

Savitribai Phule Pune University, Pune
Second Year Civil Engineering (2019 Course)
201017 Project Based Learning
Credits: 02

Teaching Scheme:

Practical : 04hrs/week

Examination Scheme:

Term Work: 50 Marks

Preamble:

Project Based Learning (PBL) was introduced in curriculum of First Year Engineering in Semester II (Course code- 110013) in 2019 course. In that course, students in group might have planned, managed and completed a task/ project/ activity which addressed the stated problem. In a continuation with this, PBL is introduced in core course of Civil Engineering. PBL demonstrates the power of student projects to develop college, community connections, applied research skills and higher levels of student thinking. PBL is a dynamic approach to teaching in which students explore real-world problems and challenges simultaneously developing 21st century Civil Engineering skills while working in collaborative groups. The aim of this course is to demonstrate the important attributes like communication, presentation, organization, time management, research, inquiry, self-assessment, group participation, leadership and critical thinking. Performance assessed on an individual basis and takes into account the quality of task/project/activity completed, the depth of content understanding demonstrated and the contributions made to the ongoing process of project realization. PBL allows students to reflect upon their own ideas and opinions and make decisions that affect project outcomes and the learning process in general.

Course Objectives:

1. To engage students in constructive learning environment and develop self-learning abilities.
2. To develop critical thinking and solving civil engineering problems by exploring and proposing sustainable solutions.
3. To integrate knowledge and skills from civil and other engineering areas.
4. To develop professional skills and project management.

Course Outcomes:

After completion of course the students will be able to

1. Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.
2. Analyse and design the physical/ mathematical/ ICT model in order to solve identified problem/project.
3. Create, work in team and applying the solution in practical way to specific problem.

Course Content

- Introduction to Project Based Learning, Traditional vs. Cognitive Learning, Why PBL? , Principles of Problem Design Seven Steps of Problem Design, Online PBL, Applications and Research Trends Case Studies in Civil Engineering.

Group Structure:

- Working in mentor – monitored groups. The students identify, plan, manage and complete a task/ project/ activity which address the stated problem related to civil engineering.
- There should be team/group of maximum four students.
- A supervisor / mentor faculty teacher assigned to individual groups.

Selection of Project/Problem:

At start of course revision of PBL, significance, guidelines and evaluation parameters should be discussed commonly at start of semester. In this session basics PBL, in brief research methodology points relevant to PBL, sample case studies related to civil engineering and brief information about patent, copy right and publications should be given.

Selection of project/problem related to any technical aspect of civil engineering is recommended or if any project/problem selected in first year engineering related to civil engineering can be continued if enough potential is there. Give preference to select project/problem related to solving any problem/issue for which suitable model can be developed or software can be used. The project/problem selected could have different alternative solutions which could be theoretical, practical, working model, demonstration or software analysis. The project/problem selected may have multi-disciplinary approach to get the solution. Problem needs to refer back to a particular practical, scientific, or technical domain. It is recommended to include hands-on activities, organizational and field visits, expert consultation to make students aware with current use of technologies. Proper representation of project/problem, course work and report on the results and conclusion is important for assessment of course.

Assessment:

The institution/head/mentor is committed to assessing and evaluating both students' performance and program effectiveness. Progress and review of PBL is monitored regularly on weekly basis. It is recommended to appoint one teaching faculty as a mentor per group/ batch and it will be duty of mentor to perform monitoring and continuous assessment of individual students as well as entire group for their performance. College/ Department is required to provide necessary assistance. It is the responsibility of students to follow guidelines of their group mentor, maintain self-discipline, authentic collaboration, peer learning and personal responsibility, motivation and adopt interactive learning environment. 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. Intermittent review and assessment of each group should be done after six weeks from the start of the semester. Each group has to submit their work at end of semester during the end review. Group may demonstrate their knowledge and skills through presentation by developing a model/product/poster and report. Individual assessment for each student (Understanding individual capacity, role and involvement in the project). Group assessment (roles defined, distribution of work, intra-team communication and togetherness).

