

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

|   |                                   |   |
|---|-----------------------------------|---|
| <b>Teaching Scheme</b><br>Practical: <b>04 Hours/Week</b> | <b>Credit Scheme</b><br><b>02</b> | <b>Examination Scheme and Marks</b><br>Term Work: <b>50 Marks</b> |
|---|-----------------------------------|---|

**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**

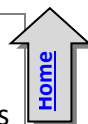
- The fundamentals of problem based learning, lies with the Tutors role.
- Tutors are not the source of solutions rather they act as the facilitator and mentor.
- The facilitator skills of the Tutors / Teacher are central to the success of PBL.

**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

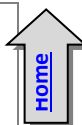
- It is important for tutors to make sure that assessment is consistent with learning objectives of the groups in PBL
- Assessment of students should not be focused only on the final leaning product.
- PBL tutors need to understand meaningful ways of assessing students' work to motivate learning.
- For 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?

### [@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

## Third Year of Computer Engineering (2019 Course)

## 310255: Internship\*\*


 Home

Teaching Scheme:

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Credit: 04

Examination Scheme:

Term work: 100 Marks

**Course Objectives:**

Internship provides an excellent opportunity to learner to see how the conceptual aspects learned in classes are integrated into the practical world. Industry/on project experience provides much more professional experience as value addition to classroom teaching.

- To encourage and provide opportunities for students to get professional/personal experience through internships.
- To learn and understand real life/industrial situations.
- To get familiar with various tools and technologies used in industries and their applications.
- To nurture professional and societal ethics.
- To create awareness of social, economic and administrative considerations in the working environment of industry organizations.

**Course Outcomes:**

On completion of the course, learners should be able to

**CO1:** To demonstrate professional competence through industry internship.

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

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

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

**CO5:** Creating network and social circle, and developing relationships with industry people.

**CO6:** To analyze various career opportunities and decide carrier goals.

**\*\* Guidelines:**

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

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

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

**Duration:**

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

**Internship work Identification:**

Student may choose to undergo Internship at Industry/Govt. Organizations/NGO/MSME/Rural Internship/ Innovation/IPR/Entrepreneurship. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/NGO's/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry[1].



Students must register at Internshala [2]. Students must get Internship proposals sanctioned from college authority well in advance. Internship work identification process should be initiated in the Vth semester in coordination with training and placement cell/ industry institute cell/ internship cell. This will help students to start their internship work on time. Also, it will allow students to work in vacation period after their Vth semester examination and before academic schedule of semester VI.

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

- Working for consultancy/ research project,
- Contribution in Incubation/ Innovation/ Entrepreneurship Cell/ Institutional Innovation Council/ startups cells of institute /
- Learning at Departmental Lab/Tinkering Lab/ Institutional workshop,
- Development of new product/ Business Plan/ registration of start-up,
- Industry / Government Organization Internship,
- Internship through Internshala,
- In-house product development, intercollegiate, inter department research internship under research lab/group, micro/small/medium enterprise/online internship,
- Research internship under professors, IISC, IIT's, Research organizations,
- NGOs or Social Internships, rural internship,
- Participate in open source development.

### **Internship Diary/ Internship Workbook:**

Students must maintain Internship Diary/ Internship Workbook. The main purpose of maintaining diary/workbook is to cultivate the habit of documenting. The students should record in the daily training diary the day-to-day account of the observations, impressions, information gathered and suggestions given, if any. The training diary/workbook should be signed every day by the supervisor.

Internship Diary/workbook and Internship Report should be submitted by the students along with attendance record and an evaluation sheet duly signed and stamped by the industry to the Institute immediately after the completion of the training.

### **Internship Work Evaluation:**

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

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

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

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

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

- Depth of knowledge and skills
- Communication & Presentation Skills
- Team Work
- Creativity
- Planning & Organizational skills
- Adaptability
- Analytical Skills
- Attitude & Behavior at work

- Societal Understanding
- Ethics
- Regularity and punctuality
- Attendance record
- Diary/Work book
- Student's Feedback from External Internship Supervisor

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period.

