

GUJARAT
TECHNOLOGICAL
UNIVERSITY

BRIDGE COURSE PHYSICS

Gujarat Technological University, Ahmedabad

Bridge Course Course Duration: 6 weeks Physics

Course Objectives:-

1. To create strong problem solving skills as an engineer along with an understanding of the approach, methods, and requirements of engineering and engineering design for a successful career in advancing technology. Its engineering science and design components prepare students to work as professional engineers.
2. To build concrete foundation for their core branch as a thinker, inter disciplinary thoughts and socio- technical issues in field.
3. To create advance applied knowledge of Physics as a subject of foundation of engineering.

Course Outcome:-

1. Student will be able to apply knowledge of basic theories of science in core subject of Engineering.
2. Student will be able to create an experimental approach in applied theories of science in problem solving technical problems.
3. Student will be able to associate natural phenomenon with technological advancement.

Course Organization:- (As per identified each study field.)

Activity	Type of Activity	Duration (in Hour/ week)	Total Hours	No of Activity per field
Topic Introduction (Theoretical)	Presentation/ Minor Quiz/ Brainstorming	1	4	2
Minor Experimental Activity	Short task based practice	2	8	3
Major Experimental Extension	Application based experiment	2	8	1

Perception:

Students entering in the engineering course can be classified in to two groups as A Level and S Level based on the following criteria.

- ✓ **S Level STUDENTS** who are scoring excellent can be considered to have adoptability with the engineering courses. Such students shall be leader of formed group and coordinate with faculty and students. He is basic monitoring person in entire training process.
- ✓ **A Level STUDENTS** who are scoring moderate can be considered to carry less knowledge from what they have learned till now. They shall be taught minimum required terminologies, application through activities from school level physics but essential to be in a student entering the engineering field.

Course Planning:

Week 1: Introductory theory, Planning of activities and basic revision of Classical Mechanics, Electrostatics, Electrodynamics and Magnetism and Basic Electronics through group discussion and slide shows.

Week 2-4: Suggested activities in above mentioned fields, problem solving, chart preparation and workbook completion.

Week 5: Report making, Case Base Study, model making or suggested task based activity on any one field (preferable on branch).

Week 6: Evaluation of the student.

Activities of Bridge Program: -

- Formation of groups, group leaders and brief idea about activity under bridge program.
- Discussion of various possible activities to students.
- Identification of group activities based on curriculum and allotment of activities.
- Provide resources available for reading and refreshing content.
- Institute may rotate topic based on availability of resources and faculties. Example group A is given to Classical than Group B can be given Basic Electronics in week 1 and rotation can be given in upcoming weeks.

Classical Mechanics: (Week 1)

Hour 1:- Basic understanding of concepts through material provided and presentation given to the group. Doubt solving related to concept of Newtonian Mechanics, Impulse, Friction, Pressure, Momentum and Inertia. (See the file Introduction of Mechanics.pptx)

Hour 2 and 3:- Suggested activities based on Active Learning Material provided. Groups have to present report based on activities done by them. (See the file Classical Activities.pptx and refer animation and videos provided in Folder name Classical_Bridge.)

Hour 4:- Every candidate has to solve MCQ and Problems provided along with course materials and submit the same to course coordinator.

Hour 5:- Weekly evaluation based on classical mechanics. It may be based on quiz, group discussion or spot task given to the group of students.

Electricity and Magnetism: (Week 2)

Hour 1:- Basic understanding of concepts through material provided and presentation given to the group. Doubt solving related to concept of Electrostatics, Electric Current, Magnetism, and Electromagnetic Induction. (See the file Introduction of E&M.pptx)

Hour 2 and 3:- Suggested activities based on Active Learning Material provided. Groups have to present report based on activities done by them. (See the file EM Activities.pptx and refer animation and videos provided in Folder name Elemag_Bridge.)

Hour 4:- Every candidate has to solve MCQ and Problems provided along with course materials and submit the same to course coordinator.

