



**CYCLE 1  
NAAC Accreditation 2023**

**Criterion: 1 Curricular Aspects**  
**Key Indicator – 1.3 Curriculum Enrichment**  
**Metric Number: 1.3.1**

## **Supporting Document**

*Submitted to*

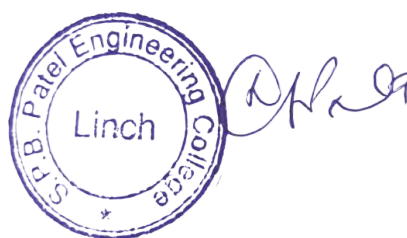


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**NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL**

### 1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Sr. No.	Subject code	Subject Name	Page No
<b>Professional Ethics</b>			
1	3150709	Professional ethics	1-3
2	3110017	Induction programme	4-13
<b>Human Values</b>			
3	3130004	Effective Technical Communication	14-17
4	3141909	Organizational Behaviour	18-20
5	3160002	Contributor Personality Development Program	21-25
6	3150005	Integrated Personality Development Course	26-30
7	3130007	Indian Constitution	31-33
8	3110017	Induction programme	34-43
<b>Environment and Sustainability</b>			
9	4300003	Environment and Sustainability	44-54
10	3300003	Environment Conservation & Hazard Management	55-58
11	4351907	Renewable & Green Energy	59-71
12	3361306	Environmental Impact assessment	72-74
13	3160622	Disaster Management	75-79
14	3160621	Earthquake Engineering	80-83
15	3160611	Environmental Engineering	84-88
16	3110007	Environmental Science	89-100
17	3140709	Principles of Economics and Management	101-102
<b>Life skills</b>			
- Professional Life Social Development course			
- Let's Celebrate Life			
- Women's Day			



# Professional Ethics

## 1. Professional Ethics

Subject Code: 3150709, Branch Code: 07

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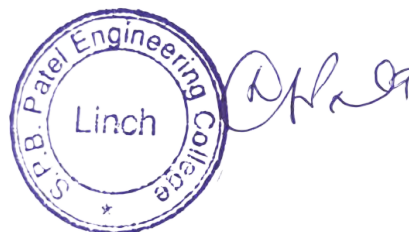
### TEACHING SCHEME / DETAIL SYALLBUS

BE  07 - COMPUTER ENGINEERING  5

2018-19  Subject Code  Enter Subject Name  Search

\*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L.	T.	P.		E	M	I	V	
+	<a href="#">3150001</a>	07	June 2020	Design Engineering - II A	Project Work	5	0	0	2	1	0	0	20	80	100
+	<a href="#">3150004</a>	07	June 2020	Contributor Personality Development Program	Personality development Elective	5	2	0	0	2	70	30	20	30	150
+	<a href="#">3150005</a>	07	June 2020	Integrated Personality Development Course	Personality development Elective	5	2	0	0	2	70	30	20	30	150
+	<a href="#">3150703</a>	07	June 2020	Analysis and Design of Algorithms	Professional Core	5	4	0	2	5	70	30	20	30	150
+	<a href="#">3150709</a>	07	June 2020	Professional ethics	Humanities and Social Science	5	3	0	0	3	70	30	0	0	100
+	<a href="#">3150710</a>	07	June 2020	Computer Networks	Professional Core	5	4	0	2	5	70	30	20	30	150
+	<a href="#">3150711</a>	07	June 2020	Software Engineering	Professional Elective - I	5	3	0	2	4	70	30	20	30	150
+	<a href="#">3150712</a>	07	June 2020	Computer Graphics	Professional Elective - I	5	3	0	2	4	70	30	20	30	150
+	<a href="#">3150713</a>	07	June 2020	Python for Data Science	Open Elective - I	5	2	0	2	3	70	30	20	30	150
+	<a href="#">3150714</a>	07	June 2020	Cyber Security	Open Elective - I	5	2	0	2	3	70	30	20	30	150



• **Syllabus of Professional Ethics**



**GUJARAT TECHNOLOGICAL UNIVERSITY**

Bachelor of Engineering

Subject Code: 3150709

**SUBJECT NAME: Professional Ethics**

**Semester V**

Type of course: NA

Prerequisite: NA

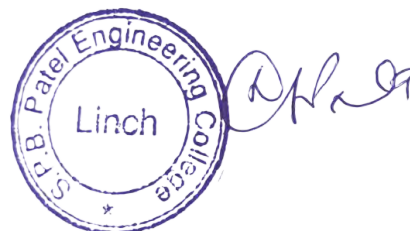
Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA	ESE (V)	PA(I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Concepts and theories of Business Ethics: Definitions of Ethics, Personal ethics and Business ethics, Morality and law, How are moral standards formed? Religion and Morality, Morality, Etiquette and Professional codes, Indian Ethical Traditions.	6
2	Business Ethics: Principles of personal Ethics, Principles of Professional ethics, Evolution of Ethics Over the years, Honesty, Integrity and Transparency are the touchstones of Business Ethics, Distinction Between Values and Ethics, Roots of unethical Behaviour, Ethical Decision – Making	6
3	Ethical Dilemmas, Sources and Their resolutions: What is an Ethical Dilemma, Sources of Ethical Behaviour, Code of Personal Ethics for Employees, How to Resolve an Ethical Problem, How to Resolve Ethical Dilemmas.	5
4	Ethical Decision – marking in Business: Ethical Models that Guide Decision making, Which Approach to use, Ethical Decision Marking with Cross – holder conflicts and competition, Applying Moral Philosophy to Ethical Decision Making, Kohlberg’s Model of Cognitive Moral Development, Influences on Ethical Decision Making, Personal values and Ethical Decision Marking	10
5	Individual factors: Moral Philosophies and values – Moral Philosophy defined, Moral philosophies, Applying Moral Philosophy to Ethical decision Making, Cognitive moral Development, White – Collar Crime, Individual factors in Business Ethics	9
6	Human Values for Indian Managers, Lessons from Ancient Indian Education system, The law of Karma, Quality of Working life, Ethics of Vivekananda, Gandhiji, Aurobindo and Tagore.	9





## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3150709

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	20	10	25	20	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

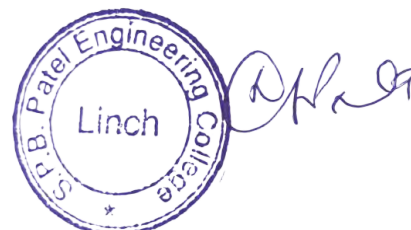
Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. Business Ethics by AC Fernando
2. Business Ethics by Ferrell, Fraedrich and Ferrell.
3. Ethics in Management and Indian Ethos by Biswanath Gosh

### Course Outcomes: After learning the course the students will able to

Sr. No.	CO statements	Marks %Weightage
CO-1	Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)	25
CO-2	Identify and describe relevant theoretical concepts related to professional ethics in engineering	20
CO-3	Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories	20
CO-4	Distinguish among morals, values, ethics, and the law and to explore how they each impact engineering practice	25
CO-5	Apply learning from Indian history and ethos to ethical practices in engineering.	10



## 2. Induction Program

- **Subject Code: 3110017, Branch Code: 07**

1/1/24, 11:01 AM

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### TEACHING SCHEME / DETAIL SYALLBUS

BE      07 - COMPUTER ENGINEERING      1

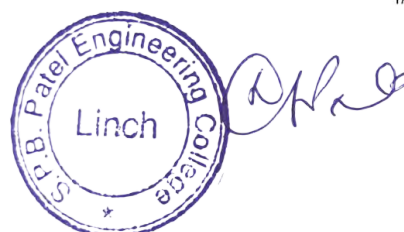
Academic Year      Subject Code      Enter Subject Name      Search

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

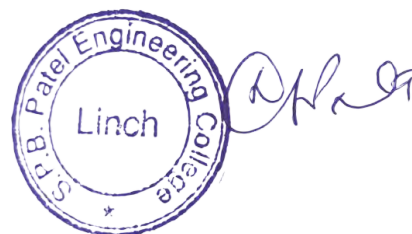
Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours				Total	Credit				Total
							L.	T.	P.	R.		E	M	I	V	
+	<a href="#">110001</a>	07	2008-09	Chemistry	Compulsory	1	3	0	2	5	70	30	50	0	150	
+	<a href="#">110002</a>	07	2008-09	Communication Skills	Compulsory	1	1	0	2	3	70	30	50	0	150	
+	<a href="#">110003</a>	07	2008-09	Computer Programming and Utilization	Compulsory	1	2	0	4	6	70	30	50	0	150	
+	<a href="#">110004</a>	07	2008-09	Elements of Civil Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150	
+	<a href="#">110005</a>	07	2008-09	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150	
+	<a href="#">110006</a>	07	2008-09	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150	
+	<a href="#">110007</a>	07	2008-09	Environmental Studies	Compulsory	1	3	0	0	3	70	30	50	0	150	
+	<a href="#">110010</a>	07	2008-09	Mechanics of Solids	Compulsory	1	3	0	2	5	70	30	50	0	150	
+	<a href="#">110011</a>	07	2008-09	Physics	Compulsory	1	3	0	2	5	70	30	50	0	150	
+	<a href="#">110012</a>	07	2008-09	Workshop	Compulsory	1	0	0	4	4	0	0	100	0	100	
+	<a href="#">110013</a>	07	2008-09	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	50	0	150	
+	<a href="#">110014</a>	07	2008-09	Calculus	Compulsory	1	3	2	0	5	70	30	50	0	150	
+	<a href="#">110015</a>	07	2008-09	Vector Calculus and Linear Algebra	Compulsory	1	3	2	0	5	70	30	50	0	150	
+	<a href="#">1990001</a>	07	2008-09	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	50	0	150	
+	<a href="#">2110002</a>	07	June 2013	Communication Skills	Compulsory	1	2	0	2	4	70	30	20	30	150	
+	<a href="#">2110003</a>	07	June 2013	Computer Programming And Utilization	Compulsory	1	3	1	2	6	70	30	20	30	150	
+	<a href="#">2110005</a>	07	June 2013	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150	
+	<a href="#">2110006</a>	07	June 2013	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150	
+	<a href="#">2110007</a>	07	June 2013	Environmental Studies	Compulsory	1	3	0	0	3	70	30	0	0	100	
+	<a href="#">2110011</a>	07	June 2013	Physics	Compulsory	1	3	0	2	5	70	30	20	30	150	
+	<a href="#">2110013</a>	07	June 2013	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	20	30	150	
+	<a href="#">2110014</a>	07	June 2013	Calculus	Compulsory	1	3	2	0	5	70	30	20	30	150	
+	<a href="#">2110015</a>	07	June 2013	Vector Calculus And Linear Algebra	Compulsory	1	3	2	0	5	70	30	20	30	150	
+	<a href="#">2110016</a>	07	June 2013	Basic Electronics	Compulsory	1	4	0	2	6	70	30	20	30	150	
+	<a href="#">2110017</a>	07	June 2013	Electrical and Electronics Workshop	Compulsory	1	0	0	4	4	0	0	20	80	100	

https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE

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+	<a href="#">2990001</a>	07	June 2013	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	20	30	150
+	<a href="#">3110001</a>	07	Oct - 21	Chemistry	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110002</a>	07	2018-19	English	Humanities and Social Science	1	2	0	2	3	70	30	20	30	150
+	<a href="#">3110003</a>	07	2018-19	Programming for Problem Solving	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110005</a>	07	2018-19	Basic Electrical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110006</a>	07	2018-19	Basic Mechanical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110007</a>	07	2018-19	Environmental Sciences	Mandatory	1	2	2	0	0	70	30	0	0	100
+	<a href="#">3110012</a>	07	2018-19	Workshop/ Manufacturing Practices	Engineering Science	1	0	0	4	2	0	0	20	80	100
+	<a href="#">3110013</a>	07	2018-19	Engineering Graphics & Design	Engineering Science	1	2	0	4	4	70	30	20	30	150
+	<a href="#">3110014</a>	07	2018-19	Mathematics - 1	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110015</a>	07	2018-19	Mathematics - 2	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110016</a>	07	2018-19	Basic Electronics	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110017</a>	07	2018-19	Induction Program	Mandatory	1	0	0	0	0	0	0	0	0	0
+	<a href="#">3110018</a>	07	2018-19	Physics	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150



## • Syllabus of Induction Program



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
 (Established by Government of Gujarat under Gujarat Act No.: 20 of 2007)  
**ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી**  
 (ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

### Induction Program (Subject Code : 3110017)

The details for Two weeks Induction Program are as per below :

#### Preamble:

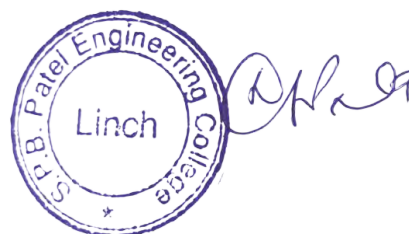
The goal of engineering education is to train engineering graduates well in branch of admission, have a holistic personality and must have desire to serve society and nation. It is expected that an engineering graduate work for solving the problems of society using the modern technologies and practices. That needs the broad understanding of the society and relationships. It is needed to cultivate the human values in engineering graduates to fulfil his responsibilities as an engineer, a citizen and a human being. Considering the various social backgrounds and whether a student comes from the urban or rural areas they differ in many of the life skills and their abilities and thinking. There branch of admission may be due to rush; their interest in subject is question. They are facing the issues like hostel and settlements, pressures from peers and many related issues. To overcome such issues, it is necessary to create an environment for students so that they feel comfortable, find their interest and explore their inner beings, create bonding with other students, establish relation with teachers, work for excellence, get a broader view of life and practice human values to build characters. The Induction Program covers the various activities which enables them to overcome all such issues and motivates them to perform well in their chosen branch of admission.

#### Scheme:

Sr. No.	Phase and Activities Heads	Weightage
1.	<b>Initial Phase</b>	<b>1 Day (6 Hrs)</b>
2.	<b>Regular Phase</b>	<b>10 Days</b>
(a)	Virtual activity	12 Hours
(b)	Creative Arts	12 Hours
(c)	Universal Human Values	12 Hours
(d)	Literary	8 Hours
(e)	Proficiency Modules	8 Hours
(f)	Lectures by Eminent People	4 Hours: (2 Expert Lectures)
(g)	Innovations	4 Hours
3.	<b>Closing Phase</b>	<b>(6 Hrs)</b>
<b>Total</b>		<b>72 Hours</b>

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 ❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013

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**Ahmedabad** : 2nd Floor, ACPC Building, L. D. College of Engineering Campus, Navrangpura, Ahmedabad, (Gujarat) India - 380 015. Phone : + 91 - 79 - 26 300 499 / 599 Fax : + 91 - 79 - 26 30 1500  
**Gandhinagar** : K-6 Circle, E-4 Electronic Estate G.I.D.C., Nr. Government Polytechnic, Sector-26, Gandhinagar - 382 028 Gujarat. e-mail : info@gtu.ac.in URL : www.gtu.ac.in







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ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

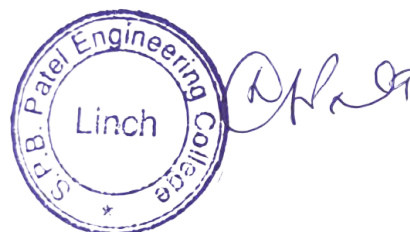
## Phases, Modules, Activities and Guidelines:

The activity during Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The initial and closing phases would be one day each. The following is the guidelines indicating the possible activities under each phase of the Induction Program.

Initial Phase (First Day)		
Following are the activities to be carried on the first day: <ul style="list-style-type: none"><li>● Orientation Programme</li><li>● Know your Department/Institute</li><li>● Know your university</li><li>● Know hostel and other amenities</li><li>● Information about Student Diary and Induction Program</li></ul>		
Regular phase		
The Regular Phase consists of 10 days, each day is of 6 hours. It covers all the 7 different activity modules. For each module, the objectives, suggested activities and guidelines are provided herewith. Institute can use additional relevant activities in additional in suggested activities for each of the phases.		
Module Name	Objectives	Suggested Activities
1.Virtual Activity	<ol style="list-style-type: none"><li>1. Improve immunity and mental strength.</li><li>2. Improve bone health.</li><li>3. Examine the effect of nutrition, rest and other lifestyle factors that contribute to the better health.</li></ol>	<ol style="list-style-type: none"><li>1. Online Yoga/ Pranayama session</li><li>2. Online Motivation for physical exercise</li></ol>
<b>Guidelines:</b> <ul style="list-style-type: none"><li>● Yoga/Pranayam followed by physical activities including various games.</li><li>● Refer this link for Yoga/Pranayam <a href="https://s3-ap-southeast-1.amazonaws.com/ministry-of-yoga/images/1528106718.pdf">https://s3-ap-southeast-1.amazonaws.com/ministry-of-yoga/images/1528106718.pdf</a></li></ul>		

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❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013

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**Ahmedabad** : 2nd Floor, ACPC Building, L. D. College of Engineering Campus, Navrangpura, Ahmedabad, (Gujarat) India - 380 015. Phone : + 91 - 79 - 26 300 499 / 599 Fax : + 91 - 79 - 26 30 1500  
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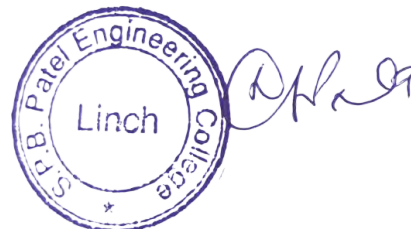
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
2. Creative Arts	<ol style="list-style-type: none"><li>1. Develop creativity and imagination through a range of complex activities.</li><li>2. Improve the student's ability to control materials, tools and techniques.</li><li>3. Develop increasing confidence in the use of visual and tactile elements and materials.</li></ol>	<ol style="list-style-type: none"><li>1. Make a model of any physical object related to Engineering Design</li><li>2. Crafting</li><li>3. Painting</li><li>4. Sculpture</li><li>5. Pottery</li><li>6. Music</li><li>7. Dance</li></ol>
<b>Guidelines:</b> <ul style="list-style-type: none"><li>• Use any activities leading to creative thing and practice.</li><li>• Show the video demonstrating the creative ideas and thinking</li><li>• Show the video demonstrating phenomenon performance using innovation in different areas of humanity and social science</li><li>• Demonstrate the story of leaders with the context of how with their creative vision, with all odds they achieved success</li></ul>		
3. Universal Human Values	<ol style="list-style-type: none"><li>1. Impart universal human values in students.</li><li>2. Enable students to live in harmony within themselves, with family, with society and the nature.</li><li>3. Initiate the process of self-exploration and self-investigation within themselves about their understanding of happiness.</li></ol>	<ol style="list-style-type: none"><li>1. Showing Motivational Videos.</li><li>2. Swachchhata Mission Activities.</li><li>3. Awareness regarding environmental issues and remedies.</li><li>4. Discuss autobiography of legendary persons who practiced universal human values in their life and work.</li></ol>

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### Guidelines:

- Use the materials and activities covered in the FDP on Induction Program held at GTU organized by AICTE.
- The faculties trained from institute will take leadership role to rollout it at institute level.