Evaluation and Continuous Assessment:

Prepare "PBL Log Book" which includes record of activities performed and evaluation carried out with appropriate remarks. Maintain regular record on weekly basis. Records and documents must also be maintained at student level. Continuous assessment sheet must be prepared by each faculty

which consists assessment made on weekly basis also performance made during mid-review and end-review. PBL log book must be maintained as a record even after completion of semester. It will serve as document which will reflect the punctuality, accountability, technical writing ability and project workflow.

Recommended parameters for assessment, evaluation and weightage:

Evaluation criteria and respective percentage weightage for marks.

1. Idea Inception = 5%
2. Solution provided/ final product at end of course = 50% (Individual assessment and team assessment).
3. Documentation in the form of PBL report (typed, hard copy) = 15%
4. Presentation/ Demonstration of model/ PPT/ poster = 10%
5. Participation/ involvement in group activity = 10%
6. Publication/ participation on technical platform = 10%

Course assessment rubrics can be prepared based on the given evaluation parameters for excellent, moderate, acceptable and not acceptable.

References:

1. M. Savin-Baden and C. Howell Major, Foundations of Problem-based Learning. McGraw-Hill Education, 2004
2. T. J. Newby, D. A. Stepich, J. D. Lehman and J. D. Russell, Instructional technology for teaching and learning: Designing instruction, integrating computers, and using media. Englewood Cliffs, NJ: Merrill/Prentice-Hall, 1996
3. S. N. Alessi and S. R. Trollip, Multimedia for learning: methods and development. Needham Heights, MA: Allyn& Bacon, 2001
4. Guerra, Aida, Ulseth, Ronald, Kolmos, Anette, PBL in Engineering Education: International Perspectives on Curriculum Change, Springer, 2017
5. Mahnaz Moallem Woei Hung Nada Dabbagh, The Wiley Handbook of Problem-Based Learning, Wiley, 2019
6. Jane I. Krauss, Suzanne K. Boss, Thinking Through Project-Based Learning: Guiding Deeper Inquiry.
7. John Larmer, David Ross, John R. Mergendollar, Project Based Learning (PBL) Starter Kit.
8. William N. Bender, Project-Based Learning: Differentiating Instruction for the 21st Century.
9. Bob Lenz, Justin Wells, Sally Kingston, Transforming Schools Using Project-Based Learning, Performance Assessment, and Common Core Standards.
10. Suzie Boss with John Larmer (ASCD/Buck Institute for Education), Implementing Project-Based Learning Solutions by Suzie Boss

Website for references

1. www.pblwork.org
2. www.my.pblworks.org
3. www.swayam.gov.in/nd2_ntr20_ed12/preview
4. www.schoolology.com

Format of PBL report: Sequence of pages:

- i) Front Cover Page
- ii) Certificate
- iii) Acknowledgement
- iv) Synopsis
- v) Contents
- vi) List of

Figures vii) List of Tables vii) Notations

Chapter 1 Introduction (This consists of: 1.1 Introduction of the Project Work; 1.2 Problem Statement, 1.3 Objectives and 1.4 Scope of the Project Works, 1.5 Research Methodology, 1.6 Limitations of study, 1.7 Expected outcome.

Chapter 2 Literature Review (It shall include theoretical support, details regarding work done by various persons, methods established, any new approach.

Chapter 3 Planning Schedule/ Flow Chart for Completion of Project

Chapter 4 Conclusion

References and Bibliography (The references and bibliography shall include name of author/code/manual/book, title of paper/code/manual/book, name of the journal, month & year of publication, volume number/ISBN number, page number x-y. The references and bibliography shall be as per universal standards as mentioned in any international journal of professional body).

Report Printing details:

1. Report shall be typed on A4 size Executive Bond paper with single spacing preferably on **Both** sides of paper.
2. Margins: Left Margin: 37.5 mm, Right Margin: 25 mm, Top Margin: 25 mm, Bottom Margin: 25 mm.
3. Give page number at bottom margin at center.
4. Size of Letters: Chapter Number: 16 font size, Times New Roman in Capital Bold Letters, Chapter Name: 12 Font size in Capital Bold Letters, Main Titles (1.1, 2.5 etc): 16 Font size in Bold Letters Sentence case, Sub Titles (1.1.5, 4.5.1 etc): 14 Font size in Bold Letters Sentence case. All other matter: 12 Font size sentence case.
5. No blank sheet be left in the report.
6. Figure name: 12 Font size in sentence case Bold- Below the figure.
7. Table title -12 font size in sentence case- Bold-Above the table.

