**Student Projects – Allocation, Reviews and Evaluation**

Project work challenges students to think beyond the boundaries of the classroom, helping them in developing their analytical, designing and critical-thinking skills; improving their inter-personal skills and enhancing their confidence levels.

Projects may be broadly categorized in the following ways:

1. Industry Sponsored Projects
2. Institute Sponsored Projects
3. Application Oriented
4. Design Oriented
5. Research Oriented

Factors such as Environment, Safety, Legal and ethical principles are to be considered while selecting a project. Project should help the students in attaining the expected POs and PSOs and the outcome of the project ultimately should be beneficial for the development of the society at large.

Student Projects have to be identified in such a way that they have a strong correlation and relevance to Program Outcomes (POs) and / or Program Specific Outcomes (PSOs). Identifying the research problem along with the objectives of the project is one of the key factors that facilitate attaining the expected deliverables of the project. The whole process involved right from the identification of the problem for the Project work to finding its solution and presenting it in the form of a report, is divided into various modules/stages as represented schematically below and explained in detail subsequently:

**Factors Considered**

Environment/ Safety

Ethics/ Cost / Standards

**Project Classification**

Application/ Product

Design & Analysis Research/ Review

Division of Project Batches using sinusoidal distribution

Interaction between Faculty and Student batches based on the Title of Project given by faculty and Options given by student batches

**Announcement of Research Problems by Faculty**

* Title of the project/research problem
* Methodology to be adopted for the execution of the project/research problem
* Relevant theoretical background with suggested references
* Specifications of the hardware/software/equipment requirements
* A monthly timeline for the completion various modules of the project with expected deliverables

Options from Project Batches regarding area of interest

Guide allocation to batches by HoD

Registration of the Project and Mapping with POs and PSOs

1. Schedule of Reviews by Project Coordinator
2. Continuous monitoring and guidance by Project Guide
3. Suggestions from PRC during Reviews

Formation of Project Review Committee (PRC) &Appointment of Project Coordinator

Circular from HoD to faculty to identify research problems that have strong correlation and relevance to POs and PSOs

**Project Evaluation Parameters**

1. Were the objectives clearly stated
2. Was the problem defined clearly
3. Are the results technically and Economically feasible
4. Whether student demonstrated his analytical and critical thinking skills
5. Whether the results are obtained in the expected way.
6. Whether the report is prepared with appropriate use of language and words and with necessary graphs and diagrams
7. Whether student has exhibited his presentation skills
8. Whether the suggestions given by PRC from time to time have been accommodated.

Evaluationof Performance by PRC during Reviews

Individual

Team

Demonstration of Project with Results

Project Report

Publication of Paper/ Participation in Project Competitions

**1. Defining the Research Problem by Faculty member:**

* Head of the department shall issue a circular to all faculty members requesting them to identify projects / research problems that have direct strong correlation and relevance to Program Outcomes (POs) and / or Program Specific Outcomes (PSOs). In response to this, faculty members of the department after rigorously going through various research problems from all possible resources, specify the identified problems and submit the following to the department:

1. Title of the project/research problem
2. Methodology to be adopted for the execution of the project/research problem
3. Relevant theoretical background with suggested references
4. Specifications of the hardware/software/equipment requirements
5. A monthly timeline for the completion various modules of the project with expected deliverables

This information is made available to the students through proper announcements.

**2. Procedure adopted in the formation of Project Batches:**

While formation of batches for carrying out the final year projects, every effort is taken to ensure that meritorious students are distributed uniformly across all the batches by following sinusoidal distribution in the formation of the project batches. A maximum of 4 students are allowed per batch. For a typical class having a student strength of 60, the distribution of students is done as shown in Table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Batches** | | | | |
| **Batch 1** | Ranker 1 | Ranker 30 | Ranker 31 | Ranker 60 |
| **Batch 2** | Ranker 2 | Ranker 29 | Ranker 32 | Ranker 59 |
| **Batch 3** | Ranker 3 | Ranker 28 | Ranker 33 | Ranker 58 |
| **Batch 4** | Ranker 4 | Ranker 27 | Ranker 34 | Ranker 57 |
| **Batch 5** | Ranker 5 | Ranker 26 | Ranker 35 | Ranker 56 |
| **Batch 6** | Ranker 6 | Ranker 25 | Ranker 36 | Ranker 55 |
| **Batch 7** | Ranker 7 | Ranker 24 | Ranker 37 | Ranker 54 |
| **Batch 8** | Ranker 8 | Ranker 23 | Ranker 38 | Ranker 53 |
| **Batch 9** | Ranker 9 | Ranker 22 | Ranker 39 | Ranker 52 |
| **Batch 10** | Ranker 10 | Ranker 21 | Ranker 40 | Ranker 51 |
| **Batch 11** | Ranker 11 | Ranker 20 | Ranker 41 | Ranker 50 |
| **Batch 12** | Ranker 12 | Ranker 19 | Ranker 42 | Ranker 49 |
| **Batch 13** | Ranker 13 | Ranker 18 | Ranker 43 | Ranker 48 |
| **Batch 14** | Ranker 14 | Ranker 17 | Ranker 44 | Ranker 47 |
| **Batch 15** | Ranker 15 | Ranker 16 | Ranker 45 | Ranker 46 |

