

GUJARAT TECHNOLOGICAL UNIVERSITY

**BRIDGE COURSE
ELEMENTS OF ENGINEERING
B.E. 1st YEAR (w.e.f. July 2014)**

ELEMENTS OF ELECTRONICS

CONTENTS:

Sr. No.	Subject Content
1.	<u>Unit – I Introduction to Electronics (1 Hour)</u> • Birth of Electronics • Importance of Electronics Engineering in day to day life • Introduction to semiconductor devices and its applications (Diodes, Transistors, Optoelectronic devices etc.
2.	<u>Unit – II Introduction to Electronics Measurement and Instrumentation (1 Hour)</u> • Measuring instruments (Ammeter, Voltmeter and Oscilloscope) • Introduction to Instruments (Bridges and transducers)
3.	<u>Unit – III Introduction to Integrated Circuits (ICs) (1 Hour)</u> • Introduction to IC technology (including SSI, MSI, LSI and VLSI) • Demonstration of basic ICs
4.	<u>Unit – IV Introduction to Communication Engineering (1 Hour)</u> • Types of Communication (Analog vs. Digital, Wired vs. wireless etc.) • Application and examples of communication systems.

Course Planning :- Bridge Course duration: 04 Weeks

- 04 Hours of theory classes (1 class / week)

Hour – 1 (Unit – I)

1. Presentation of Topic by teacher (with the help of PPTs/Videos or simple chalk and Board).
2. Doubt Solving session on the topic covered by teacher.
3. Making of groups of students by teacher (at least 6 Groups, 10 students per group).

Hour – 2 (Unit – II)

1. Presentation of Topic by teacher (with the help of PPTs/Videos or simple chalk and Board).
2. Demonstration of the instruments and equipments.
3. Activity based on covered topic.

Hour – 3 (Unit – III)

1. Presentation of Topic by teacher (with the help of PPTs/Videos or simple chalk and Board).
2. Demonstration of different ICs.
3. Activity based on covered topic (Chart preparation of different ICs including pin diagram)

Hour – 4 (Unit – IV)

1. Presentation of Topic by teacher (with the help of PPTs/Videos or simple chalk and Board).
2. Different applications correlating the communication engineering.
3. Activity based on covered topic (Video or presentation preparation related to recent communication advancement)

Evaluation of Bridge course

Continuous evaluation is done on the basis of rubrics given below, teacher will evaluate every activity and take average all to produce final outcome bridge course at the end of the Bridge course.

Assessment can be carried out on the basis of different activities suggested to the students:

- Report / chart / poster /ppt preparation from the above topics in the group of students.

Rubrics for the evaluation:

Sr. No.	Evaluation Criterion	Marks
01.	Involvement the student during activities.	10
02.	Communication and interaction of students among the groups	10
03.	Presentation skill	10
04.	Critical Thinking	10
05.	Team work	10
	Total	50

Learning Resources :-

Course Material :-

- Presentations, Video and Course planning

Books:-

1. Starting Electronics, by Keith Brindley
2. Basics of Electrical, Electronics and Communication Engineering, by Storey Nei
3. Grob'S Basic Electronics 10E, by Schultz
4. Technology of Integrated Circuits, by D. Widmann, H. Mader, H. Friedrich
5. Analog And Digital Communication Engineering, by J.S.Chitode

Useful sites:-

- <http://www.learnabout-electronics.org/>
- <http://www.electronics-tutorials.ws/>
- <http://www.electronics-lab.com/>

ELEMENTS OF MECHANICAL ENGINEERING

CONTENTS:

Sr. No.	Subject Content
1.	Demonstration of energy conversion systems using model/Charts: Students can understand different energy conversion systems
2.	Power transmission system: Students will familiarize with different power transmission system and bearings
3.	Dimensioning and Geometrical Construction: Students will get familiarized from different kind of geometrical construction by using drawing instruments

Course Planning :- Bridge Course duration: 04 Weeks

Sr. No.	Type of Activity		Duration Hours/Week	Required Components
1.	To demonstrate different Energy Conversion system & understand Power Transmission system (Students will make one energy conversion system in a group wise)	Experiment : 01 " Free Energy Magnet Motor " - magnetic to mechanical and mechanical to electrical energy conversion	02	(1) smps fan (2) 10- led (3) magnet 1 (4) 3 mt. wire (5) bread board
		Experiment : 02 " Salt Water Energy " - chemical to electrical and electrical to mechanical energy conversion		(1) smps fan (2) 2- led (3) copper Plate(30*20*2 mm) (4) 3 mt. wire (5)aluminum tin (cold drinks tin) (6) 1 kg salt (7) 1 plastic jar (8) 1 multi meter
		Experiment : 03 " Flywheel Energy Storage "- electrical to mechanical, mechanical to kinetic and kinetic to electrical energy conversion		(1) 4" plastic wheel (2) 2- led (3) 12V battery (4) 3 mt. wire (5)2- 12V dc small motors (6) bread board