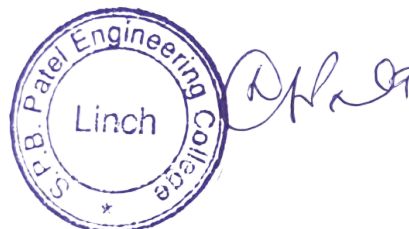
Module Name	Objectives	Suggested Activities
4. Literary	<ol style="list-style-type: none"><li>1. Inculcate the habit of active (or interactive) consumption of the best content available in literature.</li><li>2. Develop thinking skills.</li><li>3. Improve reading abilities and attitude.</li></ol>	<ol style="list-style-type: none"><li>1. Basic Mathematics for Solving Real World Problems</li><li>2. Use of Scientific Calculator in Engineering</li><li>3. General Knowledge Quiz Competition</li><li>4. Vedic Mathematics</li><li>5. Reading/writing/speaking/listening</li><li>6. Book review</li></ol>

### Guidelines:

- Use the video lectures to literate students in different skills needed for day-to-day life and need.
- Motivate students to create the nature of inquiry and reading habits.
- Arrange the various competitions like Elocution, Essay writing, Storytelling, Book reviews etc.
- Writing the review of the well-known books, movies and sharing.

Winners of : ICT Enabled University Award E-India - 2009 ❖ Manthan Award - 2009 ❖ GESIA Award - 2011  
❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013

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**Ahmedabad** : 2nd Floor, ACPC Building, L. D. College of Engineering Campus, Navrangpura, Ahmedabad, (Gujarat) India - 380 015. Phone : + 91 - 79 - 26 300 499 / 599 Fax : + 91 - 79 - 26 30 1500  
**Gandhinagar** : K-6 Circle, E-4 Electronic Estate G.I.D.C., Nr. Government Polytechnic, Sector-26, Gandhinagar - 382 028 Gujarat. e-mail : info@gtu.ac.in URL : www.gtu.ac.in





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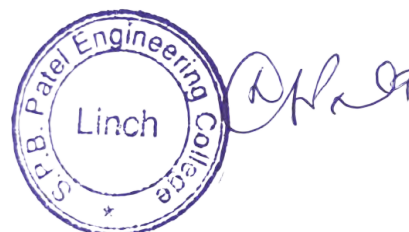
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
5. Proficiency modules	<ol style="list-style-type: none"><li>1. Determining English proficiency level of students and mentoring accordingly.</li><li>2. Learn the mining vocabulary, idioms, and expressions and Understand their meanings in context.</li><li>3. Develop ability to write a paragraph about general topics by using the English language correctly.</li><li>4. Realize the importance of English language as a global business language.</li></ol>	<ol style="list-style-type: none"><li>1. English general diagnostic test to determine student's English proficiency level.</li><li>2. Mentoring students to improve in English proficiency according to his/her proficiency level based on test.</li></ol>
<p><b>Guidelines:</b></p> <ul style="list-style-type: none"><li>● An MCQ test of <b>45 minutes</b> should be conducted covering basic grammar and vocabulary.</li><li>● Group the students in three groups based on test result in three proficiency levels:<ul style="list-style-type: none"><li>○ Unsatisfactory</li><li>○ Satisfactory</li><li>○ Good</li></ul></li><li>● Following activities are to be used to uplift proficiency levels of students.<ul style="list-style-type: none"><li>○ Motivational movies, documentary<ul style="list-style-type: none"><li>○ Language games</li><li>○ Essay/story writing</li><li>○ Ice breaking games.</li></ul></li></ul></li></ul> <p>Separate set of activities from suggested list should be used for different groups.</p>		

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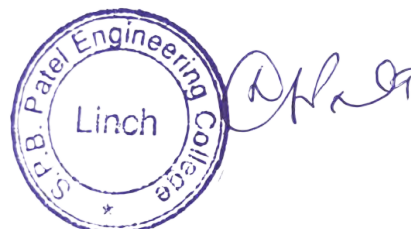
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
6. Lectures by Eminent people	1. Motivation through knowing experience of successful person. 2. Meet and interact with eminent personalities of different fields.	1. To conduct lecture by eminent people. 2. Interaction with leaders, experts, entrepreneurs, contributors and successful personalities
<b>Guidelines:</b> <ul style="list-style-type: none"><li>• 1 expert lecture.</li><li>• Multiple divisions can be combined in an expert lecture.</li><li>• External expert should be invited.</li><li>• Expert can be from academic, industry, research organization, social organization etc.</li><li>• An individual successful person in any of the field can be invited.</li><li>• The aspect to be addressed may be social / economical / engineering / entrepreneurship/ spiritual/ humanity science.</li></ul>		
Module Name	Objectives	Suggested Activities
7. Innovation	1. Introduce the student about innovation in different fields 2. Make students aware about innovative and modern practices and products in their own branch 3. Create awareness about support available for start-up and innovation	1. Lectures by senior faculties. 2. Showing videos demonstrating innovation. 3. Introducing innovative technology/products. 4. Awareness regarding SSIP Scheme of Government of Gujarat 5. Awareness about Government initiatives in areas of innovations and supports for start-up, Incubation, Entrepreneurship etc.
<b>Guideline:</b> <ul style="list-style-type: none"><li>• Video lectures from leaders and innovators.</li><li>• TeDx Talks.</li><li>• Government Policy documents for different schemes.</li></ul>		

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(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

## Closing Phase (Last Day)

The closing phase is the last day of the Induction Program and covering conclusion and summary of the Induction Program.

### Conclusion and summary:

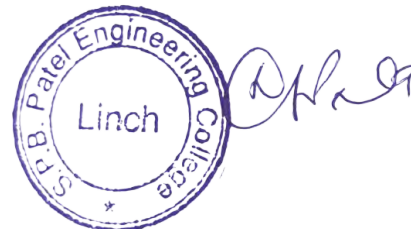
- Guiding students for preparation of student report about Induction Program.
- Instruct students regarding submission and examination of the Induction Program.
- Address by HODs/Senior faculties regarding branch/discipline and career option in respective branch.
- Introduce about the engineering and its importance in life and their responsibilities towards the society.

### General Regulations:

- Every student has to maintain a daily diary. Format of the diary is already given.
- After completion of the Induction program student has to prepare a report based on activities performed during the Induction program. Diary will be attached as Appendix in Report.
- 75% Attendance is requiring during Induction Program.
- This program will be noncredit subject but it will reflect in 1<sup>st</sup> Semester Marksheet as PASS or FAIL.
- Institute should appoint a mentor for a group of 20 to 30 students. Mentor can take help of senior students.
- If student gets admission transfer in other college during Induction Program the diary will be continued from previous college to new college.
- If student gets admission in middle of the Induction Program or student gets admission after Induction Program, it is responsibility of the institute to fulfill the criteria of the Induction Program.
- If student fails in the Induction program the student has to clear the same during subsequent Semester

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## Evaluation Pattern:

1. Induction Program is Mandatory course for each branch of Engineering.
2. It is mandatory for each student to clear Induction Program with PASS grade.
3. Grades for Induction Program are either PASS or FAIL and have no credits. Evaluation for Induction Program is based on the Induction Program Report prepared by a student from Student diary and student will be declared PASS or FAIL.
4. Student has to submit the Induction Program Report at the end of first semester dully approved by Mentor and HOD.
5. Evaluation of Induction Program will be done along with first Semester Term-Work Submission.
6. The evaluation is carried out by Internal Examiner from institute itself. The entry on the GTU portal will be PASS or FAIL, not marks.
7. Students who will FAIL have to reappear again after every 6 months as remedial exam.

## Guidelines for Program Report:

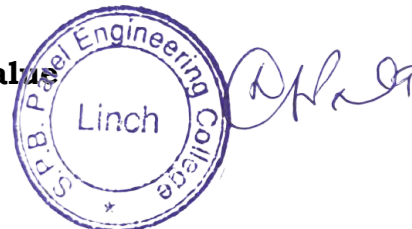
- 1) Report should have minimum 20 pages.
- 2) Report must have One Photograph per Activity.
- 3) Report consists of Certificate, Index and Diary as Appendix.
- 4) Report should be dully signed by Mentor and HOD.
- 5) Index will have following sequence:

1.	<b>Initial Phase</b>
2.	<b>Regular Phase</b>
(a)	Virtual activity
(b)	Universal Human Values
(c)	Literary
(d)	Proficiency Modules
(e)	Lectures by Eminent People
(f)	Innovations
3.	<b>Closing Phase</b>

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Human Values



### 3. Effective Technical Communication

**Subject Code: 3130004, Branch Code: 06**

08/02/2024, 14:52

<https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE>



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#### TEACHING SCHEME / DETAIL SYLLABUS

BE      06 - CIVIL ENGINEERING      3

2018-19      Subject Code      Enter Subject Name      Search

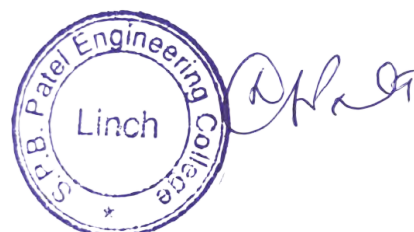
\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff. from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L.	T.	P.		E	M	I	V	
+	<a href="#">3130004</a>	06	2018-19	Effective Technical Communication	Humanities and Social Science	3	2	0	2	3	70	30	20	30	150
+	<a href="#">3130007</a>	06	2018-19	Indian Constitution	Mandatory	3	2	0	0	0	50	0	0	0	50
+	<a href="#">3130008</a>	06	2018-19	Design Engineering - IA	Project Work	3	0	0	2	1	0	0	20	80	100
+	<a href="#">3130606</a>	06	2018-19	Geotechnical Engineering	Professional Core	3	4	0	2	5	70	30	20	30	150
+	<a href="#">3130607</a>	06	2018-19	Building Construction Technology	Professional Core	3	4	0	2	5	70	30	20	30	150
+	<a href="#">3130608</a>	06	2018-19	Mechanics of Solids	Engineering Science	3	4	0	2	5	70	30	20	30	150
+	<a href="#">3130609</a>	06	2018-19	Building and Town Planning	Engineering Science	3	2	0	4	4	70	30	20	30	150

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- Syllabus of Effective Technical Communication**







## GUJARAT TECHNOLOGICAL UNIVERSITY

### Bachelor of Engineering

Subject Code: 3130004

14. Build From Scratch by Vineet Bajpai
15. Ten Much by A G Krishnamoorthy
16. Poor Little Rich Slum by Rashmi Bansal
17. Our Ice Berg is Melting by John Paul Cotter
18. Most and More by Mahatria Ra
19. Third Curve by Mansoor Ali Khan
20. Selected Short Stories of Rabindranath Tagore edited by William Radice
21. That Thou Art by Dhruv Bhatt
22. Old Man and the Sea by Ernest Hemingway

#### Reference Books:

1. Raman and Sharma, *Technical Communications*, OUP, New Delhi, 2017
2. Lata and Kumar, *Communication Skills*, OUP, New Delhi, 2018
3. Mike Martin and Roland Schinzinger, *Ethics in Engineering*, McGraw Hill, New York, 2014
4. Mohapatra and Sreejesh S., *Case Studies in Business Ethics and Corporate Governance*, Pearson, UP, 2013
5. Ramesh and Ramesh, *The Ace of Soft Skills*, Pearson, UP, 2019
6. Sherfield, Montgomery and Moody, *Cornerstone: Developing Soft Skills*, UP, 2009

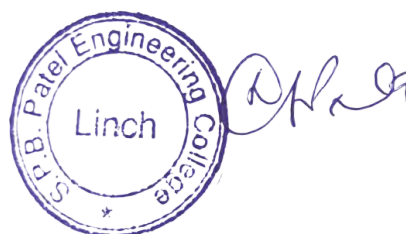
#### Open Sources:

<https://www.scu.edu/ethics/focus-areas/more/engineering-ethics/engineering-ethics-cases/>

#### Course Outcomes:

At the end of the course students will be able to:

Sr. No.	Course Outcome	Weightage
1	Define and discuss dynamics of Verbal and Non Verbal aspects of Communication	20%
2	Write various formal documents of technical and professional communication	25%
3	Communicate in diverse formal situations taking place in organizations	20%
4	Illustrate and examine the knowledge of ethical aspects of engineering	12%
5	Demonstrate and explain social and professional etiquettes	16%
6	Plan self-development and practice self-assessment	7%





## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering  
Subject Code: 3130004

	Respecting privacy Learning to say NO Time management		
6	<b>Self-development and Assessment:</b> Change, Grow, Persist, Prioritize, Read, Learn, Listen, Record, Remember, Asses, Think, Communicate, Relate, Dream.	03	7%

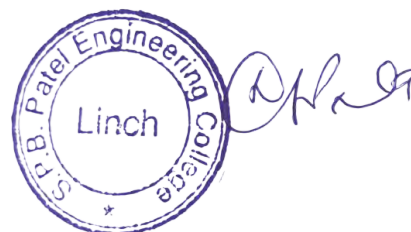
Distribution of Theory Marks					
Remember	Understand	Analysis	Application	Evaluation	Creativity
05	05	15	15	15	15

Language Laboratory Activities:

Sr. No.	Practical/ Exercise	Apprx. Hours required	Preferably to be conducted in:
1	Role Play	02	Classroom/Hall
2	Letter writing: Formal	02	Classroom/Lab
3	Group Discussion	04	Classroom/Hall
4	Presentations	04	Classroom/Hall
5	Book Review(Preferably related to self-development)	04	Classroom/Hall
6	Mock Interview	04	Classroom/Hall
7	Report writing	02	Classroom/Lab
8	Case studies related to unit 4, 5 and 6	06	Classroom/Lab
9	Conducting meetings and minutes of meeting	02	Classroom/Hall
10	Practical assessment	02	Classroom/Lab

Suggested books for review:

1. You Can Win by Shiv Khera
2. How to Win Friends and Influence People by Dale Carnegie
3. Getting Things Done: The Art of Stress Free Productivity by David Allen
4. Quiet: The Power of Introverts in a World That Can't Stop Talking by Susan Cain
5. The Alchemist by Paulo Coelho
6. The 7 Habits of Highly Effective People by Stephen Covey
7. What to Say When You Talk to Yourself by Dr. Shad Helmstetter
8. The Big Leap by Gay Hendricks
9. Thinking Fast and Slow by Daniel Kahneman
10. The Art of Thinking Clearly by Ralf Dobelli
11. Upside Down Key by Sudha Murthy
12. Born to be Happy by Pramod Batra
13. Kiss That Frog by Brian Tracy





## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3130004

Semester – III

Subject Name: Effective Technical Communication

Type of course: Communication and ethics

Prerequisite: Zeal to learn the subject

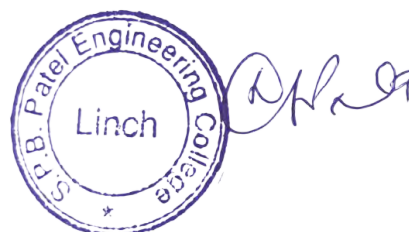
Rationale: The rationale of the curriculum is to help students learn technical communication along with necessary moral and ethical dimensions of engineering.

