BTD415	PROJECT PHASE I	CATEGORY	L	Τ	Р	CREDIT
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### Preamble:

The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7<sup>th</sup> and 8<sup>th</sup> semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7<sup>th</sup> semester and two third in 8<sup>th</sup> semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies.

## **Course Objectives**

- > To apply engineering knowledge in practical problemsolving.
- > To foster innovation in design of products, processes or systems.
- > To develop creative thinking in finding viable solutions to engineering problems.

**Course Outcomes [COs]** : After successful completion of the course, the students will be able to:

CO1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: <b>Apply</b> ).						
CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: <b>Apply</b> ).						
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: <b>Apply</b> ).						
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: <b>Apply</b> ).						
CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).						
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: <b>Apply</b> ).						

## Mapping of course outcomes with program outcomes

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	1	2	2	2	1	1	1	1	2
CO2	2	2	2		1	3	3	1	1		1	1
CO3									3	2	2	1
CO4					2			3	2	2	3	2

CO5	2	3	3	1	2						1
CO6					2		2	2	3	1	1

Abstract POs defined by National Board of Accreditation									
PO#	A Broad PO BDI	PO#	Broad PO						
PO1	Engineering Knowledge	PO7	Environment and Sustainability						
PO2	Problem Analysis	PO8	Ethics						
PO3	Design/Development of solutions	PO9	Individual and team work						
PO4	Conduct investigations of complex problems	PO10	Communication						
PO5	Modern tool usage	PO11	Project Management and Finance						
PO6	The Engineer and Society	PO12	Lifelong learning						



## **PROJECT PHASE I**

# Phase 1 Target

- Literature study/survey of published literature on the assigned topic
- Formulation of objectives
- Formulation of hypothesis/ design/methodology
- Formulation of work plan and task allocation.
- Block level design documentation
- Seeking project funds from various agencies
- Preliminary Analysis/Modeling/Simulation/Experiment/Design/Feasibility study
- Preparation of Phase 1 report

## **Evaluation Guidelines & Rubrics**

Total: 100 marks (Minimum required to pass: 50 marks).

- Project progress evaluation by guide: 30 Marks.
- Interim evaluation by the Evaluation Committee: 20 Marks.
- Final Evaluation by the Evaluation Committee: 30 Marks.
- Project Phase I Report (By Evaluation Committee): 20Marks.

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

### **Evaluation by the Guide**

The guide/supervisor shall monitor the progress being carried out by the project groups on a regular basis. In case it is found that progress is unsatisfactory it shall be reported to the Department Evaluation Committee for necessary action. The presence of each student in the group and their involvement in all stages of execution of the project shall be ensured by the guide. Project evaluation by the guide: 30 Marks. This mark shall be awarded to the students in his/her group by considering the following aspects:

**Topic Selection:** innovativeness, social relevance etc. (2) **Problem definition:** Identification of the social, environmental and ethical issues of the project problem. (2)

**Purpose and need of the project:** Detailed and extensive explanation of the purpose and need of the project. (3)

**Project Objectives:** All objectives of the proposed work are well defined; Steps to be followed to solve the defined problem are clearly specified. (2)

**Project Scheduling & Distribution of Work among Team members:** Detailed and extensive Scheduling with timelines provided for each phase of project. Work breakdown structure well defined. (3)

Literature survey: Outstanding investigation in all aspects. (4)

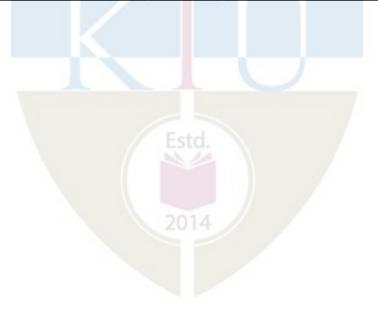
**Student's Diary/ Daily Log:** The main purpose of writing daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students should record in the daily/weekly activity diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students. The daily/weekly activity diary shall be signed after every day/week by the guide. (7)

