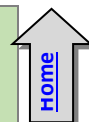


Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
 (With effect from Academic Year 2021-22)

Semester-III

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
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	-	-	03
217521	Operating Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
217522	Data Structures Laboratory	-	04	-	-	-	25	50	-	75	-	02	-	02
217523	OOP and Computer Graphics Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
217524	Operating Systems Laboratory	-	02	-	-	-	25	-	-	25	-	01	-	01
217525	Business Communication Skills	-	02	-	-	-	25	-	-	25	-	01	-	01
217526	Humanity and Social Science	-	-	01	-	-	25	-	-	25	-	-	01	01
217527	Audit Course 3	Grade												
Total		15	12	01	150	350	125	75	-	700	-	-	-	-
Total Credit											15	06	01	22
217526: Options for Audit Course 3														
Audit Course Code	Audit Course Title													
217527-I	Green Construction and Design													
217527-II	Social Awareness and Governance Program													
217527-III	Environmental Studies													
217527-IV	Smart Cities													
217527-V	Foreign Language (one of Japanese/Spanish/French/German). Course contents for Japanese(Module 1) are provided. For other languages institute may design suitably.													

Savitribai Phule Pune University														
Second Year of Artificial Intelligence and Data Science (2020 Course)														
(With effect from Academic Year 2021-22)														
Semester-IV														
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
217528	Statistics	03	-	-	30	70	-	-	-	100	03	-	-	03
217529	Internet of Things	03	-	-	30	70	-	-	-	100	03	-	-	03
210252	Data Structures and Algorithms	03	-	-	30	70	-	-	-	100	03	-	-	03
210253	Software Engineering	03	-	-	30	70	-	-	-	100	03	-	-	03
217530	Management Information System	03	-	-	30	70	-	-	-	100	03	-	-	03
217531	Internet of Things Laboratory	-	04	-	-	-	50	25	-	75	-	02	-	02
217532	Data Structures and Algorithms Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
217533	Project Based Learning II	-	04	-	-	-	50	-	-	50	-	02	-	02
217534	Code of Conduct	-	-	01	-	-	25	-	-	25	-	-	01	01
217535	Audit Course 4	Grade												
Total		15	12	01	150	350	150	50	-	700	-	-	-	-
Total Credit											15	06	01	22
217535: Options for Audit Course 4														
Audit Course Code	Audit Course Title													
217535-I	Water Management													
217535-II	Intellectual Property Rights and Patents													
217535-III	The Science of Happiness													
217535-IV	Stress Relief: Yoga and Meditation													
217535-V	Foreign Language (one of Japanese/Spanish/French/German) Course contents for Japanese(Module 2) are provided. For other languages institute may design suitably.													



Savitribai Phule Pune University Second Year of Artificial Intelligence and Data Science (2020 Course) 217525: Business Communication Skills		
Teaching Scheme Practical: 02 Hours/Week	Credit Scheme 01^{\$}	Examination Scheme and Marks Term Work^{\$}: 25 Marks
Course Objectives: <ul style="list-style-type: none"> 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– <ul style="list-style-type: none"> 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. 		
<p style="text-align: center;">Guidelines for Instructor's Manual</p> <p>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.</p>		
<p style="text-align: center;">Guidelines for Student's Laboratory Journal and Term Work Assessment</p> <p>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.</p> <p>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.</p> <p>Recommended Assessment and Weightage Parameters: (Attendance 30%, Assignments/activities-Active participation and proactive learning 50% and report 20%)</p> <p>Students must submit the report of all conducted activities conducted. The brief guidelines for report preparations are as follows:</p> <ol style="list-style-type: none"> One activity report must be of maximum 3 pages; 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. The report must contain: <ul style="list-style-type: none"> 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:²

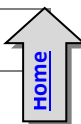
https://swayam.gov.in/nd2_imb19_mg14/preview

Virtual Laboratory:

- <https://ve-iitg.vlabs.ac.in/>

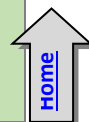
Sr. No.	Suggested List of Laboratory Experiments/Assignments
1	<p>SWOT analysis</p> <p>The students should be made aware of their goals, strengths and weaknesses, attitude, moral values, self-confidence, etiquettes, non-verbal skills, achievements. through this activity. SWOT Analysis, Confidence improvement, 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</p>
2	<p>Personal and Career Goal setting – Short term and Long term</p> <p>The teacher should explain to them on how to set goals and provide template to write their short term and long term goals.</p>
3	<p>Public Speaking</p> <p>Any one of the following activities may be conducted :</p> <p>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)</p>
4	<p>Reading and Listening skills</p> <p>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.</p>
5	<p>Group discussion</p> <p>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.</p>
6	<p>Letter/Application writing</p> <p>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.</p>
7	<p>Report writing</p> <p>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.</p>
8	<p>Resume writing- Guide students and instruct them to write resume</p>
9	<p>Presentation Skill</p> <p>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.</p>
10	<p>Team games for team building - Students should make to participate in team activity.</p>

11	Situational games for role playing as leaders
12	Faculty may arrange one or more sessions from following: Yoga and meditation. Stress management, relaxation exercises, and fitness exercises. Time management and personal planning sessions.
13	Mock interviews- guide students and conduct mock interviews
14	Telephonic etiquettes -To teach students the skills to communicate effectively over the phone. Students will be divided into pairs. Each pair will be given different situations, such as 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 telephone call.
15	Email etiquettes -To provide students with an in-depth understanding of email skills. Students will be made to send e-mails for different situations such as sending an e-mail to the principal for a leave, inviting a friend for a party, e-mail to enquire about room tariff of a hotel. Students will be assessed on the basis of e-mail such as clarity, purpose and proof reading of e-mail.