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
2	0	2	3	70	30	30	20	150

### Contents:

Sr. No.	Topics	Teaching Hours	Module Weightage
1	<b>Dynamics of Communication:</b> Definition and process Kinesics Proxemics Paralinguistic features Importance of Interpersonal and Intercultural Communication in today's organizations	06	20%
2	<b>Technical Writing:</b> Report writing Technical proposal Technical description Business letters (sales, order, complaint, adjustment, inquiry, recommendation, appreciation, apology, acknowledgement, cover letter) Agenda of meeting, Minutes of meeting Resume writing	08	25%
3	<b>Technical Communication:</b> Public speaking Group discussion Presentation strategies Interview skills Negotiation skills Critical and Creative thinking in communication	06	20%
4	<b>Ethics in Engineering:</b> Scope of engineering ethics Accepting and sharing responsibility Responsible professionals and ethical corporations Resolving ethical dilemmas Making moral choices	04	12%
5	<b>Etiquettes:</b> Telephone etiquettes Etiquettes for foreign business trips Visits of foreign counterparts Etiquettes for small talks	05	16%



## 4. Organizational Behaviour

### Subject Code: 3141909, Branch Code: 19

08/02/2024, 15:23

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### TEACHING SCHEME / DETAIL SYLLABUS

BE      19 - MECHANICAL ENGINEERING      4

2018-19      Subject Code      Enter Subject Name      Search

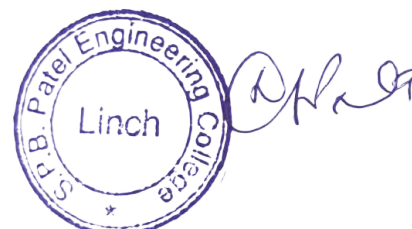
\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff_from	SubjectName	Category	Sem /Year	Hours			Credit		Max Marks			Total
							L.	T.	P.	Total	E	M	I	V	
+	<a href="#">3140005</a>	19	2018-19	Design Engineering 1 B	Project Work	4	0	0	2	1	0	0	20	80	100
+	<a href="#">3141901</a>	19	2018-19	Mechanical Measurement and Metrology	Basic Science	4	4	0	2	5	70	30	20	30	150
+	<a href="#">3141906</a>	19	2018-19	Fluid Mechanics and Hydraulics Machines	Professional Core	4	4	0	2	5	70	30	20	30	150
+	<a href="#">3141907</a>	19	2018-19	Fundamentals of Machine Design	Professional Core	4	4	0	2	5	70	30	20	30	150
+	<a href="#">3141908</a>	19	2018-19	Manufacturing Processes	Professional Core	4	3	0	2	4	70	30	20	30	150
+	<a href="#">3141909</a>	19	2018-19	Organisational Behaviour	Humanities and Social Science	4	3	0	0	3	70	30	0	0	100

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- **Syllabus of Organizational Behaviour**





## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering  
Subject Code: 3141909

### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	25	25	10	10

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. Stephen P. Robins, Organizational Behavior, / Pearson Education
2. Udai Pareek, Understanding Organizational Behaviour, Oxford Higher Education
3. Margi Parikh and Rajan Gupta, Organizational Behaviour, McGraw Hill Education
4. Fred Luthans, Organizational Behavior, McGraw Hill
5. Schermerhorn, Hunt and Osborn, Organizational behavior, John Wiley
6. Mc Shane & Von Glinov, Organizational Behaviour, McGraw Hill
7. Hellrigan, Slocum and Woodman, Organizational Behavior, Cengage Learning
8. Ivancevich, Konopaske & Maheson, Organizational Behaviour & Management, McGraw Hill

### Course Outcomes:

After learning the course

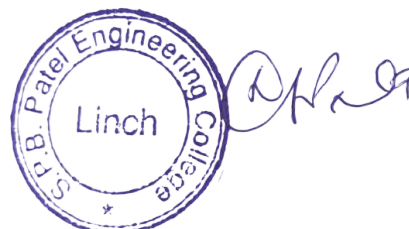
Sr. No.	CO statement	Marks % weightage
CO-1	Students will be able to understand various methods and terms used different organizational behaviour model	15
CO-2	Students will be able to understand Individual Behaviour like attitude, perception, motivation, personality, misbehaviour and emotions.	30
CO-3	Students will be able to understand group behaviour, leadership and power	35
CO-4	Students will be able to understand dynamics of organizational behaviour and managing change.	20

### List of Open Source Software/learning website:

Industry visit, Management games to understand Individual behaviour and group behaviour, also games for leadership development.

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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3141909

Semester – IV

Subject Name: Organisational Behaviour

Type of course:

Prerequisite: Nil

**Rationale:**

Organizational Behavior deals with the application of management skills applied to individual as well as group of persons. It also helps in team work and understanding group dynamics and leads to leadership and motivation.

**Teaching and Examination Scheme:**

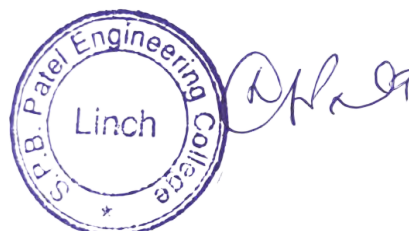
Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Focus and Purpose:</b> Definition, need and importance of organizational behavior, Nature and scope, Frame work, OB model	03
2	<b>Individual Behaviour:</b> Attitudes: Characteristics, Components, Formation, Measurement, barriers to change attitude. Perception: Meaning and concept of perception, factors influencing perception, Motivation: Importance, Types, Theories of Motivation, Effects on work behaviour. Personality and value: Types, Factors influencing personality, Theories, Learning, Types of learners, The learning process, Learning theories, Organizational behaviour modification. Misbehaviour: Types, Management Intervention. Emotions: Emotional Labour, Emotional Intelligence, Theories. Impression management, Individual decision making techniques	14
3	<b>Group Behaviour:</b> Organization structure, Formation, Groups in organizations, Influence, Group dynamics, Group decision making techniques, Team building, Communication, Control, Johari Window	08
4	<b>Leadership and Power:</b> Meaning, Importance, Leadership styles, Behavioural Theories, Fiedler model, LMX theory and Path Goal theory, Leaders vs Managers, Sources of power, Power centers, Power and Politics.	07
5	<b>Dynamics of Organizational Behaviour:</b> Organizational culture and climate, Factors affecting organizational climate, Importance, Job satisfaction, Determinants, Measurements, Influence on behaviour, Stress, Work Stressors, Prevention and Management of stress, Balancing work and Life, Kurt Lewin's-three step model, methods for implementing organizational change.	10

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## 5. Contributor Personality Development Program Subject Code: 3160002, Branch Code: 05

08/02/2024, 14:59

<https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE>



Gujarat Technological University

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### TEACHING SCHEME / DETAIL SYLLABUS

BE  05 - CHEMICAL ENGINEERING  6

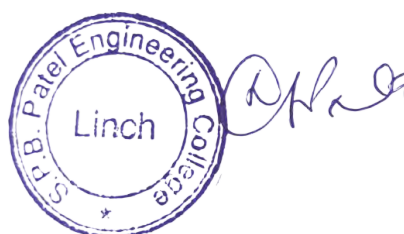
2018-19  Subject Code  Enter Subject Name  Search

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff_from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L.	T.	P.		E	M	I	V	
<input type="checkbox"/>	<a href="#">3160001</a>	05	Dec-2020	Design Engineering II B	Project Work	6	0	0	2	1	0	0	20	80	100
<input type="checkbox"/>	<a href="#">3160002</a>	05	Dec-2020	Contributor Personality Development Program	Personality development Elective	6	2	0	0	2	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160003</a>	05	Dec-2020	Integrated Personality Development Course	Personality development Elective	6	2	0	0	2	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160501</a>	05	Dec-2020	Mass Transfer Operations II	Professional Core	6	4	0	2	5	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160506</a>	05	Dec-2020	Chemical Reactions Engineering I	Professional Core	6	3	0	2	4	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160507</a>	05	Dec-2020	Advanced Separation Processes	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160510</a>	05	Dec-2020	Petroleum Refining and Petrochemicals	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160511</a>	05	Dec-2020	Polymer Science and Technology	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160512</a>	05	Dec-2020	Biochemical Engineering	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
<input type="checkbox"/>	<a href="#">3160513</a>	05	Dec-2020	Waste Water Engineering	Open elective - II	6	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3160514</a>	05	Dec-2020	Green Technology and sustainable Development	Open elective - II	6	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3160515</a>	05	Dec-2020	Solid waste Management	Open elective - II	6	3	0	0	3	70	30	0	0	100

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• **Syllabus of Contributor Personality Development**

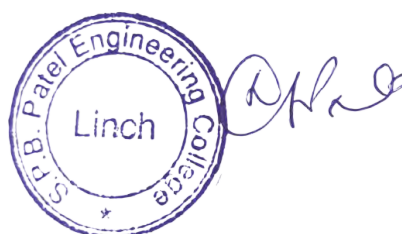


**GUJARAT TECHNOLOGICAL UNIVERSITY**

**Bachelor of Engineering**  
**Subject code: 3160002**

**Course Outcomes:**

Sr. No.	CO statement	Marks % weightage
<b>Outcome of theory sessions</b>		
CO-1	Students will be able to recognize & appreciate the thinking required to find solutions in the face of any challenge.	10-12%
CO-2	Students will be able to recognize & appreciate different types of value that can be created and the different ways to create value for others.	10-12%
CO-3	Students will be able to recognize & appreciate how to engage deeply, and its need, value, payoffs and consequences in different contexts.	10-12%
CO-4	Students will be able to differentiate between 'enlightened self-interest' and 'narrow self-interest' & appreciate the payoffs/ consequences of both when working with multiple stakeholders.	10-12%
CO-5	Students will be able to recognize & appreciate the human side of situations or interactions or projects that will help them develop a more human-centric approach/ response to work.	10-12%
CO-6	Students will be able to recognize & appreciate conduct which builds trust of people in contrast to conduct which breaks trust of people - in teams / organization & the value of trust conduct in various situations.	10-12%
<b>Outcome of practical sessions</b>		
CO-7	Students complete their 'Contributor Showcase Profile' on the Showcase Platform. This includes (a) completing Illumine's Contributor Mindset Assessment (b) building evidence to demonstrate their functional orientations as contributors.	15%
CO-8	Students learn to apply contributor thinking to think-through and address real-world challenges.	15%







## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject code: 3160002**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
-	15	15	-	20	20

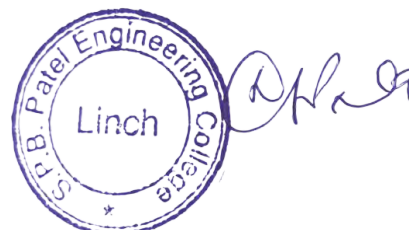
### Reference resources:

#### A. Basic reference for both students and teachers

1. Contributor Personality Program textbook cum workbook developed by Illumine
2. Web-based ActivGuide™ for self-exploration of rich media resources to vividly understand many of the ideas, watch role models, learn from industry people, get reference readings – that help them enrich the understanding they gained in the class published by Illumine Foundation

#### B. Advanced reference for teachers

1. On Contributors, Srinivas V.; Illumine Ideas, 2011
2. Enlightened Citizenship and Democracy; Swami Ranganathananda, Bharatiya Vidya Bhavan, 1989
3. Eternal Values for a Changing Society – Vol I-IV, Swami Ranganathananda; Bharatiya Vidya Bhavan
4. Karma Yoga, Swami Vivekananda; Advaita Ashrama
5. Vivekananda: His Call to the Nation, Swami Vivekananda; Advaita Ashrama
6. Six Pillars of Self Esteem, Nathaniel Branden; Bantam, 1995
7. Mindset: The New Psychology of Success, Carol S. Dweck; Random House Publishing Group, 2007
8. Lasting Contribution: How to Think, Plan, and Act to Accomplish Meaningful Work, Tad Waddington; Agate Publishing, 2007
9. Why not?: how to use everyday ingenuity to solve problems big and small, Barry Nalebuff, Ian Ayres; Harvard Business School Press, 2003
10. The value mindset: returning to the first principles of capitalist enterprise (Ch 8 & 9); Erik Stern, Mike Hutchinson; John Wiley and Sons, 2004
11. The Power of Full Engagement: Managing Energy, Not Time, is the Key to High Performance and Personal Renewal, Jim Loehr, Tony Schwartz; Simon and Schuster, 2003
12. Creating Shared Value, Michael E. Porter and Mark R. Kramer; Harvard Business Review; Jan/Feb2011, Vol. 89 Issue 1/2
13. The Speed of Trust: The One Thing That Changes Everything, Stephen M. R. Covey, Rebecca R. Merrill, Stephen R. Covey; Free Press, 2008
14. The Courage to Meet the Demands of Reality, Henry Cloud; HarperCollins, 2009
15. Responsibility at work: how leading professionals act (or don't act) responsibly, Howard Gardner; John Wiley & Sons, 2007

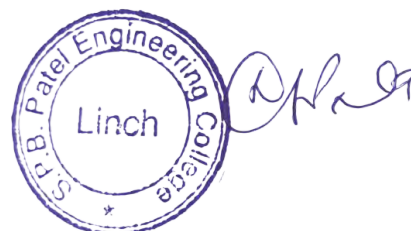




## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject code: 3160002**

	people who were most efficient and productive, who were valued by organizations). At the heart of innovation lies this way of thinking of “finding solutions” rather than “seeing problems or roadblocks”. Students learn how to build this way of thinking, in this topic.	
<b>2</b>	<b>Creating Value</b> Companies are also looking for employees who do not just work hard, or work efficiently or productively - but those who will make a valuable difference to the fortunes of the company. This difference may come from innovation, but it may also come from focusing on the right things and identifying what really matters – both to the company and to the customers. In this topic, students learn how to build this capability.	Same as above
<b>3</b>	<b>Engaging deeply</b> The environment we live in is becoming increasingly complex because more and more things are getting interconnected, new fields are emerging, technologies are rapidly changing, capabilities and knowledge one is trained in will become fast obsolete. In such a scenario, the student’s ability to quickly understand and master what is going on, dive deep, get involved in any area, rapidly learn new capabilities that a job demands, is important. Engaging deeply is a core way of thinking that can help them in this. In this topic, students learn how to engage deeply.	Same as above
<b>4</b>	<b>Enlightened self-interest &amp; collaboration at work</b> The changing nature of work in organizations and in the global environment is increasingly demanding that people work more collaboratively towards shared goals and more sustainable goals. A key to working successfully when multiple stakeholders are involved is “thinking in enlightened self-interest”. In this topic, students learn how to develop this way of thinking (going beyond “narrow self-interest”).	Same as above
<b>5</b>	<b>Human-centered thinking &amp; Empathy</b> In this topic, students explore a human-centric approach to work – where the ability to recognize and respond to other people (whether they are users or customers or team members) as a human being with human needs and difficulties, is essential. This is at the heart of user-centric design of products and solutions, at the heart of genuine customer-centricity in services, and of any successful interaction with other people.	Same as above
<b>6</b>	<b>Trust Conduct</b> The biggest currency in a sustainable career is “trust” i.e. being trusted by team members, bosses, and customers. When we are trusted, people listen to us, they are willing to give us the chance to grow, give us the space to make mistakes, and work seamlessly with each other without always having to “prove ourselves”. In this topic, students learn how to demonstrate conduct that builds the trust of people.	Same as above
<b>Showcase Lab Sessions</b>		3 hrs
<b>Project work</b>		Beyond classroom





## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject code: 3160002**  
Contributor Personality Development Program

### SEMESTER VI

**Type of course:** Work-Personality Development

**For Year:** Pre-final year for all Diploma, Degree & Masters programmes over 2 semesters. For e.g. for Bachelors of Pharmacy and Engineering, the course will be conducted in Semesters V & VI.

**Rationale:** The Contributor Program aims to accomplish the following outcomes in the lives of students–

- Improve the employability of students by giving them the right work ethic and thinking that employers are looking for.
- Build their confidence with which they can go into any job and contribute meaningfully.
- Improve their ability to engage better in the workplace and to be able to handle the challenges that come up there.
- Build their career-worthiness and help them develop into future-ready contributors with ability to navigate a career in a volatile, changing world.
- Widen their choices of career and success, so that they are able to open up more opportunities for themselves and take up unconventional career pathways.
- Enable them to recognize how they, as technical professionals, can participate and make a positive contribution to their communities and to their state.

Towards this goal, the Contributor Program has been designed to awaken and strengthen students from within, in terms of building positive self-esteem, increasing their confidence level and I-can attitude, improving their aspirations, giving them new methods of thinking, building their cognitive capacities, exposing them to the skills and practices associated with being contributors in the workplace (not mere employees).

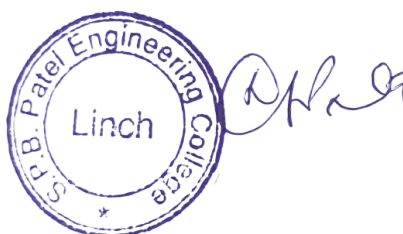
The Program content is also designed to expose students to real-world workplace scenarios and sensitize them to some of the challenges faced in society around them, especially in the local communities around them and in their own state of Gujarat.

The Contributor Program syllabus has been evolved and fine-tuned over several years, (a) to address the changing need and contemporary challenges being faced by industry and what employers of today are looking for in the people they hire and (b) by working extensively with universities and students building an appreciation of their challenges and concerns. At the core, the program is guided by the higher ideas and principles of practical Vedanta in work.

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	0	2	70	30	30	20	150

### COURSE CONTENT :

Sr. No.	Content	Total Hrs
1	<b>Finding Solutions</b> The market environment in which organizations are operating, is becoming increasingly dynamic and uncertain. So, employers are increasingly seeking out people who can innovate and figure out solutions in the face of any challenge (unlike in the past when it was the	1.5 hrs Classroom engagement (including self-discovery/ solutioning sessions)



## 6. Integrated Personality Development Course Subject Code: 3150005, Branch Code: 07

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### TEACHING SCHEME / DETAIL SYALLBUS

BE      07 - COMPUTER ENGINEERING      5

2018-19      Subject Code      Enter Subject Name      Search

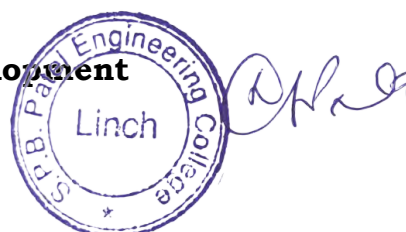
\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L	T	P		E	M	I	V	
+	<a href="#">3150001</a>	07	June 2020	Design Engineering - II A	Project Work	5	0	0	2	1	0	0	20	80	100
+	<a href="#">3150004</a>	07	June 2020	Contributor Personality Development Program	Personality development Elective	5	2	0	0	2	70	30	20	30	150
+	<a href="#">3150005</a>	07	June 2020	Integrated Personality Development Course	Personality development Elective	5	2	0	0	2	70	30	20	30	150
+	<a href="#">3150703</a>	07	June 2020	Analysis and Design of Algorithms	Professional Core	5	4	0	2	5	70	30	20	30	150
+	<a href="#">3150709</a>	07	June 2020	Professional ethics	Humanities and Social Science	5	3	0	0	3	70	30	0	0	100
+	<a href="#">3150710</a>	07	June 2020	Computer Networks	Professional Core	5	4	0	2	5	70	30	20	30	150
+	<a href="#">3150711</a>	07	June 2020	Software Engineering	Professional Elective - I	5	3	0	2	4	70	30	20	30	150
+	<a href="#">3150712</a>	07	June 2020	Computer Graphics	Professional Elective - I	5	3	0	2	4	70	30	20	30	150
+	<a href="#">3150713</a>	07	June 2020	Python for Data Science	Open Elective - I	5	2	0	2	3	70	30	20	30	150
+	<a href="#">3150714</a>	07	June 2020	Cyber Security	Open Elective - I	5	2	0	2	3	70	30	20	30	150

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### • Syllabus of Integrated Personality Development





## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject Code: 3150005**

14	<b>From House to Home-</b> Bonding the Family	Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	2
15	<b>Selfless Service-</b> Seva	Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	2

• **COURSE MATERIAL / MAIN COURSE WORKBOOK -**

**1. IPDC Workbook-1** (presented by B.A.P.S. Swaminarayan Sanstha)

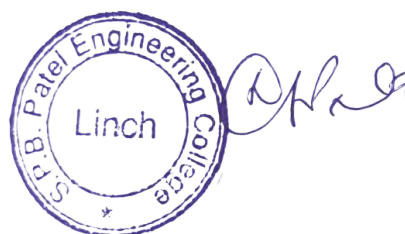
**IPDC REFERENCES –**

These are the reference material for the IPDC lectures. This is not compulsory reading for the students as the essential information is contained in the workbooks.

