Mandatory Audit Course 3: Road Safety

211090

Road transport remains the least safe mode of transport, with road accidents representing the main cause of death of people. The boom in the vehicle population without adequate road infrastructure, poor attention to driver training and unsatisfactory regulation has been responsible for increase in the number of accidents. India's vehicle population is negligible as compared to the World statistics; but the comparable proportion for accidents is substantially large.

The need for stricter enforcement of law to ensure greater safety on roads and an environment-friendly road transport operation is of paramount importance. Safety and security are growing concerns for businesses, governments and the traveling public around the world, as also in India. It is, therefore, essential to take new initiatives in raising awareness, skill and knowledge of students as one of the ibid stake holders who are expected to follow the rules and policies of the government in order to facilitate safety of individual and safe mobility of others.

Course Contents:

1. Existing Road Transport Scenario
2. Accident Causes & Remedies
3. Road Accident Investigation & Investigation Methods
4. Vehicle Technology – CMVR & Road Safety
5. Regulatory / Legislative Provisions for Improving Road Safety
6. Behavioral Training for Drivers for Improving Road Safety
7. Road Safety Education
8. Road Engineering Measures for Improving Road Safety

Project Based Learning
211099

Teaching Scheme	Credit Scheme	Examination Scheme
Practical: 4 hours / week	Practical: 2	Term Work: 50 marks

Preamble:
For better learning experience, along with traditional classroom teaching and laboratory learning; project based learning has been introduced with an objective to motivate students to learn by working in group cooperatively to solve a problem.
Project-based learning (PBL) is a student-centric pedagogy that involves a dynamic classroom approach in which it is believed that students acquire a deeper knowledge through active exploration of real-world challenges and problems. Students learn about a subject by working for an extended period of time to investigate and respond to a complex question, challenge, or problem. It is a style of active learning and inquiry-based learning.
Problem 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.

Course Outcomes:
1. Project based learning will increase their capacity and learning through shared cognition.
2. Students able to draw on lessons from several disciplines and apply them in practical way.
3. Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

Group Structure:
Working in supervisor/mentor – monitored groups. The students plan, manage and complete a task/project/activity which addresses the stated problem.
- There should be team/group of 5 -6 students
- 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 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, analyze, 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 the individual and 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.

- 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)
- Documentation and presentation

Evaluation and Continuous Assessment:

It is recommended that the all activities are to be record and regularly, regular assessment of work to be done and proper documents are to be maintained at college end by both students as well as mentor (you may call it PBL work book).

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

Recommended parameters for assessment, evaluation and weightage:

- Idea Inception (5%)
- Outcomes of PBL/ Prob'lem Solving Skills/ Solution provided/ Final product (50%) (Individual assessment and team assessment)
- Documentation (Gathering requirements, design & modeling, implementation/execution, use of technology and final report, other documents) (25%)
- Demonstration (Presentation, User Interface, Usability etc) (10%)
- Contest Participation/ publication (5%)
- Awareness /Consideration of -Environment/ Social /Ethics/ Safety measures/Legal aspects (5%)

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

References:

- Project-Based Learning, Edutopia, March 14, 2016.
- What is PBL? Buck Institute for Education.
- www.schoology.com
- www.howstuffworks.com

Mandatory Audit Course 4

211100

Students should complete one of the NPTEL courses listed below:

NPTEL Courses:

1. Developing soft skills and personality, T. Ravichandran, IIT Kanpur
   https://swayam.gov.in/nd1_noc20_hs43/preview
2. Innovation by Design, By Prof. B.K. Chakravarthy, IIT Bombay
   https://swayam.gov.in/nd1_noc20_de08/preview
3. Design Thinking - A Primer, By Prof. Ashwin Mahalingam, Prof. Bala Ramadurai, IIT Madras
   https://swayam.gov.in/nd1_noc20_mg38/preview
4. Technical English for Engineers, By Prof. Isha Iqbal, IIT Madras
   https://swayam.gov.in/nd1_noc20_hs56/preview
5. Ethics in Engineering Practice, Susmita Mukhopadhyay, IIT Kharagpur
   https://swayam.gov.in/explorer?searchText=Ethics%20in%20Engineering%20Practice

Industrial visit/expert lectures should be organized for the audit courses undertaken by students. The group of students should be allocated to faculty members to keep the track of students' progress. The performance of the students may be evaluated using any appropriate method.