[@The CO-PO Mapping Matrix](#)

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	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 Artificial Intelligence and Data Science (2020 Course)
217526: Humanity and Social Science

Teaching Scheme	Credit Scheme	Examination Scheme and Marks
Tutorial: 01 Hours/Week	01^{\$}	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

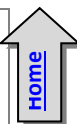
MOOC/ Video Lectures available at^{\$}:

- <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 skills, 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

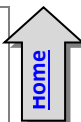
Assessment of Learning

- 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

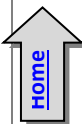
Tutorial Conduction and Term Work guidelines

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
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 - 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)

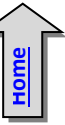
- a. Purpose: Propagate a social message by way of a sport activity
- b. Method: A group of students will begin the race with banner / placard in hand that contains a social message. The group runs for 500 meters and hands over the banner / placard to the next group of students. This chain of exchange 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-so-privileged 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

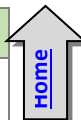
Students must submit the report of all conducted activities conducted during Tutorial (Outside Classroom) of at least 04 activities (out of 07 activities) from group (of 02-03) students.

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%)



Learning Resources

Books:

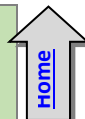
1. A. Alavudeen, M. Jayakumaran, and R Kalil Rahman, “Professional Ethics and Human Values”
2. Ram Ahuja, “Social Problems in India” (third edition)
3. Shastry, T. S. N., “India and Human rights: Reflections”, Concept Publishing Company India Pvt. Ltd., 2005.
4. Nirmal, C.J., “Human Rights in India: Historical, Social and Political Perspectives (Law in India)”, Oxford India
5. Rangarajan, “Environmental Issues in India”, Pearson Education.
6. University of Delhi, The Individual and Society, Pearson Education.
7. Wikipedia.org / wiki /social studies.
8. M. N. Srinivas, “Social change in modern India”, 1991, Orient Longman.
9. David Mandelbaum, Society in India, 1990, Popular.
10. Dr. Abha Singh, “Behavioral Science: Achieving Behavioral Excellence for Success”, Wiley.

e-Books:

- <https://www.moteoo.org/en/products/social-science-and-humanities-student-book-english>
- <https://www.springeropen.com/books>
(SpringerOpen open access books; download them free of charge from SpringerLink)
- <https://muse.jhu.edu/article/541846/pdf>
(This content has been declared *free* to read by the publisher during the COVID-19)

@The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	2	2	2	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	-
CO3	-	-	-	-	-	-	-	2	2	-	-	1
CO4	-	-	-	-	-	-	2	2	2	-	-	-
CO5	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-



Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
217527: Audit Course 3

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):

- | | |
|---|---|
| <ul style="list-style-type: none"> • Lectures/ Guest Lectures • Visits (Social/Field) and reports • Demonstrations | <ul style="list-style-type: none"> • Surveys • Mini-Project • 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 3 Options

Audit Course Code	Audit Course Title
217527-I	Green Construction and Design
217527-II	Social Awareness and Governance Program
217527-III	Environmental Studies
217527-IV	Smart Cities
217527-V	Foreign Language (one of Japanese/Spanish/French/German). Course contents for Japanese(Module 1) 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

Second Year of Artificial Intelligence and Data Science (2020 Course)

217527-II: Social Awareness and Governance Program

Prerequisites:

Awareness about basic terms in Social Science and Governance

Course Objectives:

1. 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.
4. 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:

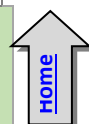
1. Conducting training/workshops/debates on HIV/AIDS prevention and stigma reduction.
2. Public shows on girls' education and empowerment.
3. Conducting campaigns on adult/disabled education.
4. To support the government to develop policy that encourages youth participation in decision-making through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

@The CO-PO Mapping Matrix

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	-	-	-



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
4. 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 mega-biodiversity nation, Threats to biodiversity, Endangered and endemic species of India, Conservation of Biodiversity, Endangered and endemic species, Conservation of biodiversity.
4. **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:

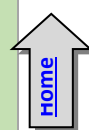
1. Bharucha, E.,-Textbook of “Environmental Studies”, Universities Press(2005),ISBN-10:8173715408
2. Mahua Basu, ”Environmental Studies”, Cambridge University Press, ISBN-978-1-107-5317-3

@The CO-PO Mapping Matrix

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	-	-	-	-	-

Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
217527-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. Norton and Company “Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia”, ISBN: 0393082873, 9780393082876.
2. Tim Campbell, Routledge, “Beyond Smart Cities: How Cities Network, Learn and Innovate”, Routledge, ISBN: 9781849714266.
3. Stan Geertman, Joseph Ferreira, Jr. Robert Goodspeed, John Stillwell, “Planning Support Systems and Smart Cities”, Lecture notes in Geo information and Cartography, Springer.

@The CO-PO Mapping Matrix

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 Artificial Intelligence and Data Science (2020 Course)
217533: Project Based Learning II



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

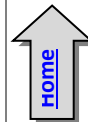
Project-based learning is an instructional approach designed to give students the opportunity to develop knowledge and skills through engaging projects set around challenges and problems they may face in the real world. PBL, is more than just projects. With PBL students "investigate and respond to an 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, peer-learning 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

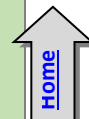
Reflection Skills

- 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	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2



Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
217534: 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.