Module No.	Module	References
1	Facing Failures	<ol style="list-style-type: none"><li>1. Thomas Edison's factory burns down, New York Times Archives, Page 1, 10/12/1914</li><li>2. <a href="#">Lincoln Financial Foundation</a>, Abraham Lincoln's "Failures": Critiques, Forgotten Books, 2017</li><li>3. <b>J.K. Rowling Harvard Commencement Speech   Harvard University Commencement, 2008</b></li><li>4. Born Again on the Mountain: A Story of Losing Everything and Finding It Back, <a href="#">Arunima Sinha</a>, Penguin, 2014</li><li>5. Failing Forward: Turning Mistakes Into Stepping Stones for Success, <a href="#">John C. Maxwell</a>, Thomas Nelson, 2007</li><li>6. Steve Jobs: The Exclusive Biography Paperback, <a href="#">Walter Isaacson</a>, Abacus, 2015</li><li>7. Failing Forward: Turning Mistakes Into Stepping Stones for Success, <a href="#">John C. Maxwell</a>, Thomas Nelson, 2007</li></ol>
2	Learning from Legends	<ol style="list-style-type: none"><li>1. Chase Your Dreams: My Autobiography, Sachin Tendulkar, Hachette India, 2017</li><li>2. Playing It My Way: My Autobiography, Sachin Tendulkar, Hodder &amp; Stoughton, 2014</li><li>3. The Wit and Wisdom of Ratan Tata, Ratan Tata, Hay House, 2018</li><li>4. The Tata Group: From Torchbearers to Trailblazers, Shashank Shah, Penguin Portfolio, 2018</li><li>5. The Leader Who Had No Title, Robin Sharma, Jaico Publishing House, 2010</li><li>6. In the Joy of Others: A Life-Sketch of Pramukh Swami Maharaj, Mohanlal Patel and BAPS Sadhus, Swaminarayan Aksharpath, 2013</li></ol>
3	My India My Pride	<ol style="list-style-type: none"><li>1. Rishis, Mystics, and Heroes of India, Sadhu Mukundcharandas, Swaminarayan Aksharpath, 2011</li></ol>

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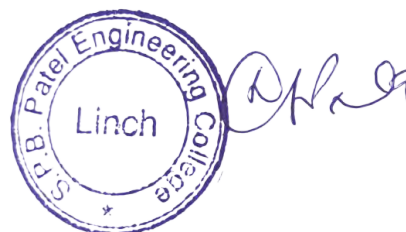
## GUJARAT TECHNOLOGICAL UNIVERSITY

### Bachelor of Engineering Subject Code: 3150005

1	<b>Remaking Yourself</b> Restructuring Yourself	Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients.	2
2	<b>Remaking Yourself -</b> Power of Habit	Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	2
3	<b>Learning from</b> <b>Legends-</b> Tendulkar & Tata	Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies.	2
4	<b>From House to Home-</b> Listening & Understanding	Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and heart.	2
5	<b>Facing Failures-</b> Welcoming Challenges	This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	2
6	<b>Facing Failures-</b> Significance of Failures	Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	2
7	<b>My India My Pride-</b> Glorious Past - Part 1	India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation.	2
8	<b>My India My Pride-</b> Glorious Past - Part 2	Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	2
9	<b>Learning from</b> <b>Legends-</b> A.P.J. Abdul Kalam	Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others	2
10	<b>Soft Skills-</b> Networking & Leadership	Students are taught the means of building a professional network and developing a leadership attitude.	2
11	<b>Soft Skills-</b> Project Management	Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life.	2
12	<b>Remaking Yourself-</b> Handling Social Media	Students will learn how social media can become addictive and they will imbibe simple methods to take back control.	2
13	<b>Facing Failures-</b> Power of Faith	Students will learn about the power and necessity of faith in our daily lives.	2

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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering  
Subject Code: 3150005  
Semester – V

Subject Name : IPDC - 1 (Integrated Personality Development Course)

### Type of Course –

Value-based holistic personality development course for university students.

### Rationale

IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, unity amongst family discord, self-discipline amidst distractions, and many more priceless lessons. The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles - as an ambitious student, reliable employee, caring family member, and considerate citizen.

### Teaching and Examination Scheme:

#### Teaching Scheme

#### Teaching and Examination Scheme per semester:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	0	2	70	30	30	20	150

The assessments should include both continuous evaluation and end-of-semester examinations. The assessment scheme should include student attendance, assignments, mid-term exams, viva, workbook submission, and end-of-semester examinations.

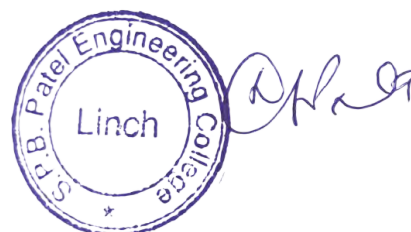
### Course-Content :

Each lecture can be taken in a continuous two-hour session, or in two separate one-hour sessions. In addition to the core lectures, an induction and concluding lectures are recommended as shown in the below table.

Lecture No.	Module -Lecture	Lecture Description	Hours
<b>IPDC-I</b>			
Induction	The Need for Values	Students will learn about the need for values as part of their holistic development to become successful in their many roles - as ambitious students, reliable employees, caring family members, and considerate citizens.	2

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## GUJARAT TECHNOLOGICAL UNIVERSITY

### Bachelor of Engineering

Subject Code: 3150005

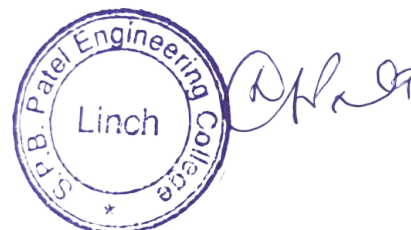
		<ol style="list-style-type: none"><li>2. Physics in Ancient India, <a href="#">Narayan Dongre</a>, <a href="#">Shankar Nene</a>, National Book Trust, 2016</li><li>3. The Rise of Civilization in India and Pakistan, Raymond Allchin, Bridget Allchin, Cambridge University Press, 1982</li><li>4. <a href="#">The Āryabhaṭīya of Āryabhaṭa: An Ancient Indian Work on Mathematics and Astronomy</a> (1930), <a href="#">Walter Eugene Clark</a>, University of Chicago Press, reprint, Kessinger Publishing, 2006</li></ol>
4	Remaking Yourself	<ol style="list-style-type: none"><li>1. Power of Habit, Charles Duhigg, Random House Trade Paperbacks, 2014</li><li>2. Change Your Habit, Change Your Life, Tom Corley, North Loop Books, 2016</li><li>3. The Seven Habits of Highly Effective People, Stephen Covey, Simon &amp; Schuster, 2013</li><li>4. Seven Habits of Highly Effective Teens, Sean Covey, Simon &amp; Schuster, 2012</li><li>5. Atomic Habits, James Clear, Random House, 2018</li><li>6. How a handful of tech companies control billions of minds every day, Tristan Harris, TED Talk, 2017</li></ol>
5	From House to Home	<ol style="list-style-type: none"><li>1. “What Makes a Good Life? Lessons from the Longest Study on Happiness”, R. Waldinger, Ted Talks, 2015</li><li>2. <b>Long Walk To Freedom, Nelson Mandela, Back Bay Books, 1995</b></li><li>3. Outliers, Malcolm Gladwell, Back Bay Books, 2011</li></ol>
6	Soft Skills	<ol style="list-style-type: none"><li>1. The 17 Indisputable Laws of Teamwork, John Maxwell, HarperCollins, 2013</li><li>2. Team of Teams: New Rules of Engagement for a Complex World, Stanley McChrystal, Portfolio, 2015</li><li>3. Predictably Irrational, Revised and Expanded Edition: The Hidden Forces That Shape Our Decisions, <a href="#">Dan Ariely</a>, Harper Perennial, 2010</li></ol>
7	Selfless Service	<ol style="list-style-type: none"><li>1. Open: An Autobiography, Andre Agassi, Vintage, 10 August 2010</li><li>2. The Physiological Power of Altruism [online], James Hamblin, The Atlantic, December 30, 2015, <a href="https://www.theatlantic.com/health/archive/2015/12/altruism-for-a-better-body/422280/">https://www.theatlantic.com/health/archive/2015/12/altruism-for-a-better-body/422280/</a> [last accessed June 10, 2020]</li><li>3. TBI Blogs: From Entrepreneurs to Doorkeepers, Everybody Serves with Love &amp; Warmth at This Ahmedabad Café [online], The People Place Project, The Better India, May 29, 2017, <a href="https://www.thebetterindia.com/102551/small-way-serve-ahmedabad-seva-cafe/">https://www.thebetterindia.com/102551/small-way-serve-ahmedabad-seva-cafe/</a>, [last accessed June 10, 2020]</li></ol>

### Course Outcomes

- To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
- To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity.
- To allow students to establish a stronger connection with their family through critical thinking and devolvement of qualities such as unity, forgiveness, empathy, and effective communication.
- To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
- To enhance awareness of India’s glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
- To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

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w.e.f. AY 2018-19





## 7. Indian Constitution

- **Subject Code: 3130007, Branch Code: 07**

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### TEACHING SCHEME / DETAIL SYALLBUS

BE  07 - COMPUTER ENGINEERING  3

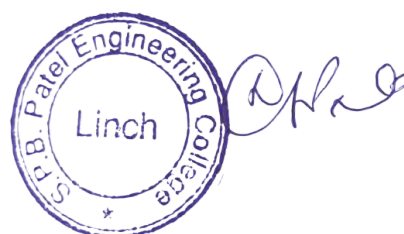
2018-19  Subject Code  Enter Subject Name  Search

\*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L	T	P		E	M	I	V	
+	<a href="#">3130004</a>	07	2018-19	Effective Technical Communication	Humanities and Social Science	3	2	0	2	3	70	30	20	30	150
+	<a href="#">3130006</a>	07	2018-19	Probability and Statistics	Basic Science	3	3	2	0	5	70	30	0	0	100
+	<a href="#">3130007</a>	07	2018-19	Indian Constitution	Mandatory	3	2	0	0	0	50	0	0	0	50
+	<a href="#">3130008</a>	07	2018-19	Design Engineering - I A	Project Work	3	0	0	2	1	0	0	20	80	100
+	<a href="#">3130702</a>	07	2018-19	Data Structures	Professional Core	3	3	0	4	5	70	30	20	30	150
+	<a href="#">3130703</a>	07	2018-19	Database Management Systems	Professional Core	3	4	0	2	5	70	30	20	30	150
+	<a href="#">3130704</a>	07	2018-19	Digital Fundamentals	Engineering Science	3	3	0	2	4	70	30	20	30	150

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## • Syllabus of Indian Constitution



### GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3130007

Semester – III

Subject Name: Indian Constitution

Type of course: Mandatory course

Prerequisite: NA

Rationale: NA.

#### Teaching and Examination Scheme:

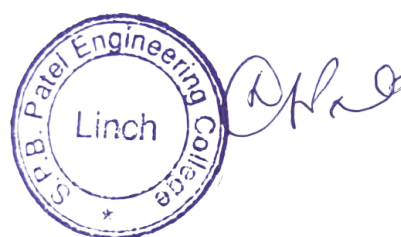
Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	0	0	50	0	0	0	50

Contents:

Sr. No.	Topics	Total Hours
1	Meaning of the constitution law and constitutionalism	01
2	History of Indian Constitution	02
3	Salient features and characteristics of the Constitution of India	01
4	Fundamental rights	02
5	Right to Equality under Article – 14	02
6	Right to certain Freedom under Article 19	02
7	Scope of the Right to Life and Personal Liberty under Article 21	02
8	Fundamental Duties and its legal status	02
9	The Directive Principles of State Policy – Its importance and implementation	02
10	Federal structure and distribution of legislative and financial powers between the Union and the States	03
11	Parliamentary Form of Government in India – The constitution powers and status of the President of India	02
12	Powers and Procedure for Amendments in Indian Constitution	01
13	History of amendments in Indian Constitutional	02
14	Emergency Provisions : National Emergency, President Rule, Financial Emergency	03
15	Local Self Government – Constitutional Scheme in India	03

#### Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Enhance human values , create awareness about law enactment and importance of Consitution	10%
CO-2	To Understand the Fundamental Rights and Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsibilities.	30%
CO-3	Create Awareness of their Surroundings, Society, Social problems and their sutable solutions while keeping rights and duties of the citizen keeping in mind.	20%
CO-4	Understand distribution of powers and functions of Local Self Government.	20%
CO-5	Understand the National Emergency, Financial Emergency and their impact on Economy of the country.	20%



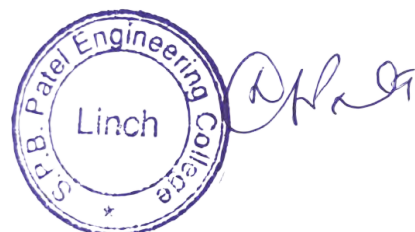


## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject Code: 3130007**

### Reference Books :

1. Constitutional Law of India, Dr. J.N. Pandey, Central Law Agency
2. Introduction to the Consitution of India, Durga Das Basu, LexisNexis.
3. Indian Constitutional Law, M.P. Jain, LexisNexis
4. V.N.Shukla's Constitution of India, Mahndra Pal Singh, Eastern Book Company
5. Constitutional Law – I Structure, Udai Raj Rai, Eastern Book Company



## 8. Induction Program

- Subject Code: 3110017, Branch Code: 07

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### TEACHING SCHEME / DETAIL SYLLBUS

BE      07 - COMPUTER ENGINEERING      1

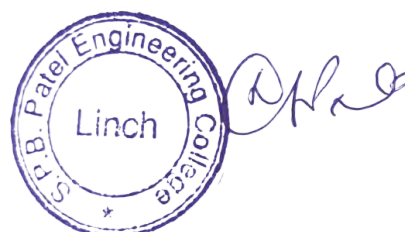
Academic Year      Subject Code      Enter Subject Name      Search

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

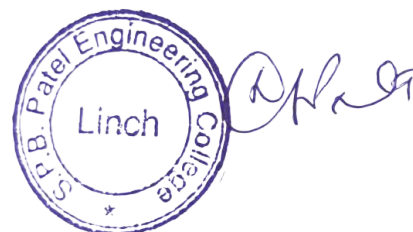
Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L.	T.	P.		E	M	I	V	
+	<a href="#">110001</a>	07	2008-09	Chemistry	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110002</a>	07	2008-09	Communication Skills	Compulsory	1	1	0	2	3	70	30	50	0	150
+	<a href="#">110003</a>	07	2008-09	Computer Programming and Utilization	Compulsory	1	2	0	4	6	70	30	50	0	150
+	<a href="#">110004</a>	07	2008-09	Elements of Civil Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110005</a>	07	2008-09	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110006</a>	07	2008-09	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110007</a>	07	2008-09	Environmental Studies	Compulsory	1	3	0	0	3	70	30	50	0	150
+	<a href="#">110010</a>	07	2008-09	Mechanics of Solids	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110011</a>	07	2008-09	Physics	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110012</a>	07	2008-09	Workshop	Compulsory	1	0	0	4	4	0	0	100	0	100
+	<a href="#">110013</a>	07	2008-09	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	50	0	150
+	<a href="#">110014</a>	07	2008-09	Calculus	Compulsory	1	3	2	0	5	70	30	50	0	150
+	<a href="#">110015</a>	07	2008-09	Vector Calculus and Linear Algebra	Compulsory	1	3	2	0	5	70	30	50	0	150
+	<a href="#">1990001</a>	07	2008-09	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	50	0	150
+	<a href="#">2110002</a>	07	June 2013	Communication Skills	Compulsory	1	2	0	2	4	70	30	20	30	150
+	<a href="#">2110003</a>	07	June 2013	Computer Programming And Utilization	Compulsory	1	3	1	2	6	70	30	20	30	150
+	<a href="#">2110005</a>	07	June 2013	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110006</a>	07	June 2013	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110007</a>	07	June 2013	Environmental Studies	Compulsory	1	3	0	0	3	70	30	0	0	100
+	<a href="#">2110011</a>	07	June 2013	Physics	Compulsory	1	3	0	2	5	70	30	20	30	150
+	<a href="#">2110013</a>	07	June 2013	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	20	30	150
+	<a href="#">2110014</a>	07	June 2013	Calculus	Compulsory	1	3	2	0	5	70	30	20	30	150
+	<a href="#">2110015</a>	07	June 2013	Vector Calculus And Linear Algebra	Compulsory	1	3	2	0	5	70	30	20	30	150
+	<a href="#">2110016</a>	07	June 2013	Basic Electronics	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110017</a>	07	June 2013	Electrical and Electronics Workshop	Compulsory	1	0	0	4	4	0	0	20	80	100

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+	<a href="#">2990001</a>	07	June 2013	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	20	30	150
+	<a href="#">3110001</a>	07	Oct - 21	Chemistry	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110002</a>	07	2018-19	English	Humanities and Social Science	1	2	0	2	3	70	30	20	30	150
+	<a href="#">3110003</a>	07	2018-19	Programming for Problem Solving	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110005</a>	07	2018-19	Basic Electrical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110006</a>	07	2018-19	Basic Mechanical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110007</a>	07	2018-19	Environmental Sciences	Mandatory	1	2	2	0	0	70	30	0	0	100
+	<a href="#">3110012</a>	07	2018-19	Workshop/ Manufacturing Practices	Engineering Science	1	0	0	4	2	0	0	20	80	100
+	<a href="#">3110013</a>	07	2018-19	Engineering Graphics & Design	Engineering Science	1	2	0	4	4	70	30	20	30	150
+	<a href="#">3110014</a>	07	2018-19	Mathematics - 1	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110015</a>	07	2018-19	Mathematics - 2	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110016</a>	07	2018-19	Basic Electronics	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110017</a>	07	2018-19	Induction Program	Mandatory	1	0	0	0	0	0	0	0	0	0
+	<a href="#">3110018</a>	07	2018-19	Physics	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150



• **Syllabus of Induction Program**



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
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**ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી**  
 (ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

**Induction Program (Subject Code : 3110017)**

The details for Two weeks Induction Program are as per below :

**Preamble:**

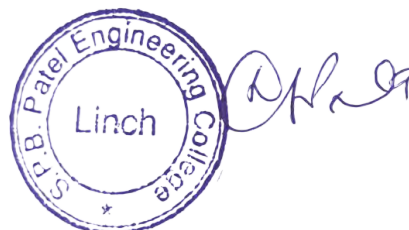
The goal of engineering education is to train engineering graduates well in branch of admission, have a holistic personality and must have desire to serve society and nation. It is expected that an engineering graduate work for solving the problems of society using the modern technologies and practices. That needs the broad understanding of the society and relationships. It is needed to cultivate the human values in engineering graduates to fulfil his responsibilities as an engineer, a citizen and a human being. Considering the various social backgrounds and whether a student comes from the urban or rural areas they differ in many of the life skills and their abilities and thinking. There branch of admission may be due to rush; their interest in subject is question. They are facing the issues like hostel and settlements, pressures from peers and many related issues. To overcome such issues, it is necessary to create an environment for students so that they feel comfortable, find their interest and explore their inner beings, create bonding with other students, establish relation with teachers, work for excellence, get a broader view of life and practice human values to build characters. The Induction Program covers the various activities which enables them to overcome all such issues and motivates them to perform well in their chosen branch of admission.