Seminar

311506

Teaching Scheme	Credit Scheme	Examination Scheme
Seminar:1 hours / week	Seminar: 01	Term work: 50 Marks

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1. The objective of Seminar is to test the student on his/her ability for self-study and his/her ability to communicate - Written and oral.

2. Seminar will be in the form of a report submitted by the student:

a) On topic of his/her choice based on literature survey/ a case study wherever applicable/possible, and approved by the staff-in- charge.

b) A report with 20-25 pages of A-4 size paper, 1.5 spaced typed material, and appropriately bound.

c) Title font/figures/graphs shall be black and white.

Audit Course 5: Disaster Management

311507

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

Course Contents:

1. Different Types of Disaster: Natural and man made
2. Risk and Vulnerability Analysis
3. Disaster Preparedness
4. Disaster Response
5. Reconstruction and Rehabilitation as a Means of Development.
6. Damage Assessment
7. Post Disaster effects and Remedial Measures.
8. Long-term Counter Disaster Planning

Internship

311513

Teaching Scheme	Credit Scheme	Examination Scheme
	Internship: 04	TW - 100 Marks

Course Outcomes:

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

CO1: To develop professional competence through industry internship.

CO2: To apply academic knowledge in a personal and professional environment

CO3: To build the professional network and expose students to future employees.

CO4: Apply professional and societal ethics in their day to day life.

CO5: To become a responsible professional having social, economic and administrative considerations.

CO6: To make own career goals and personal aspirations.

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 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.

Duration:

Internship 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./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:

- Working for consultancy/ research project,
- Participation at Events (Technical / Business)/in innovation related completions like Hackathon,
- 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,
- Participation in IPR workshop/Leadership Talks/ Idea/ Design/ Innovation/ Business Completion/ Technical Expos,
- 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.

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

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:

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

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
- 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 (Library books, magazines and other sources)

Feedback from internship supervisor (External and Internal)

Post internship, faculty coordinator should collect feedback about student with following recommended parameters

Technical knowledge, Discipline, Punctuality, Commitment, Willingness to do the work, Communication skill, individual work, Team work, Leadership…..

Audit Course 6: Technical writing and communication skill

311514

This course is intended to equip the students with skills to write technical reports and also to equip them with skills to communicate and articulate in English (verbal as well as writing)

Technical Writing –

- Various forms of scientific writings- theses, technical papers, reviews, manuals, etc.
- Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion); Writing of abstracts, summaries, précis, citations etc.;
- Commonly used abbreviations in the theses and research communications;
- Illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations;
- Writing of numbers and dates in scientific write-ups; Editing and proof-reading; Writing of a review article.

Communication Skills –

- Grammar (Tenses, parts of speech, clauses, punctuation marks);
- Error analysis (Common errors);
- Concord;
- Collocation; Phonetic symbols and transcription;
- Accentual pattern: Weak forms in connected speech: Participation in group discussion: Facing an interview;
- presentation of scientific papers

Project Phase-I

Teaching Scheme	Credit Scheme	Examination Scheme
Lectures: 04 hours / week	Pr/Or: 02	Termwork: 50 Marks

Pre-requisite:
1. Students are required to undergo 3 to 4 weeks industrial training / implant training /in-house project based learning/project related skill development course/ industrial survey report before commencement of first semester of Final year .
2. Submit detailed report of 25-30 pages of the same.
3. Project registration will be based on completion of above activities.