**Individual Contribution:** The contribution of each student at various stages. (7)

			EVALUAT	ION RUBRICS for PROJECT Phase	e I: Interim Evaluation	
No.	Parameters	Marks	Poor	Fair	Very Good	Outstanding
1-a	Topic identification, selection, formulation of objectives and/or literature survey. (Group assessment) [CO1]	10	The team has failed to come with a relevant topic in time. Needed full assistance to find a topic from the guide. They do not respond to suggestions from the evaluation committee and/or the guide. No literature review was conducted. The team tried to gather easy information without verifying the authenticity. No objectives formed yet.		Good evidence of the group thinking and brainstorming on what they are going to build. The results of the brainstorming are documented and the selection of topic is relevant. The review of related references was good, but there is scope of improvement. Objectives formed with good clarity, however some objectives are not realistic enough.	The group has brainstormed in an excellent manner on what they were going to build. The topic selected is highly relevant, real world problem and is potentially innovative. The group shows extreme interest in the topic and has conducted extensive literature survey in connection with the topic. The team has come up with clear objectives which are feasible.
			(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)
1-b	Project Planning, Scheduling and Resource/ Tasks Identification and allocation. (Group assessment) [CO4]	10	No evidence of planning or scheduling of the project. The students did not plan what they were going to build or plan on what materials / resources to use in the project. The students do not have any idea on the budget required. The team has not yet decided on who does what. No project journal kept.	Some evidence of a primary plan. There were some ideas on the materials /resources required, but not really thought out. The students have some idea on the finances required, but they have not formalized a budget plan. Schedules were not prepared. The project journal has no details. Some evidence on task allocation among the team members.	Good evidence of planning done. Materials were listed and thought out, but the plan wasn't quite complete. Schedules were prepared, but not detailed, and needs improvement. Project journal is presented but it is not complete in all respect / detailed. There is better task allocation and individual members understand about their tasks. There is room for improvement.	Excellent evidence of enterprising and extensive project planning. Gantt charts were used to depict detailed project scheduling. A project management/version control tool is used to track the project, which shows familiarity with modern tools. All materials / resources were identified and listed and anticipation of procuring time is done. Detailed budgeting is done. All tasks were identified and incorporated in the schedule. A well-kept project journal shows evidence for all the above, in addition to the interaction with the project guide. Each member knows well about their individual tasks.
			(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)
			Phase 1 Inter	im Evaluation Total Marks: 20		

			EVALUA	TION RUBRICS for PROJECT Pha	se I: Final Evaluation	
SI. No.	Parameters	Marks	Poor	Fair	Very Good	Outstanding
1-с	Formulation of Design and/or Methodology and Progress. (Group assessment) [CO1]	5	show any evidence of knowledge about the design and the methodology adopted tillon the design procedure to be adopted, and the methodologies.de ha ha		design methods adopted, and they have made some progress as per the plan. The methodologies are understood to a large extent.	Shows clear evidence of having a well- defined design methodology and adherence to it. Excellent knowledge in design procedure and its adaptation. Adherence to project plan is commendable.
			(0 – 1 Marks)	(2 – 3 Marks)	(4 Marks)	(5 Marks)
1-d	Individual and Teamwork Leadership (Individual assessment) [CO3]	10	The student does not show any interest in the project activities, and is a passive member.	est in the project activities, activities. However, the activities		The student takes a leadership position and supports the other team members and leads the project. Shows clear evidence of leadership.
			(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)
1-e	Preliminary Analysis/ Modeling / Simulation/ Experiment / Design/ Feasibility	The team has not done any preliminary work with respect to the analysis/modeling/ 10 simulation/experiment/desig n/feasibility study/ algorithm development.		The team has started doing some preliminary work with respect to the project. The students however are not prepared enough for the work and they need to improve a lot.	There is some evidence to show that the team has done good amount of preliminary investigation and design/ analysis/ modeling etc. They can improve further.	Strong evidence for excellent progress in the project. The team has completed the required preliminary work already and are poised to finish the phase I in an excellent manner. They have shown results to prove their progress.
	study [CO1]		(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)

