

22ES150	ENGINEERING EXPLORATION	Category	L	T	P	Credit(s)
		ESC	1	1	0	2

### Preamble

The course Engineering Exploration provides an introduction to the engineering field. It is designed to help the student to learn about engineering and how it affects our everyday lives. On the successful completion of the course, students will be able to explain how engineering is different from science and technology and how science, mathematics and technology are an integral part of engineering design.

### Prerequisite

- Nil

### Course Outcomes

On the successful completion of the course, students will be able to

CO	Course Outcome Statement	TCE Proficiency Scale	Expected Proficiency (in %)	Expected Attainment Level (in %)
CO1	Explain technological & engineering development, change and impacts of engineering	TPS2	70	70
CO2	Draw a product in enough detail that others can accurately build it and write specification sheet for a given product	TPS3	70	70
CO3	Complete initial steps (Define a problem, list criteria and constraints, brainstorm potential solutions and document the ideas) in engineering design process	TPS3	70	70
CO4	Draw sketches to a design problem and provide a trade-off matrix	TPS3	70	70
CO5	Communicate possible solutions through drawings and prepare project report	TPS3	70	70
CO6	Apply the concept of engineering fundamentals in Civil and Mechanical, Engineering	TPS3	70	70

### Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	L	-	-	-	-	-	-	-	-	-	-	-	-
CO2	S	M	L	-	-	-	-	-	-	-	-	-	-	-
CO3	S	M	L	-	-	-	-	-	-	-	-	-	-	-
CO4	S	M	L	-	-	-	-	-	-	-	-	-	-	-
CO5	S	M	L	-	-	-	-	-	-	-	-	-	-	-
CO6	S	M	L	-	-	-	-	-	-	-	-	-	-	-

S – Strong

M – Medium

L – Low

### Assessment Pattern

TPS Scale	Assesment-1 (Theory)						Assesment-2 (Theory)						Terminal Examination (Theory)		
	Worksheet-1			CAT-1			Case study-1			CAT-2					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CO1	-	30	-	-	30	-	-	-	-	-	-	-	-	20	-
CO2	-	-	30	-	-	30	-	-	-	-	-	-	-	-	15
CO3	-	-	40	-	-	40	-	-	-	-	-	-	-	-	15
CO4	-	-	-	-	-	-	-	30	-	-	30	-	-	-	20
CO5	-	-	-	-	-	-	-	-	30	-	-	30	-	-	15
CO6	-	-	-	-	-	-	-	-	40	-	-	40	-	-	15

\*Terminal examination should cover all Course Outcomes in the appropriate TPS Scale level.

### Syllabus

**What is Engineering:** Engineering Requirement, Knowledge within Engineering disciplines, Engineering advancements

**Engineering Design:** Problem definition, idea generation through brainstorming and researching, solution creation through evaluating and communicating, text/analysis, final solution and design improvement.

**Defining problems and Brainstorming:** Researching design, sketching problem solving

**Communicating solution:** Dimensioning orthographic drawing, perspective drawing

**Modelling and testing final output:** Product evaluation, reverse engineering, final project report.

**Civil Engineering:** Structural forces structural analysis, bridge design components, structural design

**Mechanical Engineering:** Types of motion, mechanical power system, mechanical power formula, mechanical design.

### Reference Books

1. Ryan A.Brown, Joshua W.Brown and Michael Berkihiser: "Engineering Fundamentals: Design, Principles, and Careers", Goodheart-Willcox Publisher, Second Edition, 2014.
2. Saeed Moaveni, "Engineering Fundamentals: An Introduction to Engineering", Cengage learning, Fourth Edition, 2011.

### Course Contents and Lecture Schedule

No.	Topic	No. of Periods
1.	<b>What is Engineering</b>	
1.1	Engineering Requirement	1
1.2	Knowledge within Engineering disciplines,	1
1.3	Engineering advancements	1
2	<b>Engineering Design</b>	
2.1	Problem definition,	1
2.2	idea generation through brainstorming and researching	1
2.3	solution creation through evaluating and communicating,	1
2.4	text/analysis	1
2.5	final solution and design improvement	1
3	<b>Defining problems and Brainstorming:</b>	
3.1	Researching design	1
3.2	sketching problem solving	2

No.	Topic	No. of Periods
4	<b>Communicating solution</b>	
4.1	Dimensioning orthographic drawing	1
4.2	perspective drawing	1
5	<b>Modelling and testing final output</b>	
5.1	Product evaluation	1
5.2	reverse engineering	1
5.3	final project report	1
6	<b>Civil Engineering</b>	
6.1	Structural forces structural analysis	1
6.2	bridge design components	2
6.3	structural design	1
7	<b>Mechanical Engineering</b>	
7.1	Types of motion	1
7.2	mechanical power system	1
7.3	mechanical power formula	1
7.4	mechanical design	1
	Total	24

**Course Designers:**

1. Dr.S.J. Thiruvengadam, sjtece@tce.edu
2. Dr. V.R.Venkatasubramani, venthiru@tce.edu