3**.Choosing the domain/ area of project and allotment of guide:**

* Faculty members of the department specify their specialization/ expertise domain or areas of interest in which they can provide guidance to the students along with the research problems identified. This information is made known to the students through proper announcement.
* After making consultations with faculty members, each batch of students has to give its options; mentioning the area in which they want to carry out the project work or specifically on an identified problem
* The Head of the Department in consultation with other senior faculty members of the department finalizes the allotment of guides to the respective student batches; depending upon the area in which they want to carry out their project.
* For in-house projects there shall be only one guide and the faculty member guiding the project will be acting as the guide. For the projects carried out in industries/ PSUs/companies, there shall be two guides; an external guide from the industry/PSU/ company in which the project is carried out and an internal guide from the department who will be monitoring the progress of the project periodically and providing the requisite guidance.

**4. Project identification and classification**

Factors such as Environment, Safety, Ethics, and Costs are considered while finalizing the topic of the project. The projects are classified into the following categories:

1. Real time problems from industries which may include developing a new set up or enhancing the existing setup.
2. Society needed projects either design or fabrication.
3. Design / Analysis Projects.
4. Research Projects
5. Application based Projects
6. Product based Projects
7. Review Projects

**5. Mapping of Project deliveries with POs and PSOs**

After finalization of the research problem along with the requirements of necessary hardware/ software, the expected deliverables of the project are mapped with POs and PSOs of relevance.

**6. Project Registration and Reviews**

* Students of each batch should submit a registration form to the department; mentioning the details of the project such as ‘Title of the Project’, ‘Particulars of Guide(s)’, ‘Place where the project will be carried out’, ‘Expected deliverables of the project with their mapping to POs and PSOs’, ‘Facilities required for carrying out the project including the requirements of hardware and software’, ‘ Timeline of activities, indicating the various modules/phases of the project to be completed in a time frame’. In case students of any batch prefers to carry out their project outside the campus such as in industries or PSUs etc., they should get ‘ No Objection Certificate’ from that company and provide details of the person who will be acting as external guide. This entire process has to be completed in the semester pre-ceding to the semester in which the students are required to carry out their project work.
* After the allotment guides to the student batches, the students have to be in touch with the respective guides on a regular basis appraising the guide about the progress of the project every week. For the projects carried out in industries the internal guide will be in contact with the external guide and monitors the progress of the project and makes visits to the industry if necessary.
* A project coordinator is appointed by the Head of the department who is responsible for planning, scheduling and execution of all the activities related to the student project work.
* Students of a project batch should attend reviews regularly and give presentations with regard to the extent of work that is carried out specifying the results obtained pertaining to the project.
* A Project Review Committee (PRC) comprising of HoD, Project Coordinator, Senior faculty members and the respective Guide is formed to monitor the progress of the project work and to assess and evaluate the quality of the work during periodical reviews. The PRC also provides suggestions to the batches if necessary and assist them in the attainment of the expected project deliverables.
* Individual and team performances are evaluated by the project guide and Project Review Committee (PRC) during reviews.
* Upon completion of the project work after successful demonstration of the project; making successful reviews and getting approval from PRC; the project report shall be submitted to the department inline with the format and specifications stipulated by the department.
* A project viva-voce will be conducted in the Semester End Examination (SEE) for 150 marks in the presence of an external examiner appointed by the university for the evaluation the project.
* Students are encouraged to participate in project competitions held inside and outside the college and are further encouraged publishing research papers in Journals / Conferences. The project supervisor and the corresponding group head shall facilitate the students writing a paper to a journal or a conference.

**7. Timeline of activities**

Time frame given for the completion of various modules of the projects is indicated below and the same is intimated to the students.