1-f	Documentatio n and presentation. (Individual & group assessment). [CO6]	5	The team did not document the work at all. The project journal/diary is not presented. The presentation was shallow in content and dull in appearance. The individual student has no idea on the presentation of his/her part.	Some documentation is done, but not extensive. Interaction with the guide is minimal. Presentation include some points of interest, but overall quality needs to be improved. Individual performance to be improved.	presentation is satisfactory.	The project stages are extensively documented in the report. Professional documentation tools like LaTeX were used to document the progress of the project along with the project journal. The documentation structure is well- planned and can easily grow into the project report. The presentation is done professionally and with great clarity. The individual's performance is excellent.
			(0 – 1 Marks)	(2 – 3 Marks)	(4 Marks)	(5 Marks)
Total 30 Phase - I Final Evaluation Marks: 30						



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### 2014

# Mapping of course outcomes with program outcomes

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CO2	2	2	2		1	3	3	1	1		1	1
CO3									3	2	2	1
CO4					2			3	2	2	3	2
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### **PROJECT PHASE II**

#### Phase 2 Targets

- > In depth study of the topic assigned in the light of the report prepared under Phase -I;
- Review and finalization of the approach to the problem relating to the assigned topic.
- Preparing a detailed action plan for conducting the investigation, including teamwork.
- > Detailed Analysis/ Modeling / Simulation/ Design/ Problem Solving/Experiment as needed.
- Final development of product/ process, testing, results, conclusions and future directions.
- Preparing a paper for Conference Presentation/ Publication in Journals, if possible.
- Presenting projects in Project Expos conducted by the University at the cluster level and/ or state level as well as others conducted in India and abroad.
- Filing Intellectual Property Rights (IPR) if applicable.
- Preparing a report in the standard format for being evaluated by the Department Assessment Board.
- Final project presentation and viva voce by the assessment board including the external expert.

### **Evaluation Guidelines & Rubrics**

Total: 150 marks (Minimum required to pass: 75 marks).

- Project progress evaluation by guide: 30 Marks.
- Two interim evaluations by the Evaluation Committee: 50 Marks (25 marks for each evaluation).
- Final evaluation by the Final Evaluation committee: 40 Marks
- Quality of the report evaluated by the evaluation committee: 30 Marks

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor. The final evaluation committee comprises of Project coordinator, expert from Industry/research/academic Institute and a senior faculty from a sister department).

#### **Evaluation by the Guide**

The guide/supervisor must monitor the progress being carried out by the project groups on regular basis. In case it is found that progress is unsatisfactory it should be reported to the Department Evaluation Committee for necessary action. The presence of each student in the group and their involvement in all stages of execution of the project shall be ensured by the guide. Project evaluation by the guide: 30 Marks. This mark shall be awarded to the students in his/her group by considering the following aspects:

**Project Scheduling & Distribution of Work among Team members:** Detailed and extensive Scheduling with timelines provided for each phase of project. Work breakdown structure well defined. (5)

Literature survey: Outstanding investigation in all aspects. (4)

**Student's Diary/ Daily Log**: The main purpose of writing daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students should record in the daily/weekly activity diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students. The daily/weekly activity diary shall be signed after every day/week by the guide. (7)

Individual Contribution: The contribution of each student at various stages. (9)

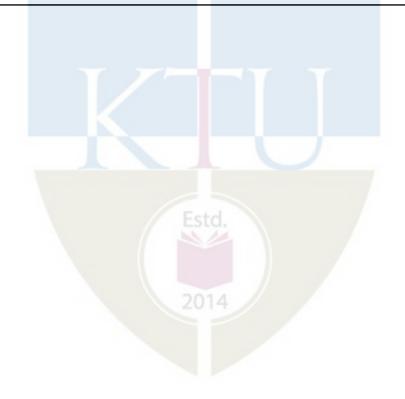
**Completion of the project:** The students should demonstrate the project to their respective guide. The guide shall verify the results and see that the objectives are met. (5)