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-

1. **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.
2. **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
 4. **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



- 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 copyright free 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.
- 7. 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:

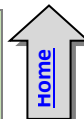
- <https://www.ieee.org/about/compliance.html>
- <https://www.cs.cmu.edu/~bmclaren/ethics/caseframes/91-7.html>
- <https://www.nspe.org/>
- http://www.ewh.ieee.org/soc/pes/switchgear/presentations/tp_files/2017-1_Thurs_Shiffbauer_Singer_Engineering_Ethics.pdf

MOOC/ Video lectures available at:

- https://swayam.gov.in/nd1_noc20_mg44/preview

@The CO-PO Mapping Matrix

CO\ PO	PO 1	PO2	PO3	PO 4	PO5	PO6	PO7	PO 8	PO9	PO1 0	PO1 1	PO12
CO1	-	-	-	-	-	-	2	2	-	-	-	-
CO2	-	-	-	-	-	-	2	2	-	-	-	-
CO3	-	-	-	-	-	-	3	2	-	-	-	-
CO4	-	-	-	-	-	-	2	3	-	-	-	-



Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
217535: 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 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):

- | | |
|---|---|
| <ul style="list-style-type: none"> • Lectures/ Guest Lectures • Visits (Social/Field) and reports • Demonstrations | <ul style="list-style-type: none"> • Surveys • Mini-Project • Hands on experience on focused topic |
|---|---|

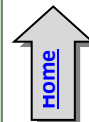
Course Guidelines for Assessment (Any one or more of following but not limited to):

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

Audit Course 4 Options

Audit Course Code	Audit Course Title
217535-I	Water Management
217535-II	Intellectual Property Rights and Patents
217535-III	The Science of Happiness
217535-IV	Stress Relief: Yoga and Meditation
217535-V	Foreign Language (one of Japanese/Spanish/French/German) Course contents for Japanese(Module 2) 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. [1]
<http://collegecirculars.unipune.ac.in/sites/documents/Syllabus%202017/Forms/AllItems.aspx>
http://www.unipune.ac.in/university_files/syllabi.htm



Savitribai Phule Pune University
Second Year of Artificial Intelligence and Data Science (2020 Course)
217535-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 resources.
- 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 resources.

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:

1. 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	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	1
CO3	-	-	-	-	-	-	1	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	2

Savitribai Phule Pune University														
Third Year of Artificial Intelligence and Data Science (2019 Course)														
(With effect from Academic Year 2022-23)														
Semester-V														
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Sem Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310241	Data Base Management System	03	-	-	30	70	-	-	-	100	03	-	-	03
317521	Computer Networks	03	-	-	30	70	-	-	-	100	03	-	-	03
310252	Web Technology	03	-	-	30	70	-	-	-	100	03	-	-	03
310253	Artificial Intelligence	03	-	-	30	70	-	-	-	100	03	-	-	03
**	Elective I	03	-	-	30	70	-	-	-	100	03	-	-	03
317523	Software Laboratory I	-	04	-	-	-	25	25	-	50	-	02	-	02
317524	CN Laboratory	-	02	-	-	-	25	25	-	50	-	01	-	01
317525	Elective I Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
317526	Seminar and Technical Communication	-	-	01	-	-	25	-	-	25	-	-	01	01
317527	Environmental Studies	-	-	01	-	-	25	-	-	25	-	-	01	01
Total		15	08	02	150	350	125	50	25	700	15	04	02	21
317528	Audit Course 5										Grade			
		Total									15	04	02	21
** Elective-I Options		Audit Course 5 Options												
317522 (A) Embedded Systems & Security		317528(A) Emotional Intelligence												
314445 (C) Design Thinking		317528(B) Industrial Safety And Environment Consciousness												
317522 (B) Pattern Recognition		317528(C) 3D Printing												
310245 (B) Human Computer Interface		317528(D) Foreign Language												
		317528(E) MOOC- Learn New Skills												
Software Laboratory I (Assignments from)		Data Base Management System and Artificial Intelligence												

Savitribai Phule Pune University
Third Year of Artificial Intelligence and Data Science (2019 Course)
 (With effect from Academic Year 2022-23)

Semester-VI

Course Code	Course Name	Teaching Scheme ##(Hours/Week)			Examination Scheme and Marks							Credit Scheme			
		#Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total	
317529	Data Science	04	-	-	30	70	-	-	-	100	03	--	-	03	
317530	Cyber security	04	-	-	30	70	-	-	-	100	03	-	-	03	
317531	Artificial Neural Network	04	-	-	30	70	-	-	-	100	03	-	-	03	
**	Elective II	04	-	-	30	70	-	-	-	100	03	-	-	03	
317533	Software Laboratory II	-	04	-	-	-	25	25	-	50	-	02	-	02	
317534	Software Laboratory III	-	04	-	-	-	50	25	-	75	-	02	-	02	
317535	Internship**	-	--	-	-	-	50	-	50	100	-	04	-	04	
317536	Mini Project (CS and Elective-II)	-	02	-	-	-	50	-	25	75	-	01	-	01	
Total		16	10	-	120	280	175	50	75	700	12	09	-	21	
317537	Audit Course 6										Grade				
Total											12	09	-	21	
Elective-II Options		Audit Course 6 Options													
317532(A) Robotics and Automation		317537(A) Digital and Social Media Marketing													
317532(B) Natural Language Processing		317537(B) Sustainable Energy Systems													
310254(C) Cloud Computing		317537(C) Leadership and Personality Development													
310254(D) Software Modeling and Architecture		317537(D) Foreign Language													
317537(E) MOOC- Learn New Skills															
Software Laboratory II (Assignments from)		Artificial Neural Network													
Software Laboratory III (Assignments from)		Data Science													
Mini Project (Assignments from)		Cyber Security and Elective II													
Internship**		Internship guidelines are provided in course curriculum sheet.													