**Scheme:**

Sr. No.	Phase and Activities Heads	Weightage
1.	<b>Initial Phase</b>	<b>1 Day (6 Hrs)</b>
2.	<b>Regular Phase</b>	<b>10 Days</b>
(a)	Virtual activity	12 Hours
(b)	Creative Arts	12 Hours
(c)	Universal Human Values	12 Hours
(d)	Literary	8 Hours
(e)	Proficiency Modules	8 Hours
(f)	Lectures by Eminent People	4 Hours: (2 Expert Lectures)
(g)	Innovations	4 Hours
3.	<b>Closing Phase</b>	<b>(6 Hrs)</b>
<b>Total</b>		<b>72 Hours</b>

*Winners of : ICT Enabled University Award E-India - 2009 ❖ Manthan Award - 2009 ❖ GESIA Award - 2011  
 ❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013*

**Chandkheda** : Nr. Campus of Vishwakarma Government Engineering College, Sabarmati - Koba Highway, Nr. Visat Three Roads, Chandkheda, Ahmedabad - 382 424. Gujarat, India Ph. : 079 - 232 67 500 Fax : +91 - 79 232 67 580  
**Ahmedabad** : 2nd Floor, ACPC Building, L. D. College of Engineering Campus, Navrangpura, Ahmedabad, (Gujarat) India - 380 015. Phone : + 91 - 79 - 26 300 499 / 599 Fax : + 91 - 79 - 26 30 1500  
**Gandhinagar** : K-6 Circle, E-4 Electronic Estate G.I.D.C., Nr. Government Polytechnic, Sector-26, Gandhinagar - 382 028 Gujarat. e-mail : info@gtu.ac.in URL : www.gtu.ac.in





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(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

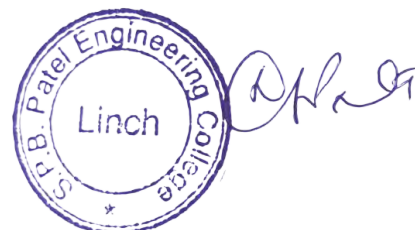
## Phases, Modules, Activities and Guidelines:

The activity during Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The initial and closing phases would be one day each. The following is the guidelines indicating the possible activities under each phase of the Induction Program.

Initial Phase (First Day)		
Following are the activities to be carried on the first day: <ul style="list-style-type: none"><li>● Orientation Programme</li><li>● Know your Department/Institute</li><li>● Know your university</li><li>● Know hostel and other amenities</li><li>● Information about Student Diary and Induction Program</li></ul>		
Regular phase		
The Regular Phase consists of 10 days, each day is of 6 hours. It covers all the 7 different activity modules. For each module, the objectives, suggested activities and guidelines are provided herewith. Institute can use additional relevant activities in additional in suggested activities for each of the phases.		
Module Name	Objectives	Suggested Activities
1.Virtual Activity	<ol style="list-style-type: none"><li>1. Improve immunity and mental strength.</li><li>2. Improve bone health.</li><li>3. Examine the effect of nutrition, rest and other lifestyle factors that contribute to the better health.</li></ol>	<ol style="list-style-type: none"><li>1. Online Yoga/ Pranayama session</li><li>2. Online Motivation for physical exercise</li></ol>
<b>Guidelines:</b> <ul style="list-style-type: none"><li>● Yoga/Pranayam followed by physical activities including various games.</li><li>● Refer this link for Yoga/Pranayam <a href="https://s3-ap-southeast-1.amazonaws.com/ministry-of-yoga/images/1528106718.pdf">https://s3-ap-southeast-1.amazonaws.com/ministry-of-yoga/images/1528106718.pdf</a></li></ul>		

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❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013

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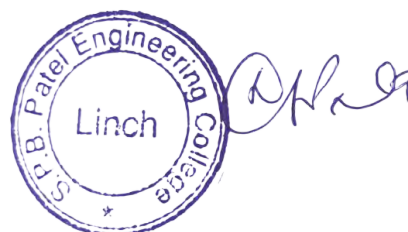
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
2. Creative Arts	<ol style="list-style-type: none"><li>1. Develop creativity and imagination through a range of complex activities.</li><li>2. Improve the student's ability to control materials, tools and techniques.</li><li>3. Develop increasing confidence in the use of visual and tactile elements and materials.</li></ol>	<ol style="list-style-type: none"><li>1. Make a model of any physical object related to Engineering Design</li><li>2. Crafting</li><li>3. Painting</li><li>4. Sculpture</li><li>5. Pottery</li><li>6. Music</li><li>7. Dance</li></ol>
<b>Guidelines:</b> <ul style="list-style-type: none"><li>• Use any activities leading to creative thing and practice.</li><li>• Show the video demonstrating the creative ideas and thinking</li><li>• Show the video demonstrating phenomenon performance using innovation in different areas of humanity and social science</li><li>• Demonstrate the story of leaders with the context of how with their creative vision, with all odds they achieved success</li></ul>		
3. Universal Human Values	<ol style="list-style-type: none"><li>1. Impart universal human values in students.</li><li>2. Enable students to live in harmony within themselves, with family, with society and the nature.</li><li>3. Initiate the process of self-exploration and self-investigation within themselves about their understanding of happiness.</li></ol>	<ol style="list-style-type: none"><li>1. Showing Motivational Videos.</li><li>2. Swachchhata Mission Activities.</li><li>3. Awareness regarding environmental issues and remedies.</li><li>4. Discuss autobiography of legendary persons who practiced universal human values in their life and work.</li></ol>

Winners of : ICT Enabled University Award E-India - 2009 ❖ Manthan Award - 2009 ❖ GESIA Award - 2011  
❖ Digital Learning WES - 2011 Award ❖ AIMS International Innovative University Award - 2013

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### Guidelines:

- Use the materials and activities covered in the FDP on Induction Program held at GTU organized by AICTE.
- The faculties trained from institute will take leadership role to rollout it at institute level.

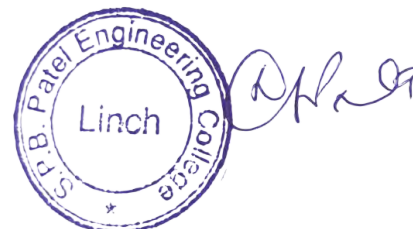
Module Name	Objectives	Suggested Activities
4. Literary	<ol style="list-style-type: none"><li>1. Inculcate the habit of active (or interactive) consumption of the best content available in literature.</li><li>2. Develop thinking skills.</li><li>3. Improve reading abilities and attitude.</li></ol>	<ol style="list-style-type: none"><li>1. Basic Mathematics for Solving Real World Problems</li><li>2. Use of Scientific Calculator in Engineering</li><li>3. General Knowledge Quiz Competition</li><li>4. Vedic Mathematics</li><li>5. Reading/writing/speaking/listening</li><li>6. Book review</li></ol>

### Guidelines:

- Use the video lectures to literate students in different skills needed for day-to-day life and need.
- Motivate students to create the nature of inquiry and reading habits.
- Arrange the various competitions like Elocution, Essay writing, Storytelling, Book reviews etc.
- Writing the review of the well-known books, movies and sharing.

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**Ahmedabad** : 2nd Floor, ACPC Building, L. D. College of Engineering Campus, Navrangpura, Ahmedabad, (Gujarat) India - 380 015. Phone : + 91 - 79 - 26 300 499 / 599 Fax : + 91 - 79 - 26 30 1500  
**Gandhinagar** : K-6 Circle, E-4 Electronic Estate G.I.D.C., Nr. Government Polytechnic, Sector-26, Gandhinagar - 382 028 Gujarat. e-mail : info@gtu.ac.in URL : www.gtu.ac.in





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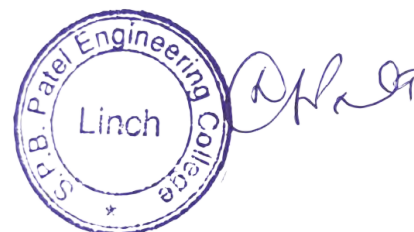
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
5. Proficiency modules	<ol style="list-style-type: none"><li>1. Determining English proficiency level of students and mentoring accordingly.</li><li>2. Learn the mining vocabulary, idioms, and expressions and Understand their meanings in context.</li><li>3. Develop ability to write a paragraph about general topics by using the English language correctly.</li><li>4. Realize the importance of English language as a global business language.</li></ol>	<ol style="list-style-type: none"><li>1. English general diagnostic test to determine student's English proficiency level.</li><li>2. Mentoring students to improve in English proficiency according to his/her proficiency level based on test.</li></ol>
<p><b>Guidelines:</b></p> <ul style="list-style-type: none"><li>● An MCQ test of <b>45 minutes</b> should be conducted covering basic grammar and vocabulary.</li><li>● Group the students in three groups based on test result in three proficiency levels:<ul style="list-style-type: none"><li>○ Unsatisfactory</li><li>○ Satisfactory</li><li>○ Good</li></ul></li><li>● Following activities are to be used to uplift proficiency levels of students.<ul style="list-style-type: none"><li>○ Motivational movies, documentary<ul style="list-style-type: none"><li>○ Language games</li><li>○ Essay/story writing</li><li>○ Ice breaking games.</li></ul></li></ul></li></ul> <p>Separate set of activities from suggested list should be used for different groups.</p>		

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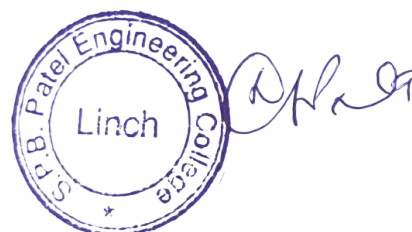
ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Module Name	Objectives	Suggested Activities
6. Lectures by Eminent people	1. Motivation through knowing experience of successful person. 2. Meet and interact with eminent personalities of different fields.	1. To conduct lecture by eminent people. 2. Interaction with leaders, experts, entrepreneurs, contributors and successful personalities
<b>Guidelines:</b> <ul style="list-style-type: none"><li>• 1 expert lecture.</li><li>• Multiple divisions can be combined in an expert lecture.</li><li>• External expert should be invited.</li><li>• Expert can be from academic, industry, research organization, social organization etc.</li><li>• An individual successful person in any of the field can be invited.</li><li>• The aspect to be addressed may be social / economical / engineering / entrepreneurship/ spiritual/ humanity science.</li></ul>		
Module Name	Objectives	Suggested Activities
7. Innovation	1. Introduce the student about innovation in different fields 2. Make students aware about innovative and modern practices and products in their own branch 3. Create awareness about support available for start-up and innovation	1. Lectures by senior faculties. 2. Showing videos demonstrating innovation. 3. Introducing innovative technology/products. 4. Awareness regarding SSIP Scheme of Government of Gujarat 5. Awareness about Government initiatives in areas of innovations and supports for start-up, Incubation, Entrepreneurship etc.
<b>Guideline:</b> <ul style="list-style-type: none"><li>• Video lectures from leaders and innovators.</li><li>• TeDx Talks.</li><li>• Government Policy documents for different schemes.</li></ul>		

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## Closing Phase (Last Day)

The closing phase is the last day of the Induction Program and covering conclusion and summary of the Induction Program.

### Conclusion and summary:

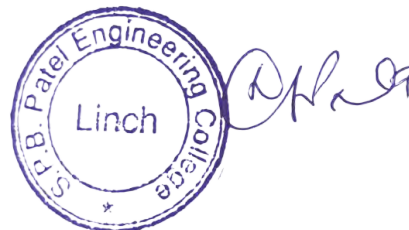
- Guiding students for preparation of student report about Induction Program.
- Instruct students regarding submission and examination of the Induction Program.
- Address by HODs/Senior faculties regarding branch/discipline and career option in respective branch.
- Introduce about the engineering and its importance in life and their responsibilities towards the society.

### General Regulations:

- Every student has to maintain a daily diary. Format of the diary is already given.
- After completion of the Induction program student has to prepare a report based on activities performed during the Induction program. Diary will be attached as Appendix in Report.
- 75% Attendance is requiring during Induction Program.
- This program will be noncredit subject but it will reflect in 1<sup>st</sup> Semester Marksheet as PASS or FAIL.
- Institute should appoint a mentor for a group of 20 to 30 students. Mentor can take help of senior students.
- If student gets admission transfer in other college during Induction Program the diary will be continued from previous college to new college.
- If student gets admission in middle of the Induction Program or student gets admission after Induction Program, it is responsibility of the institute to fulfill the criteria of the Induction Program.
- If student fails in the Induction program the student has to clear the same during subsequent Semester

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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3150709

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	20	10	25	20	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

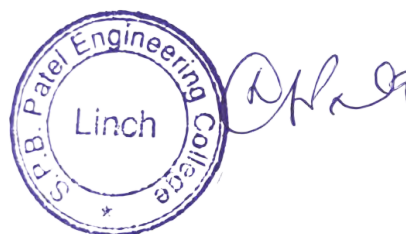
Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. Business Ethics by AC Fernando
2. Business Ethics by Ferrell, Fraedrich and Ferrell.
3. Ethics in Management and Indian Ethos by Biswanath Gosh

### Course Outcomes: After learning the course the students will able to

Sr. No.	CO statements	Marks %Weightage
CO-1	Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)	25
CO-2	Identify and describe relevant theoretical concepts related to professional ethics in engineering	20
CO-3	Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories	20
CO-4	Distinguish among morals, values, ethics, and the law and to explore how they each impact engineering practice	25
CO-5	Apply learning from Indian history and ethos to ethical practices in engineering.	10



# Environment and Sustainability

## 9. Environment and Sustainability Subject Code: 4300003, Branch Code: 07

08/02/2024, 15:43

<https://syllabus.gtu.ac.in/Syllabus.aspx?p=BE>



Gujarat Technological University  
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### TEACHING SCHEME / DETAIL SYLLABUS

DIPLOMA  19 - MECHANICAL ENGINEERING  2   
 2021-22  Subject Code  Enter Subject Name  Search

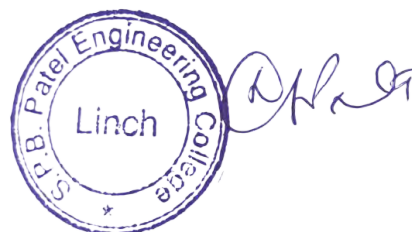
\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff_from	SubjectName	Category	Sem /Year	Hours			Total	Credit			Max Marks			Total
							L	T	P		E	M	I	V			
+	<a href="#">4300003</a>	19	Feb-2022	Environment and Sustainability	General Science	2	3	0	0	3	70	30	0	0	100		
+	<a href="#">4300008</a>	19	Feb-2022	Engineering Mechanics	Engineering Sciences	2	3	0	2	4	70	30	25	25	150		
+	<a href="#">4300014</a>	19	Feb-2022	Basics of Electrical and Electronic Engineering	Engineering Sciences	2	0	2	2	3	0	0	25	25	50		
+	<a href="#">4300016</a>	19	Feb-2022	Indian Constitution	Audit	2	2	0	0	0	0	0	50	0	50		
+	<a href="#">4300019</a>	19	Feb-2022	Computer Applications and Graphics	Engineering Sciences	2	0	0	4	2	0	0	25	25	50		
+	<a href="#">4320001</a>	19	Feb-2022	Applied Mathematics	Basic Sciences	2	3	1	0	4	70	30	0	0	100		
+	<a href="#">4321902</a>	19	Feb-2022	Mechanical Drafting	Engineering Sciences	2	2	0	4	4	70	30	25	25	150		

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### • Syllabus of Environment and Sustainability

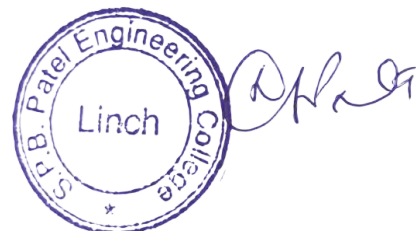


**16. COURSE CURRICULUM DEVELOPMENT COMMITTEE****GTU Resource Persons**

S. No.	Name and Designation	Institute	Contact No.	Email
1	Dr. Jayesh Shah	Ass. Dean GTU, Pacific School of Engineering, Surat	9825436342	jayesh.shah.23021971@gmail.com
2	Mrs. Jini Sunil	Shri K.J. Polytechnic, Bharuch	9601880636	jinivt@rediffmail.com

