the environmental effects of dams (nn 29-64)						
7.	7. Mecuny, 1.1990. Rivers no more, the environmental effects of dams (pp.29-04). ZedBooks						
8.	McNeil, John R. 2000, Something New Under the Sun: An Environmental History of						
0.	the Twentieth Century						
	101014: Environmental						
Studi	ac-IITH: 0.2 Hr/waak Mandatary						
Non-(Crodit Courso						
	To provide a comprehensive everyies of environmental pollution and the						
1.	To provide a comprehensive overview of environmental pollution and the						
•	science and technology associated with the monitoring and control.						
2.	To understand the evolution of environmental policies and laws.						
3.	To explain the concepts behind the interrelations between environment and the development.						
4.	To examine a range of environmental issues in the field, and relate these to scientific						
	theory.						
Cours	Se Outcomes: On completion of the course, learner will be able to–						
CO1:	Have an understanding of environmental pollution and the science behind those						
proble	ems and potential solutions.						
CO2 :	Have knowledge of various acts and laws and will be able to identify the industries that						
are vi	olating these rules.						
CO3:	Assess the impact of ever increasing human population on the biosphere: social,						
econo	mic issues and role of numans in conservation of natural resources.						
CO4:	CU4: Learn skills required to research and analyze environmental issues scientifically and						
learn	learn now to use those skins in applied situations such as careers that may involve						
envire	onmental problems and/or issues.						
	Course Contents						
Unit V	/ Environmental Pollution (08						
Hrs)F	Invironmental pollution : types, causes, effects and controls: Air, water, soil, chemical						
and n	oisepollution						
Nuclear hazards and human health risks							
Solid	waste management: Control measures of urban and industrial waste						
	5						

Pollution case studies.							
Unit VIEnvironmental Pollution(07 Hrs)Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities& agriculture.Environment Laws : Environment Protection Act; Air (Prevention &Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife protectionAct; Forest Conservation Act; International agreements; Montreal and Kyoto Protocols andconservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian contextUnit VIIHuman Communities and the Environment (06 Hrs)Human population and growth; Impacts on environment, human health and welfares. Carbon foot-print. Resettlement and rehabilitation of project affected persons; case studies.							
Disaster management: floods earthquakes, cyclones and landslides. Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan, Environmental ethics: Role of							
Indian and other religions and cultures in environmental conservation.							
Environmental communication and public awareness, case studies (e.g., CNG vehicles in							
Unit VIII Field work (05 Hrs)							
 Visit to an area to document environmental assets: river/forest/flora/fauna. etc. 							
• Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.							
• Study of common plants, insects, birds and basic principles of identification.							
• Study of simple ecosystems-pond, river Delhi Ridge, etc							
Suggested Readings:							
1. Carson, R. 2002. Silent spring. Houghton Mifflin Harcourt.							
2. Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.							
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.							
4. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment &Security. Stockholm Env. Institute. Oxford Univ. Press.							
5. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principals of							
ConservationBiology, Sunderland: Sinauer Associates, 2006							
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams.							
7 McCully P1996 Rivers no more the environmental effects of dams (nn 29-64)							
ZedBooks.							
8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of							

theTwentieth Century.

Course	Course Name	Programme	Factor addressed
Code			
102	Organizational Behavior	MBA	Human Values and Professional Ethics
401	Indian Ethos & Business Ethics	MBA	Human Values and Professional Ethics

1.3.1 List of Courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics

DEPARTMENT

MASTER OF BUSINESS ADMINISTRTION

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- 4. Management Accounting, MadhuVij
- 5. Fundamentals of Management Accounting, H. V.Jhamb
- 6. Cost and Management Accounting, M. N. Arora
- 7. Financial Accounting for Managers, Sanjay Dhmija, Pearson Publications
- 8. Management Accounting, Mr. Anthony Atkinson, Robert Kaplan, Pearson
- 9. Accounting For Management, Jawarhar Lal
- 10. Accounting, Shukla Grewal
- 11. Management Accounting, Ravi Kishore
- 12. Accounting for Managers, Dearden and Bhattacharya

Semester I		102 - Organizational Behaviour
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO102.1	REMEMBERING	DESCRIBE the major theories, concepts, terms, models, frameworks and
		research findings in the field of organizational behavior.
CO102.2	UNDERSTANDING	EXPLAIN the implications of organizational behavior from the perspectives of
		employees, managers, leaders and the organization.
CO102.3	APPLYING	MAKE USE OF the Theories, Models, Principles and Frameworks of
		organizational behavior in specific organizational settings.
CO102.4	ANALYSING	DECONSTRUCT the role of individual, groups, managers and leaders in
		influencing how people behave and in influencing organizational culture at
		large.
CO102.5	EVALUATING	FORMULATE approaches to reorient individual, team, managerial and
		leadership behaviour inorder to achieve organizational goals.
CO102.6	CREATING	ELABORATE UPON the challenges in shaping organizational behavior,
		organizational culture and organizational change.

