PROJECT I
ENEX 414

Credit: 2 **Year: IV** **Part: I**

Course Objectives

The objective of this course is to execute the first phase of the B.E. project by enabling students to formulate and define a relevant engineering problem and pursue it through either a research-oriented or product-oriented or internship-based approach in the field of electronics, communication and information engineering. This course emphasizes the development of skills in problem identification, literature review, circuit/system design, research methodology, and project planning, thereby preparing students for effective implementation and evaluation in the subsequent phase with a focus on hardware plus software integration.

General Procedures

Under the supervision of the assigned supervisor, students shall be organized into groups of maximum three members. Each group shall select their track for conducting their major project work. The track may be either research track or product track or internship track.

Projected Themes

The project topic may be an extension of the minor project completed in the sixth semester or a newly proposed topic within the field of electronics, communication and information engineering, including but not limited to areas such as embedded systems (Arduino, Raspberry Pi, microcontrollers, etc), Internet of Things (IoT) systems and applications, FPGA hardware/software platforms, signal and image processing (MATLAB, Simulink, Python libraries such as NumPy, SciPy, OpenCV etc), communication systems (GPS, GSM, Bluetooth, WiFi, network simulators, etc), instrumentation and data acquisition (sensors, DAQ, LabVIEW, etc), circuit design (PCB fabrication, simulation, and prototyping, etc). Students may conduct field visits or collect real-world datasets where appropriate. Continuous guidance, monitoring and feedback will be provided by the supervisor/mentor throughout the duration of the course to ensure effective project development and learning outcomes.

Project I shall be carried as per the following order:

1 Group Formation

2 Project Selection and Planning

- 2.1 Selection of major project topic based on theory/practical subject studied or as per the research or industry needs.
- 2.2 Problem identification and scope definition
- 2.3 Approval of project by the department and prospective mentor in case of internship based track

3 Literature Review

3.1 Basic literature review and background study
3.2 Study of relevant theories
3.3 Study of existing systems

4 Concept note submission

4.1 Submission of concept note to the department in the second week after the commencement of seventh semester
4.2 Approval of the concept note by the department

5 Proposal Report Submission and Presentation

5.1 Preparation of brief project proposal including objective and methodology
5.2 Selection of hardware/software tools, technologies, and resources (development board, simulation software, hardware components, sensors, embedded programming languages, embedded IDEs etc)
5.3 Proposal report submission, presentation in department approved format within 2 weeks after the commencement of seventh semester
5.4 Approval of project proposal by the department

6 Initial Project Development Phase

6.1 Data collection or experimental/product set up
6.2 Analysis and design of hardware/software/hybrid systems
6.3 Methodology development
6.4 Application of programming, circuit design, and hardware design skills
6.5 Proof of concept and preliminary works

7 Progress Report Submission and Presentation

7.1 Submission of the project I final progress report two weeks prior to the end of the semester
7.2 Final Presentation

Evaluation

The total marks allocated for Project I is 50. The overall internal evaluation of the Project I will be done on the following basis:

Details	Weightage	Marks
Proposal Report and Defense	10%	5
Initial Project Development Works	50%	25
Documentation(Final report)	20%	10
Final Presentation	20%	10

Formatting Guidelines

For documentation, existing department approved formatting guidelines can be used. In general, following formatting guidelines can be met:

1. Document layout: standard A4 paper
2. Font style and size: font typeface: Times New Roman font, for chapter title: 16 pt (Bold), section headings: 14 pt (Bold), sub headings: 13 pt (Bold), body text: 12 pt (Normal), figure/table captions: 10 pt (bold and italic)
3. Line spacing and paragraph format: line spacing: 1.5 lines, paragraph spacing: 6 pt after and before, text alignment: justified
4. Margins: Left: 1.5 inch, right: 1 inch, top: 1 inch, bottom: 1 inch
5. Page numbering: roman numerals (i, ii, iii, etc) for preliminary pages, Arabic numerals (1, 2, 3, etc) for main chapters. Page numbers should be placed in bottom center with font size 11.
6. Headings and Numbering: Chapters numbering format: Chapter 1: Introduction, Section numbering (1.1, 1.2, 1.3 etc)
7. Figures and tables: figure and tables must be numbered sequentially in the chapter. For example: ***Figure 3.1. Research Design, Table 5.3 Performance Comparison.*** *Figure 3.1* means first figure of chapter 3. Table 5.3 means third table of chapter 5. The figure caption must be placed below figure in center alignment, and table caption must be placed before table in center alignment.
8. Equations: center-aligned, numbered sequentially (3.1), (3.2), etc, variables must be clearly defined after equation
9. Citation and referencing: Follow IEEE style citation and referencing.
10. Binding and printing: final submission should be tape bounded hard copy; the printing should be black color on white paper
11. Language: Formal English language with third person passive voice

Additional Guidelines

1. Every group must maintain the log sheet of meeting with the supervisor.
2. At least a small hardware design and implementation part must be incorporated in the project.
3. Proper version control and teamwork practices shall be followed during project development.
4. The reports for proposal and progress defense must follow standard formatting guidelines and IEEE referencing style.
5. The report structure of a research based and product based project shall be different.
6. The product based project involving software development must follow standard SDLC pipeline.
7. The similarity index of final report shall not exceed 25%.
8. Students are encouraged to use modern tools and technologies.