**NITTR Resource Persons**

S. No.	Name and Designation	Dept.	Contact No.	Email
1	Dr. V.D.Patil, Associate Professor, DCEEE	DCEEE	9422346736	<a href="mailto:vdpatil@nittrbpl.ac.in">vdpatil@nittrbpl.ac.in</a>
2	Prof. M.C.Paliwal, Associate Professor, DCEEE	DCEEE	9407271980	<a href="mailto:mcpaliwal@nittrbpl.ac.in">mcpaliwal@nittrbpl.ac.in</a>



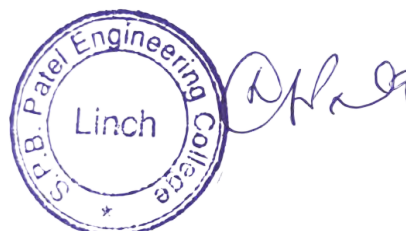
14. SOFTWARE/LEARNING WEBSITES

- a) [www.nptel.iitm.ac.in](http://www.nptel.iitm.ac.in)
- b) [www.khanacademy](http://www.khanacademy)
- c) [http://www1.eere.energy.gov/wind/wind\\_animation.html](http://www1.eere.energy.gov/wind/wind_animation.html)
- d) [http://www.nrel.gov/learning/re\\_solar.html](http://www.nrel.gov/learning/re_solar.html)
- e) [http://www.nrel.gov/learning/re\\_biomass.html](http://www.nrel.gov/learning/re_biomass.html)
- f) <http://www.mnre.gov.in/schemes/grid-connected/biomass-powercogen/>
- g) <http://www.epa.gov/climatestudents/>
- h) <http://www.climatecentral.org>
- i) <http://www.envis.nic.in/>
- j) <https://www.overshootday.org/>
- k) <http://www.footprintcalculator.org/>
- l) <https://www.carbonfootprint.com/calculator.aspx>

15. PO-COMPETENCY-CO MAPPING

Semester II	Environment and Sustainability (Course Code: .....)								
	POs and PSOs								
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning	PSO 1 Environmental planning & design	PSO 2 Execution & Maintenance
<b>Competency - Adopt the sustainable practices to resolve the environment related issues</b>									
a. Adopt relevant ecofriendly product in the given situation to protect ecosystem	2	1	1	-	2	1	1	2	2
b. use relevant method of pollution reduction in the given situation	2	2	1	1	2	-	2	2	2
c. Use of renewable resources of energy for sustainable development	2	2	2	1	2	2	1	2	2
d. Use the relevant techniques in given context to reduce impact due to climate change	2	2	2	1	2	1	2	2	2
e. Use relevant laws and policies for developing the sustainable environmental development	2	2	2	1	1	1	1	2	2

Legend: '3' for high, '2' for medium, '1' for low or '-' for the relevant correlation of each competency, CO, with PO/ PSO

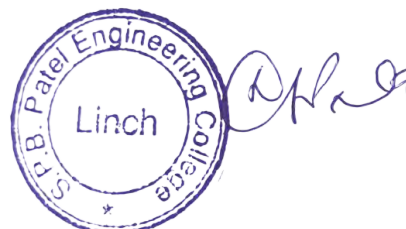




- e) Compare the pollution (water, air and noise) data of various cities with standard values as laid by pollution control board.
- f) Surf different websites related environment and sustainable development, Pollution control.
- g) Prepare energy audit report of any residential building.
- h) Collect relevant information about the software used in pollution control.
- o) Visit to ongoing project and study various aspects related to environment and sustainable development

### 13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	Renewable Energy Technologies: A Practical Guide for Beginners	Solanki, Chetan Singh	PHI Learning, New Delhi, 2010 Print Book ISBN: 9788120334342 eBook ISBN: 9789354437151
2	Ecology and Control of the Natural Environment	Izrael, Y.A.	Kluwer Academic Publisher eBook ISBN: 978-94-011-3390-6 Softcover ISBN: 978-94-010-5499-7
3	Green Technologies and Environmental Sustainability	Singh, Ritu, Kumar, Sanjeev	Springer International Publishing, 2017 eBook ISBN 978-3-319-50654-8
4	Environmental Noise Pollution and Its Control	G.R. Chhatwal, M. Satake, M.C. Mehra, Mohan Katyal, T. Katyal, T. Nagahiro	Anmol Publications, New Delhi ISBN: 8170411378 ISBN: 8170411378
5	Wind Power Plants and Project Development	Earnest, Joshua & Wizelius, Tore	PHI Learning, New Delhi, 2011 ISBN-10: 8120351274 ISBN-13: 978-8120351271
6	Renewable Energy Sources and Emerging Technologies	Kothari, D.P. Singal, K.C., Ranjan, Rakesh	PHI Learning, New Delhi, 2009 ISBN-13 - 978-8120344709
7	Environmental Studies	Anandita Basak	Pearson Publications ISBN 8131785688, 9788131785683 ISBN: 9788131721186, 8131721183
8	Environmental Science and Engineering	Aloka Debi	University Press ISBN: 9788173718113 ISBN-10: 8173716080 ISBN-13: 978-8173716089
9	Coping With Natural Hazards: Indian Context	K. S. Valadia	Orient Longman ISBN-10: 8125027351 ISBN-13: 978-8125027355
10	Introduction to Engineering and Environment	Edward S. Rubin	Mc Graw Hill Publications ISBN-10 : 0071181857 ISBN-13 : 978-0071181853



- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the students for **self-learning**, but to be assessed using different assessment methods.
- e) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- f) **Guide students on how to address issues on environment and sustainability**
- g) Guide students for using data manuals.
- h) Guide students for using data manuals.
- i) Arrange visit to nearby industries and workshops for understanding various sources of pollution.
- j) Use video/animation films to explain various processes related to environment and sustainable development
- k) Use different instructional strategies in classroom teaching.
- l) Write the report on properties of various eco-friendly construction materials like Stone, aggregate of different sizes, timber, lime, bitumen, Bricks, tiles, precast concrete products, Water proofing material, Termite proofing material, Thermal insulating material, plaster of Paris, paints, distemper, and varnishes.
- m) Display various technical brochures of recent projects/themes related to environment and sustainable development
- n) Visit the Pollution control board office and its various projects to demonstrate the various practices adopted for control of Pollution

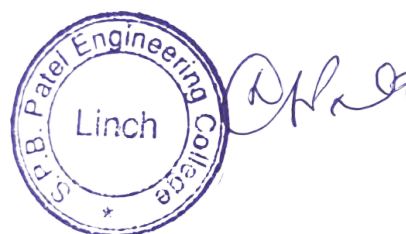
## 12. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

- a) **Natural cycles:** Build a Chart showing different natural cycles like Carbon, Nitrogen, Sulphur and phosphorus cycle.)
- b) **Solar Energy:** Build a model of Solar water heater/Solar cooker
- c) **Wind energy:** Build a model of wind mill
- d) **Best out of waste:** Build useful items from waste materials like used plastic bottles, discarded pens etc.



Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A	Total Marks
V	Environmental legislation and sustainable practices	06	5	3	2	10
<b>Total</b>		<b>42</b>	<b>12</b>	<b>28</b>	<b>30</b>	<b>70</b>

**Legends:** R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

**Note:** This specification table provides general guidelines to assist student for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

#### 10. SUGGESTED STUDENT ACTIVITIES

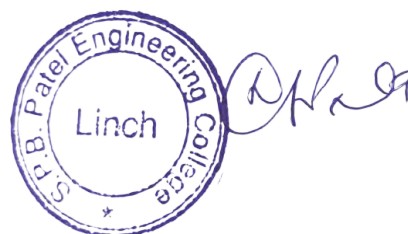
Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Prepare specification of some renewable sources of energy.
- Undertake micro-projects in teams
- Give seminar on any relevant topic.
- Undertake a market survey of different green materials.
- Prepare showcase portfolios.
- Prepare report on various issues related to environment and sustainable development
- Publish a research paper on themes related to environment and sustainable development.
- Compare the pollution (water, air and noise) data of various cities with standard values as laid by pollution control board.
- Undertake some small mini projects on various issues related to environment and sustainable development.
- Submit a report on visit to an energy park
- Prepare power point on clean and green technologies
- Submit a report on visit to garbage disposal system in your city/town.
- Submit a report on analysis of the life cycle of any one or two eco-friendly product/s.
- Calculate ecological footprint using various calculator available on web with a report recommending ways and means to reduce ecological footprint.
- Give seminar on relevant topic.
- Undertake micro-projects.

#### 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- Guide student(s) in undertaking micro-projects.
- 'L' in section No. 4** means different types of teaching methods that are to be employed by teachers to develop the outcomes.

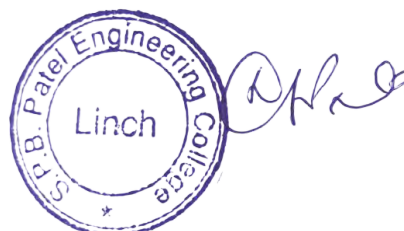


Unit	Unit Outcomes (UOs) (4 to 6 UOs at Application and above level)	Topics and Sub-topics
	4.1 Identify Factors affecting climate change in given locality. 4.e. Justify the need of relevant Climate change management system to reduce the impact of climate change in the given context.	
<b>Unit– V Environmental legislation and sustainable practices</b>	5.a Use relevant policy or law in relation with environment in given situation 5.b Relate the relevant provision of given act in given situation. 5.c Explain the necessity of the Environmental management system in given situation. 5.d Use the principle of Rain water harvesting in the given situation. 5.e Justify the necessity of Green building in India. 5.f. Adopt the relevant rating system for energy calculation for the given building. 5.f Explain the terms, “Cradle to cradle concept” and “Life cycle analysis” 5.g Emphasize the importance of Carbon credit system in India. 5.h Explain the importance of 5R concept.	5.1 Environmental policies in India 5.2 Air act, water act, Environment protection act, wild life protection act, Forest conservation act, Biodiversity act 5.3 Environmental management system: ISO 14000, definition and benefits 5.4 Rain water harvesting 5.5 Green building and rating system in India 5.6 Cradle to cradle concept and Life cycle analysis 5.7 Green label 5.8 Carbon credit system its advantages and disadvantages 5.9 Concept of 5R(Refuse, Reduce, Reuse, Repurpose, Recycle) 5.10 Eco tourism: advantages and disadvantages

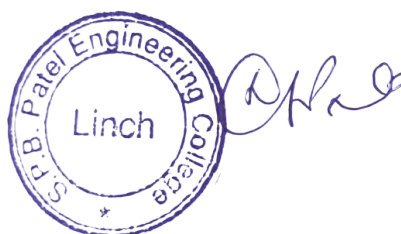
**Note:** The UOs need to be formulated at the ‘Application Level’ and above of Revised Bloom’s Taxonomy’ to accelerate the attainment of the COs and the competency.

**9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN**

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A	Total Marks
I	Ecosystem	08	6	6	2	14
II	Pollution and its types	10	4	6	6	16
III	Renewable sources of energy	10	4	6	6	16
IV	Climate Change	08	4	6	4	14



Unit	Unit Outcomes (UOs) (4 to 6 UOs at Application and above level)	Topics and Sub-topics
	2d. Explain relevant techniques of treatment to deal with given type of water pollution. 2e. Apply relevant techniques of Solid waste management based on its characteristics. 2f. Explain drawbacks of noise pollution in given situation. 2g. Describe the environmental degradation due to Plastic waste and E- waste	secondary and tertiary 2.6. Solid waste generation, sources and characteristics of Municipal solid waste 2.7. Collection and disposal of Municipal waste and Hazardous waste 2.8. Noise pollution- its effects, sources and measurement 2.9. Plastic waste and its hazard 2.10. E waste and its hazard
<b>Unit– III Renewable sources of energy</b>	3a. Justify the need of renewable energy adopting relevant energy policy in given situation. 3b. Explain the working of the solar thermal and PV systems with sketch in given situation. 3c. Justify the need of Advanced collector, Solar Pond, Solar water heater, Solar dryer in the given system. 3d. Emphasize the importance of wind power in India 3e. Select the relevant type of wind turbines in the given situation. 3f. Identify the relevant types of Sources of biomass energy. 3g. Draw the neat labelled diagram of simple biogas plant to explain its working. 3h. Identify the sources of the energy generation for the given situation.	3.1 Need of Renewable energy and energy policy 3.2 Solar energy: National solar mission 3.3 Features of solar thermal and PV systems Advanced collector, Solar Pond, Solar water heater, Solar dryer, polycrystalline, monocrystalline and thin film PV systems 3.4 Wind Energy: Growth of wind power in India 3.5 Types of wind turbines – Vertical axis wind turbines (VAWT) and horizontal axis wind turbines (HAWT) 3.6 Types of HAWTs – drag and lift types 3.7 Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel 3.8 Anaerobic digestion, Biogas production mechanism, utilization and storage. 3.9 New energy sources: Geothermal energy, Ocean energy sources, Tidal energy conversion, Hydrogen energy
<b>Unit– IV Climate Change</b>	4a. Explain the term, “climate change” in context of environment. 4b. Describe the ill effects of Global warming due to various causes arising in the given situation. 4c. Explain the term, “greenhouse effect” with its causes. 4d. Relate the impact of Ozone depletion in climate change due to its causes.	4.2 Definition of climate change 4.3 Global warming-causes, effect, process 4.4 Greenhouse effect 4.5 Ozone depletion 4.6 Factors affecting climate change 4.7 Impact and mitigation 4.8 Climate change management



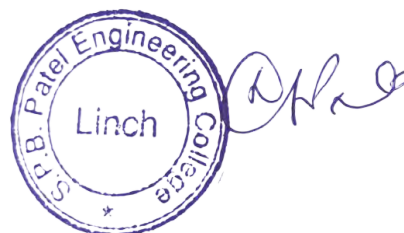
The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl’s ‘Affective Domain Taxonomy’ should gradually increase as planned below:

- i. ‘Valuing Level’ in 1<sup>st</sup> year
- ii. ‘Organization Level’ in 2<sup>nd</sup> year.
- iii. ‘Characterization Level’ in 3<sup>rd</sup> year.

**8. UNDERPINNING THEORY**

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom’s taxonomy* in order development of the COs and competency is not missed out by the students and teachers. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at Application and above level)	Topics and Sub-topics
<b>Unit – I Ecosystem</b>	1a. Explain the Structure with components of the given Ecosystem 1b. Explain Carbon, Nitrogen, Sulphur and phosphorus cycle for the given ecosystem. 1c. Justify the need to conserve the given Ecosystem on the w.r.t. following points: <ul style="list-style-type: none"> <li>• carrying capacity of earth</li> <li>• Biomes,</li> <li>• Ecologically sensitive area</li> </ul> 1d. Explain the term biodiversity with its importance. 1e. Illustrate the importance of IUCN red list in environmental engineering. 1f. Calculate global ecological overshoot and virtual water requirement of given natural and man-made materials.	1.1 Structure and components of ecosystem 1.2 Types of Ecosystem, changes in ecosystem 1.3 Various natural cycles like carbon, Nitrogen, Sulphur, Phosphorus 1.4 Ecosystem conservation, carrying capacity of earth, Biomes in India, (ESA) Ecologically sensitive areas 1.5 Bio diversity, its need and importance, International Union for Conservation of Nature (IUCN) red list 1.6 Concept of Ecological foot print, virtual water, global ecological overshoot
<b>Unit – II Pollution and its types</b>	2a. Explain the term, “pollution and pollutant” in the given situation. 2b. Classify the air pollution on the basis of its source 2c. Use relevant equipment to control given type of air pollution.	2.1. Definition of pollution and pollutant 2.2. Air pollution, classification and its sources 2.3. Air pollution control Equipments 2.4. Water pollution, pollution parameters like BOD,COD, pH, Total suspended solids, Turbidity, Total Solids 2.5. Waste water treatment like primary,



(\*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

**Legends:** L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P - Practical; C – Credit, CA - Continuous Assessment; ESE - End Semester Examination.

**5. SUGGESTED PRACTICAL EXERCISES – Not Applicable**

The following practical outcomes (PrOs) that are the sub-components of the COs. *Some of the PrOs marked '\*\*' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
	<b>Total</b>		<b>44</b>

**Note**

- i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. The following are some **sample 'Process' and 'Product' related skills** (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency..

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Prepare of experimental setup	20
2	Operate the equipment setup or circuit	20
3	Follow safe practices measures	10
4	Record observations correctly	20
5	Interpret the result and conclude	30
	<b>Total</b>	<b>100</b>

**6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED – (Not Applicable)**

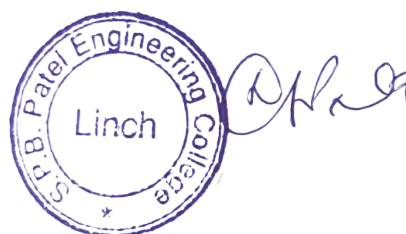
These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1		

**7. AFFECTIVE DOMAIN OUTCOMES**

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfil the development of this competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Practice environmental friendly methods and processes. (Environment related)



## GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

## Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)

I – Semester

Course Title: Environment and Sustainability

(Course Code: 4300003)

Diploma programme in which this course is offered	Semester in which offered
Chemical, Mechatronics, Computer	First
Civil, Environment, Mining, Architectural Assistantship, Mechanical, Automobile, Marine, Metallurgy, Fabrication, Electrical, Electronics and Communication, Instrumentation and Control, Bio Medical, Power Electronics, IT, Textile Manufacturing, Textile Processing, Textile Design, Printing, Plastics, Ceramics, CACDDM, Computer Science and Engineering.	Second

## 1. RATIONALE

For a country to progress, sustainable development is one of the key factors. Environment conservation and hazard management is of much importance to every citizen of India. Considerable amount of energy is being wasted. Energy saved is energy produced. Environmental pollution is on the rise due to rampant industrial mismanagement and indiscipline. Renewable energy is one of the answers to the energy crisis and also to reduce environmental pollution. Therefore this course has been designed to develop a general awareness of these and related issues so that the every student will start acting as a responsible citizen to make the country and the world a better place to live in.