Internship Diary/workbook may be evaluated on the basis of the following criteria:

- Proper and timely documented entries
- Adequacy & quality of information recorded
- Data recorded
- Thought process and recording techniques used
- Organization of the information

The report shall be presented covering following recommended fields but limited to,

- Title/Cover Page
- Internship completion certificate
- Internship Place Details- Company background-organization and activities/Scope and object of the study / Supervisor details
- Index/Table of Contents
- Introduction
- Title/Problem statement/objectives
- Motivation/Scope and rationale of the study
- Methodological details
- Results / Analysis /inferences and conclusion
- Suggestions / Recommendations for improvement to industry, if any
- Attendance Record
- Acknowledgement
- List of reference (Library books, magazines and other sources)

### Feedback from internship supervisor(External and Internal)

Post internship, faculty coordinator should collect feedback about student with recommended parameters include as- Technical knowledge, Discipline, Punctuality, Commitment, Willingness to do the work, Communication skill, individual work, Team work, Leadership.....

Reference:

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

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

### @ The CO-PO Mapping Matrix

| CO/<br>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**  
**Fourth Year of Computer Engineering (2019 Course)**  
**410248: Project Work Stage I**

|                               |               |                             |
|-------------------------------|---------------|-----------------------------|
| <b>Teaching Scheme:</b>       | <b>Credit</b> | <b>Examination Scheme:</b>  |
| <b>Practical:02Hours/Week</b> | <b>02</b>     | <b>Presentation:50Marks</b> |

**Course Objectives:**

- To Apply the knowledge for solving realistic problem
- To develop problem solving ability
- To Organize, sustain and report on a substantial piece of team work over a period of several months
- To Evaluate alternative approaches, and justify the use of selected tools and methods
- To Reflect upon the experience gained and lessons learned
- To Consider relevant social, ethical and legal issues
- To find information for yourself from appropriate sources such as manuals, books, research journals and from other sources, and in turn increase analytical skills.
- To Work in Team and learn professionalism

**Course Outcomes:**

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

- Solve real life problems by applying knowledge.
- Analyze alternative approaches, apply and use most appropriate one for feasible solution.
- Write precise reports and technical documents in a nutshell.
- Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work
- Inter-personal relationships, conflict management and leadership quality.

**Guidelines**

Project work Stage – I is an integral part of the Project work. In this, the student shall complete the partial work of the Project which will consist of problem statement, literature review, SRS, Model and Design. The student is expected to complete the project at least up to the design phase. As a part of the progress report of project work Stage-I, the candidate shall deliver a presentation on the advancement in Technology pertaining to the selected project topic. The student shall submit the duly certified progress report of Project work Stage-I in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute. The examinee will be assessed by a panel of examiners of which one is necessarily an external examiner. The assessment will be broadly based on work undergone, content delivery, presentation skills, documentation, question-answers and report.

**Follow guidelines and formats as mentioned in Project Workbook recommended by Board of Studies**



## Savitribai Phule Pune University

### Fourth Year of Computer Engineering (2019 Course)

#### 410256: Project Work Stage II

|   |                            |   |
|---|----------------------------|---|
| <b>Teaching Scheme:</b><br><b>TH: 06 Hours/Week</b> | <b>Credit</b><br><b>06</b> | <b>Examination Scheme:</b><br><b>Term work: 100 Marks</b><br><b>Presentation: 50Marks</b> |
|---|----------------------------|---|

#### Prerequisite Courses: Project Stage I(410248)

##### Course Objectives:

- To follow SDLC meticulously and meet the objectives of proposed work
- To test rigorously before deployment of system
- To validate the work undertaken
- To consolidate the work as furnished report

##### Course Outcomes:

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

- CO1: Show evidence of independent investigation
- CO2: Critically analyze the results and their interpretation.
- CO3: Report and present the original results in an orderly way and placing the open questions in the right perspective.
- CO4: Link techniques and results from literature as well as actual research and future research lines with the research.
- CO5: Appreciate practical implications and constraints of the specialist subject

### Guidelines

In Project Work Stage–II, the student shall complete the remaining project work which consists of Selection of Technology and Tools, Installations, UML implementations, testing, Results, performance discussions using data tables per parameter considered for the improvement with existing/known algorithms/systems and comparative analysis and validation of results and conclusions. The student shall prepare and submit the report of Project work in standard format for satisfactory completion of the work that is duly certified by the concerned guide and head of the Department/Institute

**Follow guidelines and formats as mentioned in Project Workbook recommended by Board of Studies**