The student shall take up a suitable project, the scope of the project shall be such as to complete it within the time schedule, the term work shall consist of:

A detailed report to be prepared based on any one of the following topics

i. Manufacturing / Fabrication of a prototype of Robotic / Automated system including selection, concept, design, material, manufacturing the components, assembly of components, testing and performance evaluation.

ii. Improvement of existing Robotic / Automated system.

iii. Design and fabrication of end effectors for robot

iv. Computer aided design, analysis *of* components such as stress analysis.

v. Modeling and Simulation of Robotic and Automation systems

vi. Robot Kinematics and Dynamic analysis

vii. Low cost automation, Computer Aided Automation in Manufacturing.

viii. Ergonomics and safety aspects of robotic systems

ix. Management Information System.

x. Product design and development

xi. Jigs and Fixtures, dies, tools, special purpose equipment, inspection gauges, measuring instruments for machine tools.

xii. Problems related to Productivity improvements / Value Engineering / Automated Material Handling Systems

Two copies of project Report shall be submitted to the college. **The students shall present and submit their Project Phase-I report to the internal and external examiner from college/Industry.**

Project Stage-II

Teaching Scheme	Credit Scheme	Examination Scheme
Practical: 12 hours / week	Pr/Or: 06	Termwork: 100 Marks Oral: 50 Marks

A per submitted project phase II plan to complete it within the time schedule, the term work shall consist of:

A detailed report to be prepared based on any one of the following topics

i. Manufacturing / Fabrication of a prototype Robotic / Automated system including selection, concept, design, material, manufacturing the components, assembly of components, testing and performance evaluation.

ii. Improvement of existing Robotic / Automated system.

iii. Design and fabrication of end effectors for robot

iv. Computer aided design, analysis *of* components such as stress analysis.

v. Modeling and Simulation of Robotic and Automation systems

vi. Robot Kinematics and Dynamic analysis

vii. Low cost automation, Computer Aided Automation in Manufacturing.

viii. Ergonomics and safety aspects of robotic systems

ix. Management Information System.

x. Product design and development

xi. Jigs and Fixtures, dies, tools, special purpose equipment, inspection gauges, measuring instruments for machine tools.

xii. Problems related to Productivity improvements / Value Engineering / Automated Material Handling Systems

Two copies of Final Project Report shall be submitted to the college. The students shall present their Final Project Phase-II report. Before the examiners. The oral examination, shall be based on the term work submitted and jointly conducted by an internal and external examiner from industry, at the end of second semester.

Format of the project report should be as follows:

1 Paper: The Project report should be typed / printed on white paper of A-4 size.

2 Typing: The typing shall be with one and half spacing and on both sides of the paper.

3 Binding: The Industrial Implant Report should be submitted with front and back cover in black Hard bound, with golden embossing

4 Margins: Left -1.25", Right -1". Top and Bottom 1"

5 Sequence of Pages

- 5.1 Title page
- 5.2 Certificate form Institute
- 5.3 Completion Certificate form Industry, if sponsored.
- 5.4 Acknowledgement
- 5.5 Abstract
- 5.6 Index
- 5.7 Nomenclature and Symbols

5.8 Actual Content
5.9 Conclusion
5.10 References.

6. Front cover: The front cover shall have the following details in block capitals

i. Title at the top.

ii. Name of the candidate in the centre, and

iii. Name of the Institute, Name of Industry, if sponsored and the year of submission on separate lines, at the bottom.

1 Blank sheets: No blank sheets be left anywhere in the report.

2 Project Completion Certificate: The approval sheet follows the title sheet and shall be as shown with proper spacing.

CERTIFICATE

This is to certify that Mr. /Ms ……(Name)……has carried out a Project entitled, ……during the course of his training at……..in partial fulfillment of the requirement of the B.E. Robotics and Automation Course of University of Pune at ……during the academic Year ……

Date:

Place:

(Guide) (Head of Department)

(Principal) (Examiner)