## 2. COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Adopt the sustainable practices to resolve the environment related issues.

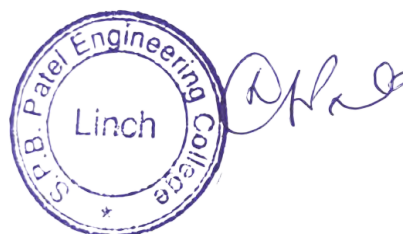
## 3. COURSE OUTCOMES (Cos)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

- Adopt relevant ecofriendly product in the given situation to protect ecosystem
  - use relevant method of pollution reduction in the given situation
  - Use of renewable resources of energy for sustainable development
  - Use the relevant techniques in given context to reduce impact due to climate change
- Use relevant laws and policies for developing the sustainable environmental development

## 4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T/2+P/2)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	CA	ESE	CA	ESE	
3	0	0	3	30*	70	0	0	100





## 10. Environmental Conservation & Hazard Management

Subject Code: 3300003, Branch Code:

### • Syllabus of Environmental Conservation & Hazard Management

#### 8. SUGGESTED LEARNING RESOURCES

##### A. List of Books

S. No.	Title of Book	Author	Publication/Year
1	Renewable Energy Technologies	Solanki, Chetan Singh	PHI Learning, New Delhi, 2010
2	Ecology and Control of the Natural Environment	Izrael, Y.A.	Kluwer Academic Publisher
3	Environment Engineering and Disaster Management	Sharma, Sanjay K.	Luxmi Publications, New Delhi
4	Environmental Noise Pollution and Its Control	Chhatwal, G.R.; Katyal, T.; Katyal,	Anmol Publications, New Delhi
5	Wind Power Plants and Project Development	Earnest, Joshua & Wizelius, Tore	PHI Learning, New Delhi, 2011
6	Renewable Energy Sources and Emerging Technologies	Kothari, D.P. Singal, K.C., Ranjan, Rakesh	PHI Learning, New Delhi, 2009
7	Environmental Studies	Anandita Basak	Pearson
8	Environmental Science and Engineering	Alka Debi	University Press
9	Coping With Natural Hazards, Indian Context	K. S. Valadia	Orient Longman
10	Engineering and Environment	Edward S. Rubin	Mc Graw Hill Publ.

##### B. List of Major Equipment/ Instrument

- Digital sound level meters (to check noise pollution)
- Digital air quality meter (to measure air pollution)
- Digital handheld anemometer (to measure wind speeds)
- Digital hand held pyranometer (to measure solar radiation levels)

##### C. List of Software/Learning Websites

- [http://www1.eere.energy.gov/wind/wind\\_animation.html](http://www1.eere.energy.gov/wind/wind_animation.html)
- [http://www.nrel.gov/learning/re\\_solar.html](http://www.nrel.gov/learning/re_solar.html)
- [http://www.nrel.gov/learning/re\\_biomass.html](http://www.nrel.gov/learning/re_biomass.html)
- <http://www.mmre.gov.in/schemes/grid-connected/solar-thermal-2/>
- <http://www.mmre.gov.in/schemes/grid-connected/biomass-powercogen/>

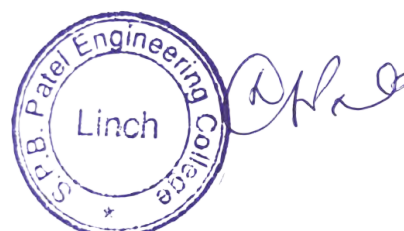
#### 9. COURSE CURRICULUM DEVELOPMENT COMMITTEE

##### Faculty Members from Polytechnics

- Prof. H.L.Purohit , HOD, Civil Engg. Dept. L.E.College. Morbi
- Shri. P.A.Pandya, LCE, Civil Engg. Dept, G.P , Himatnagar

##### Co-ordinator and Faculty Members from NITTTR Bhopal

- Dr. J.P.Tegar, Professor Dept of Civil and Environmental Engg, NITTTR, Bhopal.
- Dr. Joshua Earnest, Professor and Head, Dept. of Electrical & Electronics Engg, NITTTR, Bhopal



Unit	Major Learning Outcomes	Topics and Sub-topics
<b>Unit – VI Seismic Engineering and disaster management</b>	6.1 Explain the principles of seismic Engineering in design of structure 6.2 State the appropriate actions to be taken during disasters	6.1 Introduction of seismic engineering and its application civil engineering designs 6.2 Features of disasters such as Floods, Earthquakes, Fires, Epidemics, Gas/radioactive leaks etc. 6.3 Management and mitigation of above disasters

#### 5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1.	Ecology and Environment	8	4	4	0	8
2.	Sustainable Development	10	4	5	1	10
3.	Wind Power	10	4	6	4	14
4.	Solar Power	10	4	6	4	14
5.	Biomass energy	8	4	4	2	10
6.	Seismic Engineering and disaster	10	6	6	2	14
	<b>Total</b>	<b>56</b>	<b>26</b>	<b>31</b>	<b>13</b>	<b>70</b>

#### Legends:

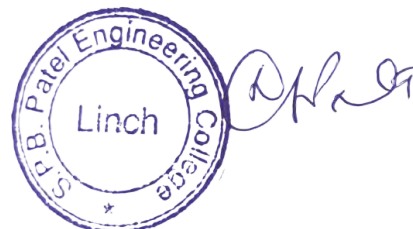
R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

#### 6. SUGGESTED LIST OF EXPERIMENTS/PRACTICAL EXERCISES

Nil

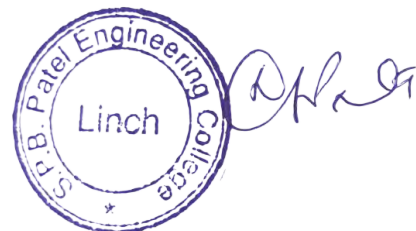
#### 7. SUGGESTED LIST OF STUDENT ACTIVITIES

- i. Prepare paper on various sustainable development
- ii. Make a report after gathering information the values of water, noise pollution and air pollution in your city/town and compare the values in other cities and towns in India with respect to environmentally acceptable levels
- iii. Prepare a paper on air and water pollution in an industry/institute
- iv. Undertake some small mini projects in any one of the renewable energies
- v. Visit an energy park and submit project on various sources of energy
- vi. Prepare powerpoint on clean and green technologies
- vii. Prepare a list of do's and don'ts applicable during disasters
- viii. Submit a report on garbage disposal system in your city/town.



## 4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
<b>Unit – I Ecology and environment</b>	1.1 Enhance knowledge about engineering aspects of Environment 1.2 Correlate the facts of ecology and environment A 1.3 assess the effect of pollution 1.4 List the causes of environmental pollution 1.5 State the major causes of air, water and noise pollution 1.6 Describe how industrial waste contaminates the land 1.7 Describe the effects of radiation on vegetables, animals	1.1 Importance of environment and scope 1.2 Engineering and environment issues 1.3 The natural system, Biotic and a-Biotic components and processes of natural system 1.4 Eco system, food chain and webs and other biological Systems, 1.5 Causes of environmental pollution 1.6 Pollution due to solid waste 1.7 water pollution, air pollution, the Noise as pollution, 1.8 Pollution of land due to industrial and chemical waste 1.9 Radiation and its effects on vegetables and animals
<b>Unit– II Sustainable Development</b>	2.1 Explain the concept of sustainable development 2.2 Justify the need for renewable energy 2.3 Describe the growth of renewable energy in India 2.4 Explain the concepts of waste management and methods of recycling	2.1 Concept of sustainable development, 2.2 Natural resources, a-biotic and biotic resources 2.3 Principles of conservation of energy and management 2.4 Need of Renewable energy 2.5 Growth of renewable energy in India and the world 2.6 Concept of waste management and recycling
<b>Unit – III Wind Power</b>	3.1 Describe the growth of wind power in India 3.2 State the differences between VAWTs and HAWTs 3.3 Explain the differences between drag and lift type wind turbines 3.4 Describe the working of large wind turbines 3.5 List the types of aerodynamic control of large wind turbines 3.6 Name the generators used in large wind turbines	3.1 Growth of wind power in India 3.2 Types of wind turbines – Vertical axis wind turbines (VAWT) and horizontal axis wind turbines (HAWT) 3.3 Types of HAWTs – drag and lift types 3.4 Working of large wind turbines 3.5 Aerodynamic control of large and small wind turbines 3.6 Types of electrical generators used in small and large wind turbines
<b>Unit – IV Solar Power</b>	4.1 Describe the salient features of solar thermal and PV systems 4.2 Describe a solar cooker and solar water heater 4.3 Describe the working of solar PV system 4.4 State the salient features of polycrystalline, monocrystalline and thin film PV systems	4.1 Features of solar thermal and PV systems 4.2 Types of solar cookers and solar water heaters 4.3 Solar PV systems and its components and their working 4.4 Types of solar PV cells 4.5 Solar PV and solar water heaters, rating and costing
<b>Unit – V Biomass energy</b>	5.1 State the different types of biomass energy sources 5.2 Describe about the energy content in biomass 5.3 Describe the working of simple biogas plant	5.1 Types of Biomass Energy Sources 5.2 Energy content in biomass of different types 5.3 Types of Biomass conversion processes 5.4 Biogas production



**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT  
COURSE CURRICULUM**

Course Title: Environment Conservation & Hazard Management  
(Code: 3300003)

Diploma Programmes in which this course is offered	Semester in which offered
Biomedical Engineering, Ceramic Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environment Engineering, Fabrication Technology, Information Technology, Instrumentation & Control Engineering, Mechanical Engineering, Mining Engineering, Textile Design, Transportation Engineering	<b>First Semester</b>
Architecture Assistantship, Automobile Engineering, Chemical Engineering, Electronics & Communication, Mechatronics Engineering, Metallurgy Engineering, Plastic Engineering, Power Electronics, Printing Technology, Textile Manufacturing, Textile Processing	<b>Second Semester</b>

### 1. RATIONALE

For a country to progress, sustainable development is one of the key factors. Environment conservation and hazard management is of much importance to every citizen of India. The country has suffered a lot due to various natural disasters. Considerable amount of energy is being wasted. Energy saved is energy produced. Environmental pollution is on the rise due to rampant industrial mismanagement and indiscipline. Renewable energy is one of the answers to the energy crisis and also to reduce environmental pollution. Therefore this course has been designed to develop a general awareness of these and related issues so that the every student will start acting as a responsible citizen to make the country and the world a better place to live in.

### 2. COMPETENCIES

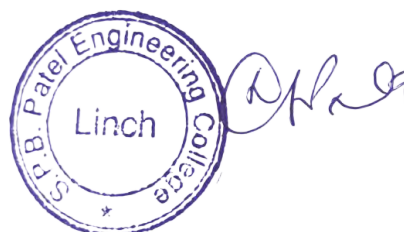
The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies.

- i. **Take care of issues related to environment conservation and disaster management while working as diploma engineer.**

### 3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	ESE	PA	ESE	PA	
4	0	0	4	70	30	0	0	<b>100</b>

**Legends:** L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P - Practical; C – Credit;  
ESE - End Semester Examination; PA - Progressive Assessment.



# 11. Renewable & Green Energy

Subject Code: 4351907, Branch Code: 19

08/02/2024, 16:20

<https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE>



Gujarat Technological University

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## TEACHING SCHEME / DETAIL SYLLABUS

DIPLOMA  19 - MECHANICAL ENGINEERING  5

2021-22  Subject Code  Enter Subject Name  Search

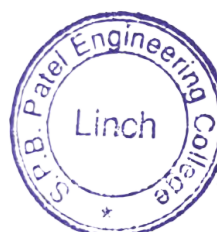
Please select other criteria to find subjects..

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff. from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L.	T.	P.		E	M	I	V	
<input type="checkbox"/>	<a href="#">4300021</a>	19	July-2023	Entrepreneurship and Start-ups	compulsory	5	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">4351901</a>	19	July-2023	Summer Internship-II	Compulsory	5	0	0	6	3	0	0	50	50	100
<input type="checkbox"/>	<a href="#">4351902</a>	19	July-2023	Manufacturing Engineering -III	compulsory	5	3	0	2	4	70	30	25	25	150
<input type="checkbox"/>	<a href="#">4351903</a>	19	July-2023	Thermal Engineering-II	compulsory	5	3	0	2	4	70	30	25	25	150
<input type="checkbox"/>	<a href="#">4351904</a>	19	July-2023	Mechnaical Engineering Project-I	compulsory	5	0	0	4	2	0	0	50	50	100
<input type="checkbox"/>	<a href="#">4351905</a>	19	July-2023	Tool Engineering	Elective(Any one)	5	3	0	2	4	70	30	25	25	150
<input type="checkbox"/>	<a href="#">4351906</a>	19	July-2023	Advance Manufacturing System	Elective(Any one)	5	3	0	2	4	70	30	25	25	150
<input type="checkbox"/>	<a href="#">4351907</a>	19	July-2023	Renewable and Green Energy	Elective(Any one)	5	3	0	2	4	70	30	25	25	150

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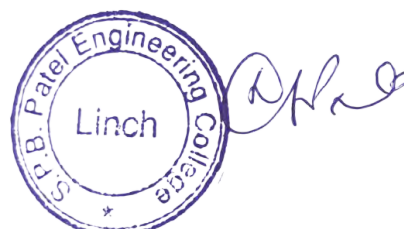
- **Syllabus of Renewable & Green Energy**

**16. COURSE CURRICULUM DEVELOPMENT COMMITTEE (GTU Resource Persons)**

Sr. No.	Name and Designation	Institute	Contact No.	Email
1.	Mr. Rajendra Pandya – Sr Project Executive	Gujarat Energy Development Agency	9909922451	<a href="mailto:rnpannya58@gmail.com">rnpannya58@gmail.com</a>
2.	Mr. Shivam R Modi – Lecturer Mechanical	K. D. Polytechnic Patan	9724717421	<a href="mailto:ershivammodi69@gmail.com">ershivammodi69@gmail.com</a>

**17. BOS Resource Persons**

Sr. No.	Name and Designation	Institute	Contact No.	Email
1	Dr. S. H. Sundarani, BOS Chairman & HOD Mechanical	Government Polytechnic, Ahmadabad	9227200147	<a href="mailto:gpasiraj@gmail.com">gpasiraj@gmail.com</a>
2	Dr. Rakesh D. Patel, BOS Member & HOD Mechanical	B. & B. Institute of Technology, V. V. Nagar	9825523982	<a href="mailto:rakeshgtu@gmail.com">rakeshgtu@gmail.com</a>
3.	Dr. Atul S. Shah, BOS Member & Principal	B. V. Patel Institute of Technology, Bardoli	7567421337	<a href="mailto:asshah97@yahoo.in">asshah97@yahoo.in</a>



	technologies						
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CO-1: Understand the Energy Scenario of the India and evaluate Renewable energy potential in India	2	-	-	-	1	2	3
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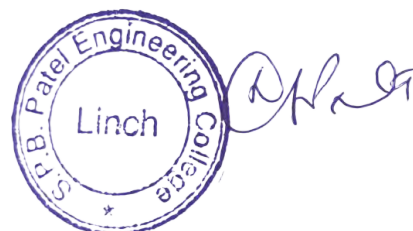
CO-2: Demonstrate the importance of solar energy collection & storage and evaluate the performance of various solar conversion systems	2	2	2	2	3	-	2
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CO-3: Determine the principle of wind energy and evaluate the potential of wind energy conversion system	2	-	2	-	3	-	2
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CO-4: Illustrate the biomass energy and its application	2	-	2	-	2	-	2
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CO-5: Illustrate the geothermal, tidal, ocean, wave energy and its application	2	-	-	3	1	-	2
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Legend: '3' for high, '2' for medium, '1' for low, and '-' for no correlation of each CO with PO.



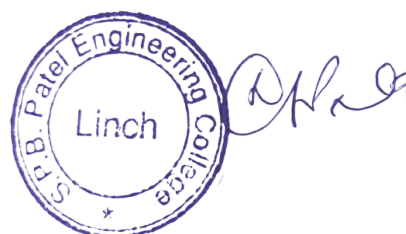
4.	Renewable Energy Technologies	R. Ramesh & Narosa	Narosa publishing house
5.	Non- Conventional Energy Resources	B. H. Khan	Tata McGraw Hill
6.	Non- Conventional Resources of Energy	G.S. Sawhney	PHI
7.	Non- Conventional Energy Resources	Shobh nath singh	Person India
8.	Solar Energy Engineering	Soteris Kalogirou	Elsevier/Academic Press
9.	Renewable Energy, power for a sustainable future	Godfrey Boyle, 2004	Oxford

#### 14. SOFTWARE/LEARNING WEBSITES

1. <http://vlab.amrita.edu/>
2. <https://nptel.ac.in/courses/112/105/112105051/>
3. <https://nptel.ac.in/courses/108/105/108105058/>
4. <https://nptel.ac.in/courses/121/106/121106014/>
5. <http://ocw.mit.edu/courses/energy-courses/>
6. [National Renewable Energy Laboratory \(NREL\), USA](#)
7. [Solar Energy Corporation of India Limited \(SECI\)](#)
8. [US Department of Energy, Energy efficiency & Renewable Energy](#)
9. [Ministry of New and Renewable Energy , New Delhi](#)
10. [Bureau of Energy Efficiency](#)
11. [Centre for Wind Energy Technology](#)
12. [The Energy Resource Institute](#)

#### 15. PO-COMPETENCY-CO MAPPING

Semester IV Semester IV	Thermal Engineering-I (4341905)						
	POs						
Competency & Course Outcomes & Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline-specific knowledge	Problem Analysis	Design/development of solutions	Engineering Tools, Experimentation & Testing	Engineering practices for society, sustainability & environment	Project Management	Life-long Learning
Competency	Basic understanding of new technologies and relate to the concepts, laws, and principles to design, deployment, operation, and maintenance of these new & renewable						





The micro-project could be industry application based, internet-based, workshop-based, laboratory-based, or field-based. Each micro-project should encompass two or more COs with in integration of PROs, UOs, and ADOs. Each student must maintain a dated work diary (Logbook) consisting of individual contributions to the project work and give a seminar presentation before submission. The duration of the micro project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit a micro-project by the end of the semester to develop the industry-oriented COs.