2	To identify different types of mechanism and geometric construction (Students will make a car viper system with the use of any mechanisms)	02	(1)40 wooden strips (160*30*6mm- 20nos & 240*30*6mm – 20nos.)
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Activity – 01 (Energy Conversion & Power Transmission)

- ☞ Whole batch is divided in to three teams (A, B & C).
- ☞ Three basic experiments on energy conversion will performed by the each group of students. (reference materials : handouts/videos)
 - Experiment: 01 “Free Energy Magnet Motor” - magnetic to mechanical and mechanical to electrical energy conversion.
 - Experiment: 02 “Salt Water Energy” - chemical to electrical and electrical to mechanical energy conversion.
 - Experiment: 03 “Flywheel Energy Storage” - electrical to mechanical, mechanical to kinetic and kinetic to electrical energy conversion.

Explanation on each and every conversion systems is done by the group of students.

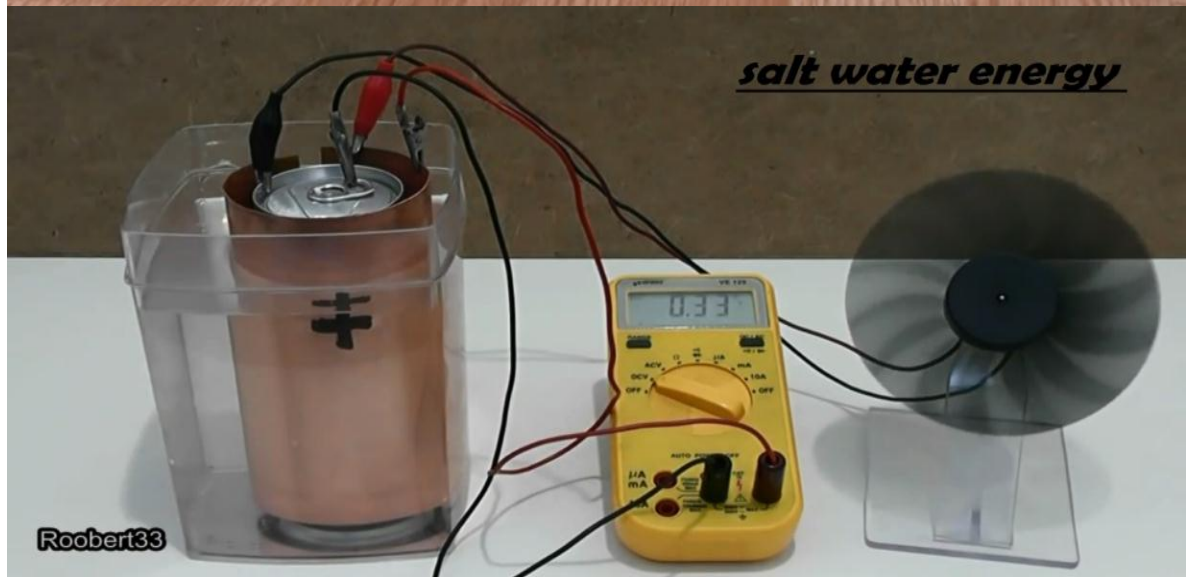
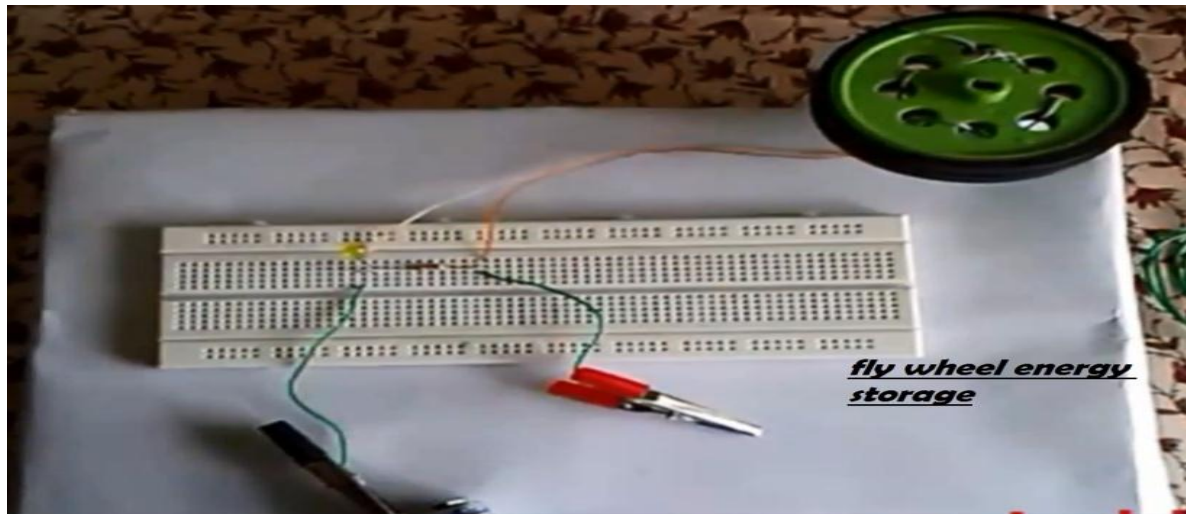
- ☞ Group discussion with the faculties (questions & quires).
- ☞ Competition day :
 - ☞ On particular one day there is a competition on energy conversion between all groups.
 - ☞ Groups are given a task to design energy conversion system having minimum four different energy conversions.
- ☞ Two basic study tasks on power transmission system will performed by the each group of students. (reference materials : handouts/videos)