	EVALUATION RUBRICS for PROJECT Phase II: Interim Evaluation - 1							
No.	Parameters	Marks	Poor	Fair	Very Good	Outstanding		
2-a	Novelty of idea, and Implementation scope [CO5] [Group Evaluation]	5	requirement. The idea is evolved into a non-implementable one. The work	Some of the aspects of the proposed idea can be implemented. There is still lack of originality in the work done so far by the team. The project is a regularly done theme/topic without any freshness in terms of specifications, features, and/or improvements.	Good evidence of an implementable project. There is some evidence for the originality of the work done by the team. There is fresh specifications/ features/improvements suggested by the team. The team is doing a design from fundamental principles, and there is some independent learning and engineering ingenuity.	The project has evolved into incorporating an outstandingly novel idea. Original work which is not yet reported anywhere else. Evidence for ingenious way of innovation which is also Implementable. Could be a patentable / publishable work.		
			(0 – 1 Marks)	(2 – 3 Marks)	(4 Marks)	(5 Marks)		
2-b	Effectiveness of task distribution among team members. [CO3] [Group Evaluation]	5	No task distribution of any kind. Members are still having no clue on what to do.	some members do not have any idea of the tasks assigned. Some of the tasks	done, supported by project journal entries, identification of tasks through discussion etc. However, the task distribution seems to	Excellent display of task identification and distribution backed by documentary evidence of team brainstorming, and project journal entries. All members are allocated tasks according to their capabilities, and as much as possible in an equal manner. The individual members are following the tasks in an excellent manner.		
			(0 – 1 Marks)	(2 – 3 Marks)	(4 Marks)	(5 Marks)		
2-c	Adherence to project schedule. [CO4] [Group Evaluation]	5	or scheduling of the project. The students did not stick to the plan what they were going to build nor plan on what materials / resources to use in the project. The students do not have any idea on the budget required even after the end of	plan prepared during phase I. There were some ideas on the materials /resources	Tonowed up to a good extern after phase i.	project planning and follow-up since phase I. Continued use of project management/version control tool to track the project. Material		
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)		

2-d	Interim Results. [CO6] [Group assessment]	5	bere are no interim recults to show	they are not complete / consistent to the current stage, Some corrections are	The interim results showed were good and mostly consistent/correct with respect to the current stage. There is room for improvement.	I hara wara significant interim results presented
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)
2-e	Presentation [Individual assessment]	5		has only a feeble idea about the team	about the team's project. The overall	Exceptionally good presentation. Student has excellent grasp of the project. The quality of presentation is outstanding.
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)
	Dhace II Interim Evaluation 1 Total Markov 25					

Phase-II Interim Evaluation - 1 Total Marks: 25



	EVALUATION RUBRICS for PROJECT Phase II: Interim Evaluation – 2							
No	Parameters	Marks	Poor	Fair	Very Good	Outstanding		
2-f	Application of engineering knowledge [CO1] [Individual Assessment]	10	of applying engineering knowledge on the	knowledge, but not able to show the design procedure and the methodologies	of application of engineering knowledge in	Excellent knowledge in design procedure and its adaptation. The student is able to apply knowledge from engineering domains to the problem and develop solutions.		
			(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)		
2-g	Involvement of individual members [CO3] [Individual Assessment]	5	No evidence of any Individual participation in the project work.	There is evidence for some amount of individual contribution, but is limited to some of the superficial tasks.	The individual contribution is evident. The student has good amount of involvement in core activities of the project.	Evidence available for the student acting as the core technical lead and has excellent contribution to the project.		
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)		
2-h	Results and inferences upon execution [CO5] [Group Assessment]	5	achieved yet. The team is unable to derive	achieved. A few inferences are made on the observed failures/issues. No further	achieved. Many observations and inferences are made, and attempts to identify the issues	Most of the stated outcomes are met. Extensive studies are done and inferences drawn. Most of the failures are addressed and solutions suggested. Clear and valid suggestions made for further work.		
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)		
2-i	Documentation and presentation. .[CO6] [Individual assessment]	5	The individual student has no idea on the presentation of his/her part. The presentation is of poor quality.		The individual's presentation performance is satisfactory.	The individual's presentation is done professionally and with great clarity. The individual's performance is excellent.		
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)		
	•		· · · · · · · · · · · · · · · · · · ·	Phase-II Interim Evaluation - 2 Total Ma	rks: 25	<u>.</u>		