Hours/Week for Theory Course in Third Year of Engineering, Semester VI:

As per the apex bodies' recommendations and guidelines, it is need of the day to train the pre-final year students for the industrial readiness through internship. As per the guidelines of AICTE, the duration of internship is 4-6 weeks after completion of semester V and before commencement of semester VI, so it is apparent that the contact hours of the TE students need to be managed meticulously. It becomes mandatory as per the structure that 4 credits for internship must be earned by the students. **Per semester, 15 weeks duration that is suggested ideally by the affiliated university will eventually reduce to fruitful 12 weeks after the implementation of the revised curriculum (2019 Course). With the evaluatory introduction of internship in the structure, we are left with the choice of 4 theory courses in the sixth semester with 12 weeks instead of traditional 15 weeks.** To balance the credits and to achieve the minimum required contact hours, it is the reasonable choice to allot 4 hours / week for each theory course of the sixth semester of Third year of Engineering. The additional one lecture/ week will definitely be instrumental in achieving the largest of minimum contact hours. As such there is no correspondence of weekly load and credits earned, the credit allotted per course remain intact despite of the change. **So it is almost imperative that the commencement of VI Semester need to be approx. 3 weeks beyond the schedule.**

Savitribai Phule Pune University

Third Year of Artificial Intelligence and Data Science (2019 Course)

317526: Seminar and Technical Communication


[Home](#)

Teaching Scheme

Credit: 01

Examination Scheme and Marks

Tutorial: 01 Hour/Week

Term Work: 25 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: Analysis specialized topic of interest from core area

CO2: Enhance Technical writing skills

CO3: Targeting specific problem and identify working solution to resolve it.

CO4: Developing professional communication skill

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.
- **All the assignments mentioned below are mandatory**
- 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

List of Assignments

1. Assignment on selecting technical topic from computer domain; this assignment should include importance of the topic, its impact and future scope.

2. Assignment on analyzing the latest technical topic through literature survey; this assignment may include progress of the topic from last few years like contents from review reports, journals or research papers related to selected topic for seminar work. Students should keep records of all the resources and use citation.

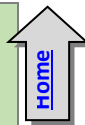
3. Analyze the topic and prepare technical details of the selected topic. This assignment may include contents like architecture details, different modules in detail, algorithms, and hardware details if any.

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
2. Johnson-Sheehan, Richard, "Technical Communication", Longman. ISBN 0-321-11764-6
3. Vikas Shirodka, "Fundamental skills for building Professionals", SPD, ISBN 978-93-5213-146-5

@The CO-PO Mapping Matrix

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 Artificial Intelligence and Data Science (2019 Course)		
317527: Environmental Studies		
Teaching Scheme:	Credit	Examination Scheme:
Tut: 01 Hours/Week	01	Term Work(TW): 25 Marks
Prerequisite Courses, if any: Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere.		
Companion Course, if any:		
Preamble: An environmental study is a multidisciplinary academic field which systematically studies human interaction with the environment. Environmental studies connect principles from the physical sciences, commerce/economics, the humanities, and social sciences to address complex contemporary environmental issues. Imparting basic knowledge about the environment and its allied problems. Developing an attitude of concern for the environment.		
Course Objectives:		
<ul style="list-style-type: none"> To gain an understanding of the Environment where we live Understanding the importance of water To educate about Air and Noise pollution To explain the concepts of E- waste and Green Computing 		
Course Outcomes:		
On completion of the course, learner will be able to–		
CO1: Aware the importance of environment		
CO2: Understand the water pollution		
CO3: Know the Air and noise pollution		
CO4: Understand the E-waste and green computing		
Course Contents		
Unit I	Introduction to Environmental Pollution	(03 Hours)
Environmental pollution: Environment and its importance, Definition, Types. Effect of environmental pollution on Plants, Non-living things.		
Unit II	Water Pollution	(03 Hours)
Water Pollution: Definition, Sources of water Pollution, Types of wastewater-Domestic and industrial wastewater		
Unit III	Air Pollution and Noise Pollution	(03 Hours)
Air pollution: Definition, Sources/causes of air pollution. Atmospheric layers, Effects on human.		
Noise Pollution: Definition of Noise Pollution, Types of Noise Pollution		
Unit IV	E-waste Management and Green computing	(03 Hours)
E-waste management: Definition of E-waste, Sources of E-waste, Types of E-waste		
Green computing: Definition, Objectives of Green Computing, Necessity, Environmental benefits		
Tutorial Conduction and Term work Guidelines (Set of Suggested Activities)		
The students are expected to submit		
1) Report/Presentation on the effect of Environmental Pollution on any world famous Structure/monument.		
2) Report/Presentation on importance of different sources of water available nearby them.		
3) Report/Presentation based on the data collected from the local authorities on air pollution and noise pollution.		
4) Report/Presentation on the E-Waste generated in the campus.		
Learning Resources		

Text Books:

3. “The text book of Environmental studies”, Dr. P. D. Raut, Shivaji University, 2013.
4. “A Text Book of Environmental Studies”, Dr. D. K. Asthana, S. Chand.
5. “Environmental Pollution, monitoring and control”, S. M. Khopkar, New Age Publication.

Reference Books:

4. “Air Pollution”, M. N. Rao, McGrawHill, Publication.
5. “E-waste Management and Procurement of Environment”, Dr. Suresh Kumar, Authorspress, 2021.
6. “Green Computing Approach towards sustainable development”, M. Afshar Alam, Dreamtech Press. 2020.