1. Fundamentals of OB: Evolution of management thought, five functions of management, Definition, scope and importance of OB, Relationship between OB and the individual, Evolution of OB, Models of OB (Autocratic, Custodial, Supportive, Collegial & SOBC), Limitations of OB. Values, Attitudes and Emotions: Introduction, Values, Attitudes, Definition and Concept of Emotions, Emotional Intelligence - Fundamentals of Emotional Intelligence, The Emotional Competence Framework, Benefits of Emotional Intelligence , difference between EQ and IQ. Personality & Attitude: Definition Personality, importance of personality in Performance, The Myers-Briggs Type Indicator and The Big Five personality model, Johari Window, Transaction Analysis, Definition Attitude Importance of attitude in an organization, Right Attitude, Components of attitude, Relationship between behavior and attitude. (7+2)

2. Perception: Meaning and concept of perception, Factors influencing perception, Selective perception, Attribution theory, Perceptual process, Social perception (stereotyping and halo effect). **Motivation:** Definition & Concept of Motive & Motivation, The Content Theories of Motivation (Maslow's Need Hierarchy & Herzberg's Two Factor model Theory), The Process Theories (Vroom's expectancy Theory & Porter Lawler model), Contemporary Theories- Equity Theory of Work Motivation. (8+2)

3. Group and Team Dynamics : The Meaning of Group & Group behavior & Group Dynamics, Types of Groups, The Five -Stage Model of Group Development Team Effectiveness & Team Building. **Leadership:** Introduction, Managers V/s Leaders. Overview of Leadership- Traits and Types, Theories of Leadership.- Trait and Behavioral Theories. **(8+2)**

4. Conflict Management – Definition and Meaning, Sources of Conflict, Types of Conflict, Conflict Management Approaches. Organizational Culture: Meaning and Nature of Organization Culture - Origin of Organization Culture, Functions of Organization Culture, Types of Culture, Creating and Maintaining Organization Culture, Managing Cultural Diversity. (7+2)

5. Stress at workplace: Work Stressors – Prevention and Management of stress – Balancing work and Life, workplace spirituality. **Organizational Change:** Meaning, definition & Nature of Organizational Change, Types of Organizational change, Forces that acts as stimulants to change. Kurt Lewin's- Three step model, How to overcome the Resistance to Change, Methods of Implementing Organizational Change, Developing a Learning Organization. **(5+2)**

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- 1. Project Management by K.Nagarajan, New Age International Publications
- 2. Principles and Practices of Auditing by Ravindar Kumar & Virendar Sharma, PHI.
- 3. Principles and Practices of Banking by Indian Institute of Banking & Finance, MacMillan India Ltd.
- 4. Financial Management by Prasanna Chandra, TMGH
- 5. E business: A Canadian perspective for a Networked World , Gerald Trites, J. Efrim Boritz Pearson

Semester IV		402 – Indian Ethos & Business Ethics
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO402.1	REMEMBERING	DESCRIBE major theories, concepts, terms, models and framework of Indian ethos and business ethics. DISCOVER the contemporary Issues in Business Ethics
CO402.2	UNDERSTANDING	CLASSIFY and RECOGNIZE Karma, Karma Yoga and discover its relevance in business setting, ILLUSTRATE the business ethical decision rationale derived from Indian Heritage Scriptures.
CO402.3	UNDERSTANDING	APPLY Principles, Theories, Models and Framework of Indian ethos and business ethics in order to incorporate value system in work culture and work place.
CO402.4	APPLYING	DEVELOP and EXHIBIT analytical, problem solving skills, and work ethos by COMPREHENSION and PRACTICE of Indian ethos and value system
CO402.5	ANALYSING	IMPLEMENT, EVALUATE, and FACILITATE ethical business behavior and promote sustainable business ecology, improve profitability, foster business relation and employee productivity.
CO402.6	CREATING	ELABORATE Ethical dilemmas in different business areas of marketing, HRM and Finance and ADAPT dilemma resolution interventions by referring to certain norms, theories and models of Eastern Management.

1. Indian Ethos and Values : Its relevance at Workplace: Indian Ethos- Meaning, Features, Need, Evolution, Relevance, Principles Practiced by Indian Companies, Requisites, Elements, Role of Indian Ethos in Managerial Practices, Triguna Theory-OSHA Model. Work Ethos meaning, dimensions of Work Ethos. Values - Concepts, Values in business, Value system in work culture, and Values of Indian Managers, Relevance of Value Based Management in Global Change; Impact of values on Stakeholders; Trans-Cultural Human Values, Ethics v/s Ethos, Eastern Management v/s Western Management. (8+1)

2. Indian Model of Management: Concept of Indian Model of Management in the Indian socio-political environment, Laws of Karma and its relevance in business settings, Indian Heritage in Business-Management. Production and Consumption: Management lessons from Indian heritage scriptures (like Mahabharata & Ramayana), Leadership Pointers from Kautilya's Arthashastra, VEDA Model of Leadership, Corporate Rishi Model, Theory K, WE theory (West-East Theory) (8+1)

3. **Business Ethics as Applied ethics:** Meaning, Characteristics of Business Ethics, Importance of Business Ethics (Long Term growth, Cost reduction, Risk mitigation, Limited resources, etc.) Types of Business Ethics (Transactional Ethics, Participatory Ethics, Recognition Ethics), Factors influencing business ethics. Categories of Ethics (Personal, Professional, Managerial) Business Code of Conduct), Approaches to Business Ethics: Consequentialist & Non- Consequentialist Theories of Ethics - Deontological Theory & Teleological Theory, Kohlberg Six stage moral development. (8+1)

4. **Ethical decision making in business matrix:** Framework of Ethical decision making, Ethical dilemmas in different functional areas of Business (Finance, Marketing HRM and International Business), Intellectual Property Rights and Business Ethics, Ethical challenges for Managers, Ethical Decision Making process, it's Model -STEP Model, PLUS Filter Model. (8+1)

5. Applications of Ethical Principles to Contemporary, Moral and Ethical problems / issues related to Business: Contemporary cases on Corporate Strategy and Climate Change, Corporate Strategy and Natural resource depletion, Corporate Social Responsibility, transparency and accountability, Social Media and E-Platforms. Current ethical issues like Bank scams, Airlines etc. (8+1)