Savitribai Phule Pune University, Pune
TE Civil (2019 Pattern) w. e. f. June 2021
301016: Internship

Teaching scheme	Credit	Examination scheme
Tutorial: 04 Hours/week	04	Term Work: 100 Marks

Pre-requisites: Fundamentals of Civil Engineering covered in earlier courses

Course objectives

- 01 To encourage and provide opportunities for students to get professional/personal experience through internships.
- 02 To learn to apply the technical knowledge gained from academics /classroom learning in real life/industrial situations.
- 03 To get familiar with various tools and technologies used in industries and their applications.
- 04 To enable students to develop professional skills and expand their professional network with the development of employer-valued skills like teamwork, communication.
- 05 To apply the experience gained from industrial internship to the academic course completion project.
- 06 To nurture professional and societal ethics in students
- 07 Understand the social, economic and administrative considerations that influence the working environment of industrial organizations

Course outcomes

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

- 01 To develop professional competence through industry internship
- 02 To apply academic knowledge in a personal and professional environment
- 03 To build the professional network and expose students to future employees
- 04 Apply professional and societal ethics in their day to day life
- 05 To become a responsible professional having social, economic and administrative considerations
- 06 To make own career goals and personal aspirations

CO-PO Mapping Matrix

CO/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	1	-	2	1	-	1

Guidelines of Internship

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 theoretical 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.

1. Duration: Internship to be completed after semester V and before commencement of semester VI of at least 4 to 6 weeks. It is to be assessed and evaluated in semester VI.

2. Internship work Identification: Student may choose to undergo Internship at Industry/Govt./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].

Contacting various companies for Internship and 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.

Student can take internship work in the form of online/onsite work from any of the following but not limited to:

- a. Working for consultancy/ research project
- b. Participation at events (technical/business) in innovation related completions like Hackathon
- c. Contribution in incubation/innovation/entrepreneurship cell/institutional innovation council/startups cells of institute
- d. Learning at departmental lab/tinkering lab/institutional workshop
- e. Development of new product/business plan/registration of start-up
- f. Participation in IPR workshop/leadership talks/ideal design/innovation/business completion/technical expos
- g. Industry/government organization internship
- h. Internship through Internshala

- i. In-house product development, intercollegiate, inter department research internship under research lab/group, micro/small/medium enterprise/online internship
- j. Research internship under professors, IISC, IIT's, research organizations
- k. NGOs or social internships, rural internship
- l. Participate in open source development
- m. Development of Physical and/or numerical, mathematical, soft computing model
- n. Carrying out surveys related to society related but Engineering problems. For example, a survey of solid waste management in a particular area/town/village, survey of water supply network in a locality, town, village etc. , survey of air quality etc.

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

3. 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 after every day by the supervisor/ in charge of the section where the student has been working.

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 diary/workbook may be evaluated on the basis of the following criteria.

- i. Proper and timely documented entries
- ii. Adequacy & quality of information recorded
- iii. Data recorded
- iv. Thought process and recording techniques used
- v. Organization of the information

4. Internship Work Evaluation: Every student is required to prepare and 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, 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) and a supervisor from place of internship.

Recommended evaluation parameters: Post internship internal evaluation 50 Marks and internship diary/workbook and internship report 50 Marks. Evaluation through Seminar Presentation/Viva-Voce at the Institute

The student will present 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, communication skills, presentation skills, team work, creativity, planning & organizational skills, adaptability, analytical skills, attitude and behavior at work, societal understanding, ethics, regularity and punctuality, attendance record, log 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. The student may contact industrial supervisor/faculty mentor/TPO for assigning special topics and problems and should prepare the final report on the student's presence physically, if the student is found absent without prior intimation to the department/institute/concern authority/T & P Cell, entire training can be cancelled.

