

NATIONAL INSTITUTE OF TECHNOLOGY – TIRUCHIRAPPALLI
Department of Instrumentation and Control Engineering

COURSE PLAN

COURSE OUTLINE			
Course Title	Product Design and Development (Practical)		
Course Code	ICPC27	Credits	2
Department	I.C.E.	Faculty	Mr. Goldin R. Bennet
Sections	A & B	Session	July 2018
Pre-requisites	ICPC26		
Course Coordinator	Mr. Goldin R. Bennet		
Faculty Member's E-mail	bennet@nitt.edu	Telephone No.	-----
Course Type	Programme Core Course		

COURSE SYLLABUS

ICPC27 PRODUCT DESIGN AND DEVELOPMENT (PRACTICE)

Course type: Programme Core (PC)

Pre-requisites: ICPC26

No. of Credits: 2

Course Learning Objectives:

1. The aim of this course is to inculcate into the student the spirit of innovation and entrepreneurship. This is achieved in this course by making the students to develop a marketable product on their own as a group. At the end of this two semester course, the students will learn how to know the needs of the society and solve them using the technical knowledge at their disposal.
2. In this semester the students will fabricate an alpha prototype and test it for its conformity to the design specifications. After demonstration of the alpha prototype they proceed to fabricate a beta prototype that is acceptable in the market-place

Practical work:

1. Alpha prototype fabrication and testing
2. Beta prototype fabrication and customer acceptance survey

Course outcomes:

After this two semester course:

1. The student will know how to make market surveys for new product development
2. The student will know the entire cycle of new product design and development.
3. The student will know how to fabricate prototypes of new products and test them.

COURSE OVERVIEW

The ultimate goal of engineering education is to provide the society with useful products and services. Usefulness of a product or service is determined by its marketability and the acceptance of the public to pay for it or purchase it.

Studying only theory or doing experiments alone does not attain the results expected by the society of an engineer or a technologist. To bring the expectations of the society at large to the attention of the under-graduate students, this course is introduced. In this course, the students must interact with the public outside the campus to develop a product prototype which has a potential market.

COURSE OBJECTIVES

1. The aim of this course is to inculcate into the student the spirit of innovation and entrepreneurship. This is achieved in this course by making the students to develop a marketable product on their own as a group. At the end of this two semester course, the students will learn how to know the needs of the society and solve them using the technical knowledge at their disposal.

2. In this semester the students will learn some of the general concepts needed for new product development and simultaneously learn how to interact with the society outside the campus to learn about its needs. They also learn about how to get prototypes fabricated outside the campus.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
After this two semester course, the student will know:	
1. Practical engineering design using theoretical knowledge	5,6,10,12
2. Project management	6,7
3. How to fabricate prototypes of new products and test them.	7,8,11
4. Record project reports in writing and in video	9

COURSE TEACHING AND LEARNING ACTIVITIES

Sl. No.	Week	Topic
1	1	Status review of the group products
2	4	Alpha prototype - Progress review
3	8	Alpha prototype - Progress review
4	10	Alpha prototype evaluations start
5	12	Alpha prototype evaluations end
6	14	Beta prototype – Progress review
7	16	Final submission of Beta prototype customer evaluation reports and product development report starts.
8	18	End of the course and evaluations.

COURSE ASSESSMENT METHODS

This is a group based course. Hence the assessments have three components.

1) Alpha prototype assessment by the course faculty member 2) Peer assessment by the group members to rank the individual contribution to the development of the product by the group members 3) Grading.

After assessing the functioning of the alpha prototype, the group may be asked to proceed to the beta prototype. If the alpha prototype is not functioning satisfactorily, the group will be asked to rectify the shortcomings and demonstrate it again.

The group need not wait till the specified week to demonstrate the alpha prototype. If it is ready even before that, they can demonstrate the alpha prototype successfully and proceed on to the beta prototype stage.

Individual contribution to the prototype developments will be done by peer assessment. In this assessment, the group members will rank the individual contribution of each group member of their own group towards the goal of completing the prototypes successfully. In the event that any group member did not contribute any work at all, or willfully worked against the group's best interests to reach its goals, the group can indicate that during the peer assessment. Such truant member will be awarded an 'F' grade even if the group had successfully completed the prototypes.

During the peer assessment, the group member who has contributed the most for the

prototype development will be ranked at the top and the one who has contributed the least will be ranked at the bottom. Two or more members can not hold the same rank in the peer assessment.

The team member who has attained the top rank in the peer assessment will be assigned the highest grade in the group subject to the following conditions:

1. There shall be only one 'S' grade per group.
2. If only above-average grades (ie. S, A, and B) are awarded to a group, there shall be a dispersion of three grades per group.
3. For below-average grades (ie. C, D, and E) or a mixture of above-average and below-average grades (ie. A, B, C, or B, C, D) per group, there need not be any dispersion of grades.
4. Except 'S' grade, two or more team members may be awarded the same grade subject to the above conditions.

Subject to the above conditions, different members of the group will be awarded different grades.

To pass the course, the minimum requirement is a functioning alpha prototype. Groups that do not pass the course before the semester grades are assigned, will be awarded 'F' grade. After that, groups that are awarded 'F' grade will have to apply for only formative assessment and complete their alpha prototypes to pass the course.

SI.No.	Mode of Assessment	Week
1	Alpha Prototype Evaluation	10-12
2	Video record of the beta prototype demonstration.	16-18
3	Video record of the customer evaluation of beta prototype and detailed written documentation of the prototype development	16-18

ESSENTIAL READINGS

This course involves a lot of internet searches to know and understand about the various aspects of the allotted group product. Also, the students will have to refer to all of the standards related to their allotted products.

Text Books:

1. Karl T. Ulrich and Steven D. Eppinger, *Product Design and Development*, 4rd Edition, Tata McGraw Hill.
2. Kevin Otto and Kristin Wood, *Product Design*, Pearson Education, 2003.

COURSE EXIT SURVEY

An anonymous exit survey will be taken from the students at the end of the semester through a questionnaire.

Feedback from the students during the class committee meetings will also be taken.

COURSE POLICY

Maintenance of the log-book

Each group must maintain the log-book they have from the ICPC26-PDD(T) course. All progress of the prototype development must be documented with date in the log-book and duly authenticated by the signature of the faculty member. The faculty member also will make comments in the log-book during reviews. If there is no progress, this will also be mentioned by the faculty member in the log-book. During each interaction with the group, the faculty member will write down the roll numbers of the group members present/absent in the log-book.

During the final submission of reports, the log-book must also be submitted. Failure to produce the log-book during the final submission will immediately reduce the grades of the group by one grade-point. Hence the log-book is an important document for this course.

Academic dishonesty

All students are expected to contribute their best efforts towards their group goals and the completion and demonstration of the alpha and beta prototypes. Hindering others from putting their best effort to the completion of the prototype development is academic dishonesty. Such academic dishonesty will be suitably dealt with during the peer assessment.

Attendance requirement

There is no strict attendance requirement for this course provided the students complete the prototypes and customer evaluations of the prototypes according to the schedule.

ADDITIONAL COURSE INFORMATION

Groups may fix appointments for detailed discussions by sending email to **bennet@nitt.edu** two days prior to the desired appointment date with the topic to be discussed. The students must come prepared for the scheduled discussion with thorough background preparation and necessary data entered in the log-book for reference. Minor doubts will be clarified whenever required without any prior appointment.

FOR SENATE'S CONSIDERATION

Course Faculty Goldin R. Bennet
25-6-2018

CC-Chairperson V. Srinivas
02/07/2018

HOD B. Venkatesh
2/7/18

Date: 02.07.2018