Web Links:

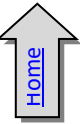
1. Prof. Mukesh Sharma, IIT Kanpur <https://archive.nptel.ac.in/courses/105/102/105102089>
2. Prof. J. Bhattacharyya, IIT Kharagpur, <https://archive.nptel.ac.in/courses/123/105/123105001>
3. Prof. Bhola Ram Gurjar, IIT Roorkee, <https://archive.nptel.ac.in/courses/105/107/105107213>

- e-Books:**
1. Bharucha, Erach (2005): “Text Book of Environmental Studies for Undergraduate Courses”, University Press (India) pvt ltd, Hyderabad, India
 2. Kothari Dr Milind- 2005- Environmental Education- Universal Publication Agra.
 3. IGNOU 1995- FST- 1/4 Foundation course in Science and Technology “Environment and Resource” – Indira Gandhi Open University, New Delhi.

MOOC Courses: https://onlinecourses.swayam2.ac.in/cec21_ge21/preview

@The CO-PO mapping table

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



SavitribaiPhule Pune University
Third Year of Artificial Intelligence and Data Science (2019 Course)
317528(C): Audit Course5
AC5-C: 3D Printing

Course Objectives:

- To understand the principle of 3D printing
- To understand resource requirements of 3D printing
- To know the basic artwork needed for 3D printing

Course Outcomes:

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

- CO1: Apply models for 3D printing
 CO2: Plan the resources for 3D printing
 CO3: Apply principles in 3D printing in real world

Course Contents

- 1. Getting started with 3D Printing:** How 3D Printers fit into Modern Manufacturing, Exploring the Types of 3D Printing, Exploring Applications of 3D Printing.
- 2. Outlining 3D Printing Resources:** Identifying Available Materials for 3D Printing, Identifying Available Sources for 3D Printable Objects.
- 3. Exploring the Business Side of 3D Printing:** Commoditizing 3D Printing, Understanding 3D Printing's Effect on Traditional lines of Business, Reviewing 3D Printing Research.
- 4. Employing Personal 3D printing Devices:** Exploring 3D printed Artwork, Considering Consumer level 3D Printers, Deciding on RepRap of Your Own

Learning Resources**Books:**

1. Richard Horne, Kalani Kirk Hausman, “ 3D Printing for Dummies”, Taschenbuch, ISBN: 9781119386315
2. Greg Norton, “3D Printing Business - 3D Printing for Beginners - How to 3D Print”, ISBN:9781514785669
3. Liza Wallach Kloski and Nick Kloski, “ Getting Started with 3D Printing: A Hands-on Guide to the Hardware, Software, and Services Behind the New Manufacturing Revolution”, Maker Media, ISBN:1680450204
4. Jeff Heldrich , “3D Printing: Tips on Getting Started with 3D Printing to Help you make Passive income for your Business”

@The CO-PO mapping table

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

Savitribai Phule Pune University		
Third Year of Artificial Intelligence and Data Science (2019 Course)		
317535: Internship		
Teaching Scheme:	Credit	Examination Scheme:
**	04	Term Work (TW): 50 Marks Oral(OR): 50 Marks
<p>Course Objectives:</p> <ul style="list-style-type: none"> To provide the work experience that can help students to put their education into practice. To encourage and provide opportunities for students to get professional experience through internships. To learn and apply knowledge gained through academics to real life/industrial situations. To get familiar with various technologies and tools used in industries for development of their applications. To inculcate professional and societal ethics. To create awareness of social, economic and administrative considerations in the working environment of industry organizations. 		
<p>Course Outcomes:</p> <p>On completion of the course, learners should be able to</p> <p>CO1: To demonstrate professional competence through industry internship.</p> <p>CO2: To apply knowledge gained through academics to a professional environment during internship.</p> <p>CO3: To select appropriate technology and tools to solve a given real time problem.</p> <p>CO4: To demonstrate abilities of a responsible professional and use ethical practices in day today life.</p> <p>CO5: To create professional and social network and develop relationships with industry people and get exposure to future employers.</p> <p>CO6: To explore various career opportunities in different domains and decide career goals.</p>		
Guidelines :		
<p>Internships are skill development, making students aware about the industrial environment, professional ethics, and career development opportunities. Students with well-identified internship goals make better utilization of practical experience in a field/broad area chosen.</p> <p>The well-skilled and properly groomed interns are always in demand for industries/organizations. Industrial internships are like learning in the supervised mode and shaping one's career with pre identified goals. It's an important aspect as employers are looking for employees who are skilled and aware of the industry environment, practices, procedures, and culture. The intern will focus on a particular task or part of the project concisely as it is structured, short-term, and supervised.</p> <p>The engineering undergraduate can be exposed to the procedures and practices followed in the industry through the traditional teaching-learning process but it is always restricted by the simulation horizons so it is being placed on the actual background to gear up the skills. An opportunity, of engineering internships, will help interns to gear up and affirm conceptual learning in academics.</p>		
Duration		
<p>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.</p>		
Internship Work Identification		
<p>The student may choose to undergo an Internship in Industry/Government</p>		

Organizations/NGO/MSME/Rural Internship/ Innovation/IPR/Entrepreneurship. The student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internships 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 by the college authorities well in advance. The internship work identification process should be initiated in the semester-5 in coordination with the training and placement cell/ industry-institute cell/ internship cell. This will help students to start their internship work on time. 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.

Students can take internship work in the form of the following but not limited to:

- Working for a consultancy/ research project
- Contribution in Incubation/ Innovation/ Entrepreneurship Cell/ Institutional Innovation
- Council/ startups cells of institute
- Learning at the 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 internships
- Participate in open source development.

Internship Diary/Internship Workbook

Students must maintain an Internship Diary/ Internship Workbook. The main purpose of maintaining a 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 supervisor to the Institute immediately after the completion of the training.