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| **Timeline** | **Module** | **Particulars of Task** |
| Preceding Semester | Formation of Project Batches and  Allotment of Guide | * Announcement of Research areas of interest/ Definition of Research problems by faculty members * Formation of Student Project Batches following Sinusoidal distribution * Allotment of Guide * Registration of the Project * Title of the Project along with other details such as Place of work, Requirements of Software/ Hardware along with expected project deliverables |
| 2nd Week of  the semester | Abstract | * Submission of Abstract of the Project |
| 4th Week of  the semester | First Review | * About 25% of the work should be completed at the time of First Review. * Presentation should be done before PRC with respect to progress of the project * Work carried out will be assessed and evaluated; batch wise and also student wise * Suggestions from PRC |
| 6th Week of  the semester | Second Review | * About 50% of the work should be completed at the time of Second Review. * Presentation should be done before PRC with respect to progress of the project * PRC monitors whether suggestions provided by PRC during earlier reviews have been considered or not * Assessment and Evaluation by PRC * Suggestions from PRC |
| 8th Week of  the semester | Third Review | * About 75% of the work should be completed at the time of Third Review. * Chapters’ names of the Project Report should be identified by this time * Presentation should be done before PRC with respect to progress made |
| 10th Week of  the semester | Fourth Review | * The work should be completed at the time of Fourth Review. * The hardware projects should be shown in working condition and software based projects should be executed successfully * Presentation should be done regarding the results obtained with necessary Tables and Graphs before PRC * After obtaining satisfactory results the batch is permitted to make Project Report |
| 12th Week of  the semester | Final Review | * A draft Project Report should be submitted at the time of Final Review. * PRC goes through the chapters of the report and also checks whether the format of the report made is in accordance with the specified format or not * PRC makes recommendations for any modifications of the report if necessary before giving a final clearance |
| 14th Week of  the semester | Submission of Project Report | * Project Reports should be submitted in the department |
| 15th Week of  the semester | Preparation of Journal Paper/ Conference Paper | * Taking advice/ help from the guide and group head in the preparation of Conference Paper or Journal Paper |

1. **Evaluation of Project Work**

* There shall be a project seminar presentation in IV Year I semester. For the project Seminar, the student shall collect the information/ literature on the project, preparea report, submit the same, and present as a seminar, which shall be evaluated as CIE for 100 marks by the project seminar review committee. The committee shall consist of Head of the Department, the supervisor of project, and two Professors/Associate professors of the department.
* Out of a total 100 marksallotted for the major project work, which shall be evaluated in IV-year IIsemester, 30 marks shall be for CIE (Continuous Internal Evaluation) and 70 marks for the SEE (End Semester Viva-voce Examination). The project viva-voce shall be conducted by a committee comprising an external examiner, Head of the Department and project supervisor. Out of 30 marks allocated for CIE, 15 marks shall be awarded by the project supervisor (based on the continuous evaluation of student’s performance throughout the Project Work period), and the other 15 marks shall be awarded by a Departmental Committee consisting of Head of the Department and Project Supervisor, and two Professors/Assoc-Professors, based on the work carried out and the presentation made by the student during internal reviews (at least two internal reviews shall be conducted).

Fig. Division of Marks in Project Evaluation

**9. Evaluation Parameters for assessment of Project Work:**

The following parameters are considered for assessment of the project work

* Clarity in stating the objectives and purpose of the project work
* Clarity in defining the identified problem of the project work
* Justification of project with supporting design, analysis and modeling
* Whether the results are technically and economically feasible with effective conclusions / recommendations?
* Use of appropriate language/word choice, formatting, and writing conventions in the written project
* Adherence of the project report with the stipulated format and guidelines
* Whether factors such as environment, safety, ethics and cost have been considered in the selection of the project.
* Presentation skills exhibited during the reviews of project
* Individual and team performances in completion of the project work.
* Proper demonstration of the working model of the project

**10. Best Projects:**

* The department has taken initiative steps in identifying and honoring the best projects in both the categories of major projects carried out during the final semester and mini projects done during the summer vacation period of third year, since academic year 2018-19.
* The projects are classified into Hardware and Software projects in each category of major and mini projects. The best three projects of Hardware and Software in each category are rewarded with cash prizes of Rs.2,500/-, Rs.1,500/- and Rs.1,000/- respectively.
* Identification of best projects is done by organizing a regional level Hardware and Software project competition, namely TECHEXPO. Evaluation is done by a committee comprising of an External judge, HoD and the Project coordinator.
* Details of the best three projects for the year are indicated below:

**Rubrics for Evaluation of Project Work**

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| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Excellent** | **Good** | **Average** | **Acceptable** | **Unacceptable** | **Score** |
| **Objectives and Purpose of the Project**  **Identification and Definition of Problem** | Detailed and extensive explanation of the  purpose and need of the project. Problem is accurately defined with supporting analysis. | Good explanation of  the of the of the purpose and need of the project. Problem is well defined with good analysis | Moderate explanation of the purpose and need of the project. Problem is defined with sufficient analysis | Outline explanation of the purpose and need of the project. Problem is defined but not with supporting analysis | Minimal explanation of the purpose and need of the project. Problem is not defined accurately |  |
| **Literature Survey**  **Study of the Existing**  **Systems and their limitations** | Detailed and extensive  study and explanation of the limitations of the existing systems. | Great deal of information is collected and good study of the existing systems. | Moderate study of the existing systems; collects some basic  information | Peripheral study on limitations of the existing systems  Limited information | Minimal study on the limitations of  the existing systems;  incomplete information |  |
| **Deliverables of the Project**  **Methodology of the**  **Proposed Work** | Deliverables of the Project are defined very accurately.  Methodology to be followed is defined very clearly | Deliverables of the Project are defined to great extent. Methodology to be followed is specified but detailing is not done | Deliverables of the Project are defined in a reasonable manner  Steps are mentioned but unclear; without justification to objectives | Project deliverables are not defined accurately. Steps to be followed to solve the defined problem are not specified properly | Not able to figure out the Project outcomes. Methodology of the proposed work is incomplete and improperly specified. |  |
| **Division of Modules**  **Design/ Analysis and Modeling of the Project** | Division of modules is done appropriately  Appropriate design methodology and properly justified | Division of modules is done appropriately  Design methodology not properly justified | Division of problem into modules is done  Design methodology not defined properly. | Partial division of  Problem into Modules  Methodology not  defined properly | Division of  Problem into Modules has not been done  Design methodology not specified |  |
| **Planning of Project**  **Work -**  **Timeline Activities** | Time frame properly specified and followed  Appropriate distribution of project work | Time frame properly specified and  Distribution of project work inappropriate | Time frame properly specified, but not followed  Distribution of project work uneven | Time frame properly specified, but not followed  Un-even distribution of project work and no synchronization | Time frame not properly specified  In-appropriate  distribution of project  work |  |
| **Project Demonstration:**  **Achievement of the Objectives and Functioning/ Working of the Project** | All defined objectives  are achieved.  Each module is working well and properly demonstrated.  All modules of project are well integrated and system working is accurate | All defined objectives are achieved. Each  module is working well and properly demonstrated  Integration of all modules not done and system working is not very satisfactory | All defined objectives are achieved  Modules are working well in isolation and properly demonstrated Modules of project are not properly integrated | Some of the defined objectives are achieved  Modules are working well in isolation and properly demonstrated  Modules of project are not properly integrated | Defined objectives are not achieved. Modules are not in proper working form |  |
| **Presentation** | Contents of presentation are appropriate and well delivered with clarity.  Proper eye contact  with audience and clear voice with good spoken language | Contents of presentation are  good and well delivered  Clear voice with good  spoken language  but less eye contact  with audience | Contents of  presentations are  good but not delivered convincingly  Eye contact with few people and unclear voice | Contents of presentations are not appropriate. Delivered with less confidence. Eye contact with few people and unclear voice | Contents of presentations are not  appropriate and not delivered in acceptable manner. Eye contact with few people and voice is not audible. |  |
| **Project Report** | Project report is very well organized with appropriate graphs and charts. Use of appropriate language/word choice, formatting, and writing conventions. Report is according to the specified format  References and citations are appropriate and well  mentioned | Project report is well organized with graphs and charts. Use of decent language/word choice and writing conventions. Report is according to the specified format  References and citations are well  mentioned | Project report is according to the specified format but  the language used needs improvement.  In-sufficient  references and citations | Project report is not fully according to the specified format and not organized in the expected manner  In-sufficient references and citations. | Project report not prepared according to  the specified format. Language used is in correct.  References and citations are not  appropriate |  |
| **Conclusion and**  **Discussion** | Results are presented and justified in a very appropriate manner  Project work is aptly  summarized and concluded. Future extensions in the project are well specified | Results are presented and justified in good manner  Project work is well summarized and concluded. Future extensions in the project are specified | Results presented but not justified in a  satisfactory manner  Project work summary and conclusions are not completely appropriate. Future extensions in the project are specified | Results are not accurate and justification is not appropriate. Project work summary and conclusion are not very appropriate  Future extensions in the project are not specified | Results are not  presented properly  Project work is not  summarized and concluded  Future extensions in the project are not  specified |  |