Study Task: 01 “Different Types of Power Transmission Elements”

Study Task: 02 “Transmission System of Conventional Lathe”

- ☞ Explanation on Power Transmission Elements & systems by the group of students.
- ☞ Group discussion with the faculties (questions & quires).

Photos:



Activity – 02 (Geometrical Construction (mechanisms))

- ☞ Whole batch is divided in to four teams (A, B, C & D).
- ☞ Study tasks of four basic mechanisms will performed by the each group of students.
(Reference materials: handouts)

Study Task: 01 “Four Bar Chain Mechanism”

Study Task: 02 “Slider Crank Mechanism”

Study Task: 03 “Wit worth Quick Return Mechanism”

Study Task: 04 “Ackerman Steering Mechanism”

- ☞ Explanation on each and every mechanism by the group of students.
- ☞ Group discussion with the faculties (questions & quires).
- ☞ One innovative task will give to each group of students.

☞ innovative task : "design a car viper mechanism with the use of any basic mechanism"

Evaluation of Bridge course

Continuous evaluation is done on the basis of rubrics given below, teacher will evaluate every activity (15 Minutes minor) activity and take average all to produce final outcome bridge course at the end of the Bridge course.

Rubrics for the evaluation:

Sr. No.	Evaluation Criterion	Marks
01.	Involvement the student during activities	10
02.	Communication and interaction of students among the groups	10
03.	Presentation skill	10
04.	Critical Thinking	10
05.	Team work	10
	Total	50

Learning Resources:-

Course Material:-

- Presentations, Video and Course planning are provided.

Books:-

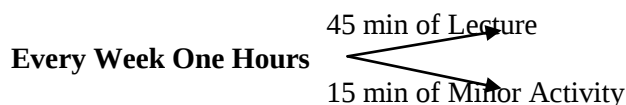
Useful sites:-

ELEMENTS OF CIVIL ENGINEERING

CONTENTS:

Sr. No.	Subject Content
1.	Introduction to Civil Engineering and Building Materials:- ➤ History of Civil Engineering ➤ Role of Civil Engineer ➤ Branches of Civil Engineering ➤ Materials used in building construction
2.	Building Planning: ➤ Principle of Planning ➤ Introduction to different types of drawing (Line diagram, Plan, Elevation, Key plan, Layout plan, Structural drawing, etc.) ➤ Introduction to different types of buildings
3.	Building Construction:- ➤ Introduction to Building components (Sub & Super structure) ➤ Overview of Building bye-laws ➤ Plot area and built-up area
4.	Basic of Surveying:- ➤ Definition - Surveying & Leveling ➤ Types of surveying ➤ Introduction to modern surveying techniques ➤ Units and Conversion

Course Planning :- Bridge Course duration: 04 Weeks



45 Min (Basic understanding of Topic)

1. Presentation of Topic by teacher (with the help of PPTs/Videos or simple chalk and Board).
2. Doubt Solving session on the topic covered by teacher.
3. Making of groups of students by teacher (at least 6 Groups, 10 to 11 students per group).

15 Min (Minor Activity relevant to topic covered in 45 minute to strengthen understanding)

1. Minor Activity suggested by teacher to students by providing material and guideline related to activity.
2. Students will perform Minor Activity as suggested by teacher.
3. Students will conclude the activity (one or two group of students can present what they have learnt during activity)
4. Teacher will evaluate the process as per rubrics given for the activity.