Internship Work Evaluation

Every student needs to prepare and maintain the documents with valid evidence of the activities done by him/her in the form of an internship diary or an internship workbook. The evaluation of these activities will be carried out by the Programme Head/Internship In-charge/Project Head/ Faculty mentor or Industry supervisor based on a satisfactory compilation of internship activities /sub-activities, effective practical work, domain knowledge, well understanding of concepts, the level of achievement expected, the evidence needed to assign the points and the duration for certain activities. Assessment and evaluation are to be done in consultation with the internship supervisor (Internal and External supervisors from the place of internship)

Recommended evaluation parameters:

Post Internship, Internal Evaluation Term work (Internship Diary/Workbook and Internship Report) - 50 Marks and Oral/Seminar Presentation – 50 Marks

Evaluation through seminar presentation at the Institute

The student will give a seminar based on his internship report/workbook before the panel of experts

constituted by the concerned department as per the norms of the institute.

The evaluation will be based on the following criteria:

- Domain knowledge and skill
- Presentation/communication skill
- Teamwork
- Innovation/Creativity
- Planning & Organizational skills
- Adaptability
- Analytical Skills
- Attitude & Behavior at work
- Societal Understanding
- Ethics
- Regularity and punctuality
- Attendance record
- Diary/Workbook
- Student's Feedback from External Internship Supervisor

After completion of the Internship, the student should prepare a comprehensive report that includes what he/she has observed, monitored and learnt during the training period.

The internship Diary/workbook may be evaluated on the basis of following parameters:

- Proper and timely documented entries
- Time to time maintaining the internship diary
- Adequacy & quality of information recorded
- Relevant information gathered and analyzed
- Thought process and recording tools and techniques used
- Structuring the information

Internship Report

The report shall be prepared and presented covering the 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 (tools and techniques used)
- Results / Analysis /Inferences
- Conclusion and future scope
- Suggestions / Recommendations for improvement to industry (if any)
- Attendance Record
- Acknowledgement
- List of references (Library books, magazines, web references and other sources)

Feedback from internship supervisor(External and Internal)

After completion of internship, the faculty coordinator should collect feedback about the student with the following recommended parameters :

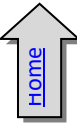
Technical knowledge gained through internship, Discipline, Sincerity and Punctuality, Commitment, Willingness to do the work, Individual work, Team work, Leadership, Verbal and written communication skills.

Reference:

[1] <https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf>[2] <https://internship.aicte-india.org/>

@The CO-PO Mapping table

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	3	1	1	1	1	2	1	1
CO2	1	2	2	2	3	2	1	1	1	2	2	1
CO3	-	-	-	-	-	1	-	-	2	2	1	1
CO4	2	-	-	-	-	2	2	3	-	1	-	2
CO5	-	-	-	-	-	1	2	1	1	1	2	1
CO6	-	-	-	-	-	1	-	-	2	1	-	1



Savitribai Phule Pune University		
Third Year of Artificial Intelligence and Data Science (2019 Course)		
317536: Mini Project		
Teaching Scheme:	Credit	Examination Scheme:
TH: 02 Hours/Week	01	Term Work (TW): 50 Marks Oral(OR): 25 Marks
Prerequisite Courses, if any: Computer Networks (317521)		
Companion Course, if any: Cyber Security (317530), Elective II**		
Part A Cyber Security		
Course Objectives:		
<ul style="list-style-type: none"> To understand threats/vulnerabilities to networks and countermeasures. To provide understanding of cryptography and its applications. To explain various approaches to Encryption techniques. To understand working of firewall and IDs. 		
Course Outcomes:		
On completion of the course, learner will be able to–		
CO1: Identify basic security attacks and services		
CO2: Analyze the vulnerabilities and design a security solution.		
CO3: Implement symmetric and asymmetric key algorithms		
CO4: Demonstrate network security applications, Firewall, IDs.		
List of Assignments (any five assignments)		
1. Implementation of S-DES		
2. Implementation of S-AES		
3. Implementation of Diffie-Hellman key exchange		
4. Implementation of RSA.		
5. Implementation of ECC algorithm.		
6. Enable/Configure (windows/ubuntu) firewall. Create rules to filter network traffic and to block unauthorized network traffic.		
7. Configure and demonstrate an Intrusion Detection System (IDS) to detect suspicious activities and generate alerts when detected.		
Mini Project (any one)		
8. Mini Project 1: Implement Cross Site Scripting using stored attack. A stored cross-site scripting vulnerability in the comment functionality. [Note: To implement this assignment, submit a comment that calls the alert function when the blog post is viewed.]		
9. Mini Project 2: Implement SQL injection vulnerability attack that causes the application to display details of all the products available on website.		
10. Mini Project 3: Design the Access control vulnerability. [Note: This assignment has an unprotected admin panel. It is located at an unpredictable location, but the location is disclosed somewhere in the application. Use https://portswigger.net]		
11. Mini Project 4: This task is to demonstrate insecure and secured website. Develop a web site and demonstrate how the contents of the site can be changed by the attackers if it is http based and not secured. You can also add payment gateway and demonstrate how money transactions can be hacked by the hackers. Then support your website having https with SSL and demonstrate how secured website is.		
Learning Resources		
Text Books:		

1. Nina Godbole, SunitBelapure, "Cyber Security- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt.Ltd.,ISBN- 978-81-265-2179-1.
2. William Stallings, "Computer Security : Principles and Practices", Pearson 6thEd. ISBN :978-81-317-3351-6

Reference Books:

1. BerouzForouzan, "Cryptography and Network Security", 2nd Ed. TMH, ISBN: 9780070702080.
2. Mark Merkow, "Information Security-Principles and Practices", Pearson Ed. 978-81-317-1288-7.
3. CK Shyamala, "Cryptography and Security", Wiley India Pvt. Ltd, ISBN 978-81-265-2285-9

e-Books: https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf

MOOC Courses:

@The CO-PO mapping table

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

Part B : Elective II : Robotics and Automation

Prerequisite Courses, if any:

Companion Course, if any:

Course Objectives:

- To study and survey recent trends in NLP
- To learn and implement different pre-processing techniques
- To design and develop different applications using NLP

Course Outcomes:

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

- CO1: Understand recent trends in NLP
 CO2: Implement different pre-processing techniques
 CO3: Design and develop various application using NLP

List of Assignments

1. Study Components of Industrial Robot (PUMA, KUKA, FANUC, Motomanetc) and its DH parameters.
2. Design and selection of Gripper / End effector
3. Two Programming exercise on lead through programming for Industrial Application
4. Program for Forward and Inverse kinematics of simple robot configuration (Robo Analyzer/ MATLAB or Open Source)
5. Control experiment using available Hardware or Software (Open Source or MATLAB)
6. Study of robotic system design.
7. Study of sensor integration.
8. Use of open source computer vision programming tool / Matlab, Open CV
9. Report on industrial application of robot /Industrial visit

Note: Choose any 4 assignments from Assignment 1 to Assignment 5 and any 1 assignment

form Assignment 6 to Assignment 9**Learning Resources****Text Books:**

1. Groover M.P.- Automation, production systems and computer integrated manufacturing' - Prentice Hall of India
2. John Craig, Introduction to Robotics, Mechanics and Control, 3rd Edition, Pearson Education, 2009
3. R K Mittal & I J Nagrath, Robotics and Control, McGraw Hill Publication, 2015
4. Ganesh Hegde, Industrial Robotics, Laxmi publication
5. S. K. Saha, Introduction to Robotics, TMH International
6. Groover, Industrial Robotics, Tata McGraw-Hill Education

Reference Books:

1. Mark W Spong, M. Vidyasagar, Robot Dynamics And Control, John Wiley & Sons
2. Richard D. Klafter, Robotics Engineering: An Integrated Approach, Pearson

@The CO-PO mapping table

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

Part B : Elective II : Natural Language Processing**Prerequisite Courses, if any: Discrete Mathematics , Data Structure ,Artificial Intelligence****Companion Course, if any: Artificial Neural Network****Course Objectives:**

- To study and survey recent trends in NLP
- To learn and implement different pre-processing techniques
- To design and develop different applications using NLP

Course Outcomes:

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

- CO1: Understand recent trends in NLP
 CO2: Implement different pre-processing techniques
 CO3: Design and develop various application using NLP

List of Assignments

- 1] Survey of Recent Advances in NLP:
Detailed survey of recent efforts being taken in the field of NLP with respect to approaches, applications, problems etc.
- 2] To perform various preprocessing tasks in NLP:
Perform various basic pre-processing tasks like tokenization, stemming, lemmatization, stop word removal etc. using inbuilt functions and using regular expressions.
- 3] Perform Spelling Correction:
Apply minimum edit distance between two strings for spelling correction.
- 4] Implement a system to detect different types of toxicity like threats, obscenity, insults, and identity-based hate from comments. (Dataset: Wikipedia comments which have been labeled by

human raters for toxic behavior. you can download dataset from <https://www.kaggle.com/competitions/jigsaw-toxic-comment-classification-challenge/data>)

5] Recommendation system using Voice Chabot. (Use of Google speech engine)

6] Examiner less oral examination system (Speech to text and answer matching)

Note: Assignments 1-4 are mandatory. Perform any 1 from 5, 6.

Learning Resources

Text Books:

1. Steven Bird, Ewan Klein and Edward Loper, "NLP with Python: Analyzing text with the Natural Language Toolkit", O'Reilly Media, Inc

Reference Books:

1. Steven Bird, Ewan Klein and Edward Loper, "NLP with Python: Analyzing text with the Natural Language Toolkit", O'Reilly Media, Inc.
2. Nitin Indurkha and Fred J. Dumeau, "Handbook of Natural Language Processing", 2nd ed. CRC press.

e-Books:

1. Yoav Goldberg. A primer on neural network models for natural language processing, 2015. URL <http://u.cs.biu.ac.il/~yogo/nlp.pdf>

MOOC Courses:

@The CO-PO mapping table

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

Part B : Elective II : Cloud Computing

Prerequisite Courses, if any: Database Management System (310241)

Companion Course, if any:

Course Objectives:

- To Learn AWS environment.
- To Learn Amazon RDS.
- To design and develop different applications using Amazon Services.

Course Outcomes:

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

- CO1: Understanding of AWS environment.
 CO2: Understand Amazon RDS
 CO3: Understand and use of AWS Lightsail

List of Assignments

1. Setting up AWS Environment: Create a new AWS account, Secure the root user, Create an IAM user to use in the account Set up the AWS CLI, Set up a Cloud9 environment.
2. Setup, Create and visualize data in an Amazon Relational Database (Amazon RDS) MS SQL Express server using Amazon Quick Sight.

3. Setup, Create and connect your Word Press site to an object storage bucket using Lightsail service.

Note: All assignments are mandatory.