The report shall be presented covering following recommended fields but not limited to:

- ✓ Title/cover Page
- ✓ Internship completion certificate
- ✓ Internship place details: Company background-organization and activities/scope and object of the study/personal observations
- ✓ 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 (books, magazines and other sources)

5. Feedback from internship supervisor (external and internal): Post internship, faculty coordinator should collect feedback about student with following recommended parameters.

Technical knowledge, discipline, punctuality, commitment, willingness to do the work, communication skill, individual work, team work and leadership

Savitribai Phule Pune University, Pune
B. E. Civil (2019 Pattern) w. e. f. June 2022
401 005: Project Stage I

Teaching scheme	Credits	Examination scheme
Practical: 04 Hours/week	01	Term Work: 50 Marks
	02	Oral: 50 Marks

Pre-requisites

Fundamentals of Civil Engineering

Course objectives

- 01 Identify latest technical/practical problems in the field of Civil Engineering.
- 02 Inculcate the ability to describe, interpret and analyze technical content.
- 03 Develop competence in preparing report which will enhance critical thinking and develop the skill of technical writing along with presentation.

Course outcomes

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

- 01 Appraise the current Civil Engineering research/techniques/developments/interdisciplinary areas.
- 02 Review and organize literature survey utilizing technical resources, journals etc.
- 03 Evaluate and draw conclusions related to technical content studied.
- 04 Demonstrate the ability to perform critical writing by preparing a technical report.
- 05 Develop technical writing and presentation skills.

Term Work

The Project Stage I report should contain the following. Internal guides may prepare a continuous evaluation sheet of each individual and refer as continuous assessment for term work marks. Project group must comprise of minimum two and maximum five students.

- 01 Introduction of the topic, its relevance to civil engineering, need for the study, aims and objective, limitations.
- 02 Literature review from reference books, journals, conference proceedings, published reports/articles/documents with conclusion. The literature review should be from published literature in the last five years.
- 03 Problem statement and methodology
- 03 Theoretical contents related to the chosen topic or case studies if applicable.
- 04 Concluding remarks or summary.
- 05 References

Oral Examination: The students must prepare presentation on Project Stage I and present in presence of pair of examiners through a viva-voce examination.

Savitribai Phule Pune University, Pune
B. E. Civil (2019 Pattern) w. e. f. June 2022
401 015: Project Stage II

Teaching scheme	Credits	Examination scheme
Practical: 04 Hours/week	03	Term Work: 100 Marks
	02	Oral: 50 Marks

Pre-requisites

Fundamentals of Civil Engineering

Course objectives

- 01 Identify latest technical/practical problems in the field of Civil Engineering.
- 02 Inculcate the ability to describe, interpret and analyze technical content.
- 03 Develop competence in preparing report which will enhance critical thinking and develop the skill of technical writing along with presentation.

Course outcomes

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

- 01 Appraise the current Civil Engineering research/techniques/developments/interdisciplinary areas.
- 02 Review and organize literature survey utilizing technical resources, journals etc.
- 03 Evaluate and draw conclusions related to technical content studied.
- 04 Demonstrate the ability to perform critical writing by preparing a technical report.
- 05 Develop technical writing and presentation skills.

Term Work

The Project Stage II report should contain the following. Internal guides may prepare a continuous evaluation sheet for each student and refer as continuous assessment for term work marks.

- 01 Introduction including aim and objective
- 02 Review of literature
- 03 Problem statement and methodology
- 03 Concepts associated with the project topic
- 04 Results and discussion
- 05 Validation of results
- 06 Conclusions and future scope of work
- 07 References
- 08 Students publication/achievements

In Project Work Stage II, the student shall complete the project and prepare the final report of project work in standard format duly certified for satisfactory completion of the project work by the concerned guide and Head of the Department/Institute. The final project report shall be submitted in hard bound copy as well as a soft copy. The term work of project stage II shall be assessed jointly by the pair of internal and external examiners, along with oral examination of the same. It is recommended that at least one publication on the project topic to be presented in a conference or published in a referred journal.

Oral Examination: The students must prepare presentation on Project Stage II and present in presence of pair of examiners through a viva-voce examination.

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