Hour 5:- Weekly evaluation based on syllabus. It may be based on quiz, group discussion or spot task given to the group of students.

Basic Electronics :- (Week 3)

Hour 1:- Basic understanding of concepts through material provided and presentation given to the group. Doubt solving related to concept of Basic circuit component, AC and DC fundamentals, Analog and Digital meters, Solid state electronic components – Diodes, LEDs, Solar Cell. (See the file Introduction of Basic Electronics.pptx)

Hour 2 and 3:- Suggested activities based on Active Learning Material provided. Groups have to present report based on activities done by them. (See the file BasicEle Activities.pptx and refer animation and videos provided in Folder name BasicEle_Bridge.)

Hour 4:- Every candidate has to solve MCQ and Problems provided along with course materials and submit the same to course coordinator.

Hour 5:- Weekly evaluation based on syllabus, it may be based on quiz, group discussion or spot task given to the group of students.

Properties of Matter:- (Week 4)

Hour 1:- Basic understanding of concepts through material provided and presentation given to the group. Doubt solving related to concept of Pressure, Buoyancy, Archimedes' Principle,

Pascal's Principle, Surface Tension and Tension and Compression. (See the file Introduction of Properties of Matter.pptx)

Hour 2 and 3:- Suggested activities based on Active Learning Material provided. Groups have to present report based on activities done by them. (See the file PropMatter_Activities.pptx and refer animation and videos provided in Folder name PropMatter_Bridge.)

Hour 4:- Every candidate has to solve MCQ and Problems provided along with course materials and submit the same to course coordinator.

Hour 5:- Weekly evaluation based on syllabus, it may be based on quiz, group discussion or spot task given to the group of students.

Group Based Activities :- (Week 5)

- Group may select any topic (discussed above) and any activities (like Study report, Problem based analysis, Model making, Short film of activity, animation etc...)
- Activity should be completed in this week and submitted to the faculty in-charge.

Evaluation :- (Week 6)

- Presentation cum seminar of work done by the group and its group discussion among same field groups.
- Evaluation of report presented by group activities done by group in entire process.
- Paper based MCQ test based on syllabus.

After completion of Bridge Course students are expected to know about :-

Introduction to Mechanics:-

- Newton's First Law of Motion – Inertia
- Linear Motion
- Newton's Second Law of Motion
- Newton's third Law of Motion
- Impulse, Friction and Inertia
- Energy, Conservation of Energy
- Momentum, Conservation of Momentum

Electricity and Magnetism:-

- Electrostatics
- Electric Current
- Magnetism
- Electromagnetic Induction

Basic Electronics:-

- Basic circuit component
- AC and DC fundamentals

- Analog and Digital meters
- Solid state electronic components – Diodes, LEDs, Solar Cell.

Properties of Matter:-

- Pressure
- Buoyancy
- Archimedes' Principle
- Pascal's Principle
- Surface Tension
- Tension and Compression

Evaluation Methods:-

- After field completion **weekly evaluation** can be done based on Quiz, Group discussion, seminar, MCQ worksheet or presentation.
- After major extended activity completion, group can select topic for Model making, Project, Circuit designing, short Film, Short animation based on real life phenomenon, Study base analysis. Group has to submit it to faculty coordinator for evaluation before Sixth week of course.

Learning Resources:-

Course Material:-

- Presentations, Video and Course planning are provided.

Books:-

For Faculty coordinator:-

1. Conceptual Physics , Hewitt, Pearson Education
2. Principles of Physics, Halliday, Resnik and Walker, Wiley India
3. Physics for Scientists and Engineers, Raymond A. Serway, John Jewett, Cengage Learning.
4. Six ideas that shape physics, Tata Mc Grawhill
5. Flying Circus of Physics, Jerald Walker, Wiley India

For Students:-

- On line lecture series of Emeritus Walter Lewin – MITOnline Courses.
- www.howstuffworks.com
- Dr Carlsons Science theater series on youtube