Part B : Elective II : Software Modeling and Architecture

Prerequisite Courses, if any: Object Oriented Programming (210243), Software Engineering (210253)

Companion Course, if any: Software Modeling and Architecture

Course Objectives:

- To understand Software Modeling and Architecture
- To Use tools and techniques of Software Modeling and Architecture
- To Design and develop applications using UML
- To Apply the knowledge of Software Modeling and Architecture for problem solving

Course Outcomes:

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

CO1: Use tools and techniques of Software Modeling and Architecture

CO2: Apply the knowledge of Software Modeling and Architecture for problem solving

CO3: Design and develop applications using UML

List of Assignments

Select a moderately complex system which has at least 4-5 major functionalities. Identify stakeholders. Actors and write detail problem statement for your system. Implement following scenarios by taking reference of design model implementation using suitable object-oriented language.

1. Prepare Use Case Model
2. Draw detail use case diagram using UML 2.0 notations
3. Draw activity diagram with swim lanes using UML 2.0 Notations for major Use Cases
4. Prepare analysis model-class model
5. Draw sequence diagram for every scenario by using advanced notations using UML 2.0 (Identify at least 5 major scenarios (sequence flow) for your system)
6. Prepare Object Diagram, Package Diagram, Component diagram, Development diagram
7. Specify and document the architecture and design pattern with the help of templates. Implement the system features and judge the benefits of the design patterns accommodated.

Learning Resources

Text Books:

1. Jim Arlow, Ila Neustadt, "UML 2 and the unified process – practical object-oriented analysis and design", Addison Wesley, Second edition, ISBN 978-0201770605
2. Len Bass, Paul Clements, Rick Kazman, "Software Architecture in Practice", Second Edition, Pearson, ISBN 978-81-775-8996-2
3. Hassan Gomaa, "Software Modeling and Design- UML, Use cases, Patterns and Software Architectures", Cambridge University Press, 2011, ISBN 978-0-521-76414-8
- Erich Gamma, "Design Patterns", Pearson, ISBN 0-201-63361-2

References Books:

1. Gady Booch, James Rumbaugh, Ivar Jacobson, "The unified modeling language user guide",

Pearson Education, Second edition, 2008, ISBN 0-321-24562-8.

2. Lan Sommerville, "Software Engineering", 9th edition, ISBN-13: 978-0-13-703515-1 ISBN-10: 0-13-703515-2.

e-Books:

1. <https://dhomaseghanshyam.files.wordpress.com/2016/02/gomaa-softwaremodellanddesign.pdf>

MOOC Courses:

@The CO-PO mapping table

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

SavitribaiPhule Pune University
Third Year of Artificial Intelligence and Data Science (2019 Course)
317537(C): Audit Course6
AC6-C: Leadership and Personality Development

Prerequisite: General awareness of communication and relationship

Course Objectives:

- To create awareness about importance of personality development
- To improve soft skills and communication skills
- To develop interpersonal skills and ability to work effectively in a team
- To create awareness about importance of body language to reveal inner self and personality
- To develop professionals with leadership qualities

Course Outcomes:

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

CO1: Explore as an individual as well as a team member

CO2: Express effectively through communication and improve interpersonal skills

CO3: Develop effective team leadership abilities

CO4: Work effectively in heterogeneous teams through the knowledge of team work, interpersonal skills and leadership qualities

Course Contents

1. Personality Development: A Must for Leadership and Career Growth

Personality Analysis, Swami Vivekananda's Concept of Personality Development: Physical Self, Energy Self, Intellectual Self, Mental Self, Blissful Self; Interpersonal Skills: Resolving Conflict, A Smiling Face, Appreciative Attitude, Assertive Nature, Communication Skills, Listening Skills, Developing Empathy; The Personality Attribute of Taking Bold Decisions; Personality Types and Leadership Qualities: Mapping the Different Personality Types, Perfectionists, Helpers, Achievers, Romantics, Observers, Questioners, Enthusiasts or Adventurers, Bosses or Asserters, Mediators or Peacemakers

2. Soft Skills: Demanded by Every Employer

Change in Today's Workplace: Soft Skills as a Competitive Weapon, Classification of Soft Skills: Time Management, Attitude, Responsibility, Ethics, Integrity, Values, and Trust, Self-confidence and Courage, Consistency and Predictability, Teamwork and Interpersonal Skills, Communication and Networking, Empathy and Listening Skills, Problem Solving, Troubleshooting and Speed-reading and Leadership

3. Communication Skills

Speaking Skills, Phonetics, Accent, Intonation, Writing Skill to Create an Impression: Your Résumé or Curriculum Vitae, Writing a Modern Résumé

4. Group Discussion: A Test of Your Soft Skills

Ability to Work as a Team, Communication Skills, Including Active Listening, Non-verbal Communication, Leadership and Assertiveness, Reasoning, Ability to Influence, Innovation, Creativity and Lateral Thinking, Flexibility

5. Job Interviews: Gateway to the Job Market

Types of Interviews, Abide by the Dress Code, Importance of Body Language in Interviews, Telephonic or Video Interview—A Growing Trend

6. Body Language: Reveals Your Inner Self and Personality

Emotions Displayed by Body Language: Aggressive, Submissive, Attentive, Nervous, Upset, Bored, Relaxed, Power, Defensive; Handshake—The Most Common Body Language, Eyes—A Powerful Reflection of One's Inner Self

Learning Resources

Reference Books:

1. Barun K Mitra, (2011), "Personality Development and Soft skills", First Edition, Oxford Publishers, ISBN: 780199459742, ISBN: 0199459746
2. Urmila Rai and S.M. Rai, "Business Communication", Himalay Publication House
3. Shiv Khera, "You Can Win", A&C Black, ISBN: 9780230331198
4. Dale Carnegie, "How to win Friends and Influence People", New York: Simon & Schuster,

1998, ISBN: 1-4391-6734-6

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

@The CO-PO mapping table

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