Evaluation of Bridge course

Continuous evaluation is done on the basis of rubrics given below, teacher will evaluate every activity (15 Minutes minor) activity and take average all to produce final outcome bridge course at the end of the Bridge course.

Rubrics for the evaluation:

Sr. No.	Evaluation Criterion	Marks
01.	Involvement the student during activities	10
02.	Communication and interaction of students among the groups	10
03.	Presentation skill	10
04.	Critical Thinking	10
05.	Team work	10
	Total	50

Learning Resources:-**Course Material:-**

- Presentations, Video and Course planning are provided.

Books:-

1. Engineering Material Author: S.C. Rangwala Publisher: Charotar Pub. House, Anand
2. Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain 16th Edition
Publisher: Laxmi Publication Delhi
3. Surveying and Leveling Author: R. Subramanian Publisher: Oxford University
4. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill
5. Building Construction and Construction Material Author: G.S.Birdie and T.D. Ahuja Publisher:
Dhanpat Rai Publishing Company
6. Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill
Education, India Pvt. Ltd.

Useful sites:-

- <http://www.engineeringcivil.com/>
- <http://www.bmtpc.org/>
- <http://www.indianhomedesign.com/>
- <http://www.tmhshop.com/>
- www.civilengineeringterms.com

Suggested Activities:**Unit –I Introduction to Civil Engineering and Building Materials:**

- **Minor Activity:** Identification of building materials viz. Cement, Bricks, Aggregate, Metal etc.

Unit –II Building Planning:

- **Minor Activity:** Preparation of line diagram for given plot area.

Unit –III Building Construction:

- **Minor Activity:** Calculation of plot and built-up area as per building bye-law.

Unit –IV Basic of Surveying:

- **Minor Activity:** Practice of taking running measurement using basic surveying instrument.

ELEMENTS OF ELECTRICAL ENGINEERING

CONTENTS:

Sr. No.	Subject Content
1.	Safety precautions to be taken while working with electricity
2.	Introduction to basic electrical elements & measuring instruments.
3.	Basic idea about power generation, transmission & distribution
4.	To give brief idea about working, construction & testing of domestic appliances

Course Planning :- Bridge Course duration: 04 Weeks

Every week one hour for electrical engineering activity

Hour-1 (Basic understanding of Topic)

- Safety precautions to be taken while working with electricity.
- Introduction to basic electrical elements & measuring instruments.

Hour- 2 Group wise Activities related to above covered topic.

- Activity suggested by teacher to students by providing material and guidelines related to activity.
- Students will perform activity as suggested by teacher.
- Students will conclude the activity (one or two group of students can present what they have learnt during activity)
- Teacher will evaluate the process as per rubrics given for the activity.

Hour-3 (Basic understanding of Topic)

- Basic idea about power generation, transmission & distribution.
- To give brief idea about working, construction & testing of domestic appliances

Hour- 4 Group wise Activities related to above covered topic.

- Activity suggested by teacher to students by providing material and guidelines related to activity.
- Students will perform activity as suggested by teacher.
- Students will conclude the activity (one or two group of students can present what they have learnt during activity)
- Teacher will evaluate the process as per rubrics given for the activity.

Evaluation of Bridge course

Continuous evaluation is done on the basis of rubrics given below, teacher will evaluate every activity and take average all to produce final outcome bridge course at the end of the Bridge course

Rubrics for the evaluation:

Sr. No.	Evaluation Criterion	Marks
01.	Involvement the student during activities	10
02.	Communication and interaction of students among the groups	10
03.	Presentation skill	10

04.	Critical Thinking	10
05.	Team work	10
	Total	50

Learning Resources:-

Course Material:-

- Presentations, Video and Course planning are provided.

Books:-

1. Study of electrical appliances and devices by K.B. Bhatia.
2. Electrical installation estimating and costing by J.B.Gupta.
3. Principles of power system by V.K.Mehta, Rohit Mehta

Useful sites:-

- www.howstuffworks.com
- www.electrical-engineering-portal.com
- www.electronics4u.com

Suggested Activities:

1. Prepare chart for Safety precautions to be taken while working with electricity.
2. To identify electrical elements & to explain its characteristics & application.
3. To prepare presentation about working of measuring instruments.
4. To measure values of electrical elements using measuring instruments.
5. To prepare line diagram for power generation, transmission & distribution.
6. To explain how domestic consumer get single phase supply from electric supply system.
7. To prepare presentation for working of domestic appliances.
8. To find fault in domestic appliances.
9. How to calculate load for a class room & to know required size of wire.
10. To prepare presentation for importance of earthing & different earthing system.
11. Importance of neutral wire in wiring system & to differentiate between neutral wire & earth wire.