	EVALUATION RUBRICS for PROJECT Phase II: Final Evaluation						
No	Parameters	Marks	Poor	Fair	Very Good	Outstanding	
2-ј	Engineering knowledge. [CO1] [Group Assessment]	10	The team does not show any evidence of applying engineering knowledge on the design and the methodology adopted.	The team is able to show some of the design procedure and the methodologies adopted, but not in a comprehensive manner.	application of engineering knowledge in the	Excellent knowledge in design procedure and its adaptation. The team is able to apply knowledge from engineering domains to the problem and develop an excellent solution.	
			(0 – 3 Marks)	(4 – 6 Marks)	(7 - 9 Marks)	(10 Marks)	
2-k	Relevance of the project with respect to societal and/or industrial needs. [Group Assessment] [CO2]	5	The project as a whole do not have any societal / industrial relevance at all.	respect to social and/or industrial application. The team has however made	industry. The team is mostly successful in	The project is exceptionally relevant to society and/or industry. The team has made outstanding contribution while solving the problem in a professional and/ or ethical manner.	
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)	
2-i	Innovation / novelty / Creativity [CO5] [Group Assessment]	~	requirement. The idea is evolved into a non-implementable one. The work presented so far is lacking any amount of original work by the team.	appears to be practical. There is still lack of originality in the work done. The project is a regularly done theme/topic without any freshness in terms of specifications, features, and/ or improvements.	There is some evidence for the originality of the work done by the team. There is fresh specifications/ features/improvements suggested by the team. The team is doing a design from fundamental principles, and there is some independent learning and engineering ingenuity. Could be translated into a product / process if more work is done.	publishable work.	
			(0 - 1 Marks)	(2 - 3 Marks)	(4 Marks)	(5 Marks)	
2-m	Quality of results / conclusions / solutions. [CO1] [Group Assessment]	10	None of the expected outcomes are achieved. The team is unable to derive any inferences on the failures/issues observed. Any kind of observations or studies is not made.	Only a few of the expected outcomes are achieved. A few inferences are made on the observed failures/issues. No further work suggested.	achieved. Many observations and inferences are made, and attempts to identify the issues	Most of the stated outcomes are met. Extensive studies are done and inferences drawn. Most of the failures are addressed and solutions suggested. Clear and valid suggestions made for further work.	

2-n	Presentation - Part I Preparation of slides. [CO6] [Group Assessment].	5	organization.	a formats to some extent. However, its r organization is not very good. Language needs to be improved. All references are not cited properly, or acknowledged. Presentation slides needs to be more professional.	of the slides is good. Most of references are cited properly. The flow is good and team presentation is neatly organized. Some of the results are not clearly shown. There is room for improvement.	The presentation slides are exceptionally good. Neatly organized. All references cited properly. Diagrams/Figures, Tables and equations are properly numbered, and I is ted. Results/ inferences clearly highlighted and readable.
			(0 - 1 Marks)	(2 - 3 Marks)	L (4 Marks)	(5 Marks)
	Presentation - Part II: Individual Communication [CO6] [Individual Assessment].	5	The student is not communicating properly. Poor response to questions.	content. The student requires a lot of	Good presentation/ communication by the student. The student is able to explain most of the content very well. There are however, a few areas where the student shows lack of preparation. Language is better.	Clear and concise communication exhibited by the student. The presentation is outstanding. Very confident and tackles all the questions without hesitation. Exceptional traits of communicator.
			(0 - 1 Marks)	(2 - 3 M <mark>a</mark> rks)	(4 Marks)	(5 Marks)
	1			Phase-II Final Evaluation, M	larks: 40	L



	EVALUATION RUBRICS for PROJECT Phase II: Report Evaluation							
SI. No.	Parameters	Marks	Poor	Fair	Very Good	Outstanding		
2-0	Report [CO6]	30	unacknowledged content. Lack of effort in	Project report follows the standard format to	standard style format and there are only a few issues. Organization of the report is good	organized. All references cited properly.		
			(0 - 11 Marks)	(12 - 18 Marks)	(19 - 28 Marks)	(29 - 30 Marks)		