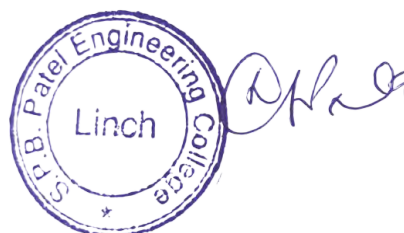
A representative list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher or using suggested student activity.

A representative **list of micro-projects** is given here. The concerned faculty can add similar micro-projects based on student activities (chart/presentation/report/model):

1. Collect information about present energy scenario of Conventional & RE sources and prepare a display chart.
2. Prepare a model of the Solar roof top system & wind mill (reference: - [Click here](#))
3. Prepare a model of the clean energy model (reference: - [Click here](#))
4. Prepare a display chart of Solar PV System
5. Prepare a display chart of different types of Solar Collectors (FPC, ETC)
6. Prepare a tabulated summary of the Wind energy potential India and installed capacity in India (Summary includes potential and installed capacity in MW) Reference- [Click here](#)
7. Make an easy solar oven at home for cookies. (For instructions: - [Click here](#))
8. Prepare a display chart of Horizontal Axis Wind Turbine (HAWT)
9. Prepare a display chart of Vertical Axis Wind Turbine (VAWT)
10. Prepare a display model of Biogas Plant (Reference- [Click here](#))
11. Make a Power Point presentation on the MHD
12. Prepare a display model of Tidal energy (Reference- [Click here](#))
13. Prepare display chart of Ocean Thermal Energy Conversion (OTEC)
14. Arrange a visit at Solar Park, Charanka, Gujarat and prepare a Report on Solar Power Plant.
15. Undertake 2 to 5 days of training in Solar Park, Charanka, Gujarat

### 13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Solar Energy – Principles of Thermal Collection and Storage	Sukhatme S.P. and J. K. Nayak	McGraw Hill Education
2.	Principles of Solar Engineering	D. Yogi Goswami, Frank Krieth & John F Kreider	Taylor & Francis
3.	Non-Conventional Energy Sources	G.D. Rai	Khanna Publication



### 9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Energy and Environment Scenario	04	4	4	-	08
II	Solar Energy Technology	14	10	10	4	24
III	Wind Energy Technology	08	4	8	2	14
IV	Bio Energy Technologies	06	4	6	0	10
V	Green Energy Technology	10	6	8	-	14
<b>Total</b>		<b>42</b>	<b>28</b>	<b>36</b>	<b>06</b>	<b>70</b>

**Legends:** R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

### 10. SUGGESTED STUDENT ACTIVITIES

Sr. No.	Activity
1.	Make an easy solar oven at home for cookies. (for instructions: - <a href="#">Click here</a> )
2.	Prepare a display chart of Solar PV System
3.	Prepare a display chart of different types of Solar Collectors (FPC, ETC)
4.	Prepare a chart/presentation of HAWT power generation
5.	Prepare a chart/presentation of VAWT power generation
6.	Make a Power Point presentation on the MHD
7.	Prepare display chart of Ocean Thermal Energy Conversion (OTEC)
8.	Identify the potential of RE in India and total RE installed capacity (MW) of India

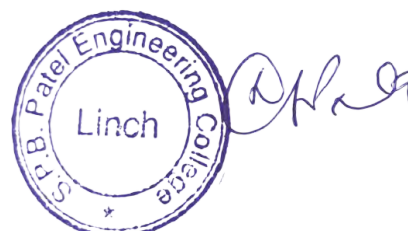
### 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies that the course teacher can use to accelerate the attainment of the various outcomes in this course.

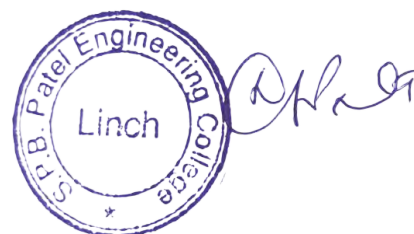
Unit	Unit Title	Strategies
I	Energy and Environment Scenario	<ul style="list-style-type: none"> <li>Real-life examples, Demonstration of RE systems, Movies/Animations.</li> <li>Numerical, Massive Open Online Courses (MOOCs)</li> </ul>
II	Solar Energy Technology	
III	Wind Energy Technology	
IV	Bio Energy Technologies	
V	Green Technology Technology	

### 12. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her at the beginning of the semester. The number of students in the group should **not exceed three**.



		systems.
<b>Unit-III Wind Energy Technology</b>	3.a Understanding Wind Energy as a potential source of green power and the different conversion techniques for producing electricity on large scale.	3.1 Physics of Wind Energy – Energy available from wind, defining Wind Energy, like wind power density, wind speed, turbine power, tip speed ratio, etc. 3.2 Types of Wind Turbines – Horizontal axis wind turbine (HAWT) and vertical axis wind turbine (VAWT), on-shore & off-shore WTG 3.3 WTG construction and configuration 3.4 Estimation of Wind Power, Turbine Power, Annual Generation, Wind energy potential & site selection 3.5 Wind energy potential & installation in India
<b>Unit-IV Bio Energy Technologies</b>	4.a Introduction to different bio energy sources and conversion technologies and their potential to provide clean energy.	4.1 Type of biomass and their properties and the conversion technologies, sources of biomass 4.2 Types of Biogas Plant and different types 4.3 Biomass Gasification Process, pyrolysis, factors affecting on biogas generation, advantages & limitations 4.4 Biocoal: - Introduction, briquetting machines 4.5 Biofuels, Biodiesel
<b>Unit V: Green Energy Technology</b>	5.a Introduction to immerging clean energy technology	5.1 Tidal: - energy from tidal power, tidal power plant, single & double basin plant 5.2 Wave energy conversion devices, advantage, and disadvantage 5.2 Geothermal energy: - Vapour & liquid dominated systems, binary cycle, hot dry rock resources, magma resources, applications 5.3 Ocean thermal energy, OTEC (Open, Closed) 5.4 Fuel Cell Technology and their present status and future prospects 5.5 MHD Power generation: - Concept & working principle



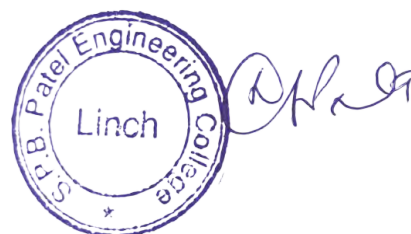
achievement of the ADOs, according to Krathwohl's 'Affective Domain Taxonomy,' should gradually increase as planned below:

- I. 'Valuing Level' in 1<sup>st</sup> year
- II. 'Organization Level' in 2<sup>nd</sup> year.
- III. 'Characterization Level' in 3<sup>rd</sup> year.

### 8. UNDERPINNING THEORY

Based on the higher-level UOs of Revised Bloom's taxonomy formulated for developing COs and competency, the primary underpinning theory is given below. If required, more such UOs could be included by the course teacher to focus on attaining COs and competency.

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
<b>Unit – I Energy and Environment Scenario</b>	<p>1.a Understand the Energy as a vital resource of development and know the current energy scenario of the World vis-à-vis India</p> <p>1.b Relevance of Renewable Energy and Green Energy in current day context of energy scarcity and environmental impacts of 'energy use'</p>	<p>1.1 Energy and Energy Sources</p> <p>1.2 Energy Scenario of the World</p> <p>1.3 Impact of Energy Use on global environment and the need to reduce these impacts.</p> <p>1.4 Introduction of REs and its potential as energy sources of the future, importance, Classification of REs, comparison with Conventional &amp; Non-conventional energy sources.</p> <p>1.5 Need of RE, advantages &amp; limitations of RE, Present Energy scenario of conventional and RE sources</p>
<b>Unit – II Solar Energy Technology</b>	<p>2.a Knowledge about Solar Energy Science and Potential of Solar Energy and understanding different conversion methods for producing green-clean and long-lasting energy for meeting future needs.</p>	<p>2.1 Solar Physics / Science – understanding different terminologies, like Solar Spectrum, Solar Irradiance, Insolation, Solar Constant, etc. related to energy flowing from the Sun and its conversion to different useable forms for meeting energy requirements of different category consumers – domestic to industrial.</p> <p>2.2 Solar Thermal Systems – solar heaters, Solar PV (Electrical) Systems, Solar cell, modules &amp; arrays, Solar cell types, Solar Concentrators, Solar Collectors, Solar ponds, Solar cookers, Solar distillation &amp; drying, Solar energy thermal storage, Solar space heating, Central Power tower – system configuration and basics of sizing system and system components.</p> <p>2.3 Installation, operation &amp; maintenance of and troubleshooting in solar</p>



Quality of Report	20%	Neat Handwriting, figure, and table. Complete labeling of figure and table.	Only formatting is improper (Location of figures/tables, use of pencil and scale).	A few required elements (labeling/ notations) are missing.	Several elements are missing (content in paragraph, labels, figures, tables).
Punctuality	15%	Timely Submission.	Submission late by one laboratory.	Submission late by two laboratories.	Submission late by more than two laboratories.

### 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

This major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to a user in uniformity of practice in all institutions across the state.

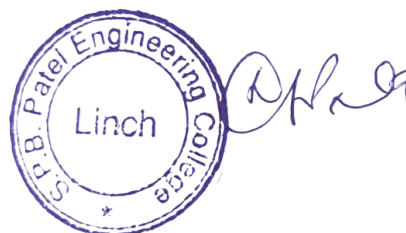
Sr. No.	Equipment Name	PrO. No.
1.	Measuring Instruments: - <ul style="list-style-type: none"> <li>• Soler Meter (Pyranometer),</li> <li>• Multimeter,</li> <li>• Anemometer,</li> <li>• Sunshine recorder,</li> <li>• Digital Thermometer with different probes (surface, air, liquid)</li> </ul>	2
2.	Models of various solar energy collectors <ul style="list-style-type: none"> <li>• Flat plate Collector (FPC)</li> <li>• Cylindrical Parabolic Collectors</li> <li>• Evacuated Tube Collector (ETC)</li> <li>• Solar Photo Voltaic (SPV)</li> </ul>	2
3.	Box type solar cooker, Solar Air Heater	3
4.	Various of models of Wind mill <ul style="list-style-type: none"> <li>• HAWT</li> <li>• VAWT</li> </ul>	3
5.	Various of model hydro turbine using running tap	5

### 7. AFFECTIVE DOMAIN OUTCOMES

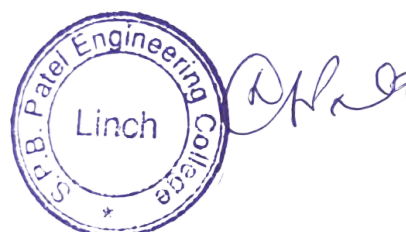
The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above COs and PrOs. More can be added to fulfill the development of this course competency.

- Work as a leader/ team member.
- Follow safety practices.
- Follow ethical practices
- Maintain tools and equipment
- Practice environment-friendly methods and processes. (Environment related)

The ADOs are best developed through laboratory/field-based exercises. Moreover, the level of



		more.			
Quality of Report	30%	Neat Handwriting, figure, and table. Complete labeling of figure and table.	Only formatting is improper (Location of figures/tables, use of pencil and scale).	A few required elements (labeling/ notations) are missing.	Several elements are missing (content in paragraph, labels, figures, tables).
Participation	25%	Excellent focused attention in the exercise.	Moderately focused attention on exercise.	Focused limited attention in the exercise.	Participation is minimum.
Punctuality	15%	Timely Submission.	Submission late by one laboratory.	Submission late by two laboratories.	Submission late by more than two laboratories.
<b>Experimentation/performance type PrOs (PrOs number: 5)</b>					
<b>Criteria</b>	<b>%</b>	<b>10</b>	<b>9-8</b>	<b>7-6</b>	<b>5</b>
Knowledge	20%	Student give the correct answers 90% or more.	Student give the correct answers between 70-89%.	Student give the correct answers between 50-69%.	Student give the correct answers less than 50%.
Procedure follows	15%	Students follow all the procedures with precaution in a logical order.	Students follow all the procedures with some precautions in a logical order.	Students follow all the procedures without precaution in a logical order.	Students follow all the procedures without precaution in an illogical order.
Observation Skill	20%	Excellent focused attention in the exercise.	Moderately focused attention on exercise.	Focused limited attention in the exercise.	Participation is minimum.
Analysis	10%	Student understand the data and analyze correctly the obtained test results.	Student understand most of the data and analyze the obtained test results with help or support.	Student need help to understand some of the data and also in analyzing the obtained test results.	Student always need help to understand the data and also in analyzing the obtained test results.



05	To study the various types of wind mill and evaluate the performance parameter of wind mill Measurement of Wind Velocity (Power) and direction at a Site, using anemometer.	3	04
06	To study the various types of biomasses and biogas plant	4	04
07	To study about different green energy viz, tidal, geothermal, MHD, OTEC, wave, ocean	5	02
08	Field Visits / Virtual Visits of different RE installations	-	-
<b>Total (Hours)</b>		-	<b>28</b>

**Note:**

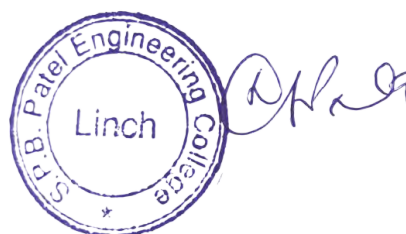
- i. More **Practical Exercises** can be designed and offered by the concerned course teacher to develop the industry-relevant skills/outcomes to match the COs. The above table is only a representative list.

The following are some **sample 'Technology'** related skills (more may be added/deleted depending on the course) that occur in the above-listed **Practical Exercises** of this course required, which are embedded in the COs and, ultimately, the competency.

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
<b>For Demonstration type PrOs (PrOs Number: 1,2,3,4,6,7)</b>		
1	Knowledge	30
2	Quality of Report	30
3	Participation	20
4	Punctuality	20
<b>Total</b>		<b>100</b>
<b>Experimentation/performance type PrOs (PrOs Number: 5)</b>		
1	Knowledge	20
2	Procedure follows	15
3	Observation Skill	20
4	Analysis	10
5	Quality of Report	20
6	Punctuality	15
<b>Total</b>		<b>100</b>

**Sample rubrics Performance Indicators for the PrOs**

<b>Demonstration type PrOs (PrOs Number: 1,2,3,4,6,7)</b>					
Criteria	%	10	9-8	7-6	5
Knowledge	30%	Students give the correct answers 90% or	Students give the correct answers between 70-89%.	Students give the correct answers between 50-69%.	Student give the correct answers less than 50%.



CO-3	Determine the principle of wind energy and evaluate the potential of wind energy conversion system.
CO-4	Illustrate the biomass energy and its application.
CO-5	Illustrate the geothermal, tidal, ocean, wave energy and its application

#### 4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme			Total	Examination Scheme				Total
L	T	P	Credits	Theory Marks		Practical Marks		
			Credits	CA	ESE	CA	ESE	
3	0	2	4	30*	70	25	25	150

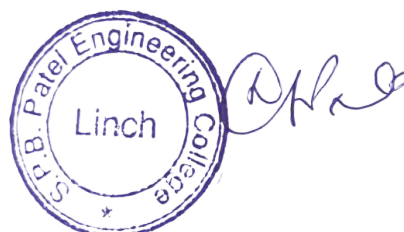
(\*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

**Legends: L-Lecture; T- Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, CA - Continuous Assessment; ESE -End Semester Examination.**

#### 5. SUGGESTED PRACTICAL EXERCISES

Following Practical activities will be included in the course to provide valuable insight to the immense potential renewable energy sources have to supplement the conventional energy in coming times. Practical activities will help in understanding RE in the same context as conventional energy sources, and in establishing a better understanding of REs which have greater advantages for a sustainable future:

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
01	Introduction of various Renewable energy sources.	1	02
02	Introduction to Instrumentation for measuring technical parameters of Solar, Wind and Bio Energy Sources. Viz. Solari Meter, Anemometer, Lux Meter, Digital Temperature Meter with different types of probes for different measurements.	2, 3	06
03	Demonstration on Working of different Solar Thermal Devices & their construction – Box Solar Cooker, Dish Solar Cooker, Solar Water Heater – FPC/ETC, insulated piping, and Hot Water Storage Tank.	2	06
04	Demonstration on Working of Solar Photovoltaic Devices & their components, viz, Solar PV Panel, Solar Inverter, Storage Battery and Charge Controller and their technical specifications.	2	04





**GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)****Competency-focused Outcome-based Green Curriculum-2023 (COGC-2023)**  
Semester-V**Course Title: Renewable and Green Energy**  
(Course Code: 4351907)

Diploma program in which this course is offered	Semester in which offered
Mechanical Engineering	5 <sup>th</sup> Semester

**1. RATIONALE**

Renewable & Green Energy technologies are emerging as Energy Sources and technologies of the Future. The Energy Sector has been identified as a sector having maximum impact on global warming and Climate Change. More than 70% of environment related issues are caused by our energy demand and utilization which is mostly 'hydrocarbons' based. 'Decarbonization of Economy' is the modern mantra for saving Planet Earth from a potential environmental disaster. Promoting and facilitating rapid development of these 'hydrocarbon-free' technologies has become a priority worldwide. Deployment of Renewable Energy Sources for meeting our present and future energy demand is an immediate need for any nation. There is going to be huge demand of engineers/ technical professionals / manpower with in-depth knowledge, exposure and understanding about Renewable and Green Energy technologies. This course will provide the basic knowledge of prospective RE technologies, viz. solar energy, wind energy, bio energy, ocean energy, geothermal energy etc. This course would develop skills related to proper designing, constructing, operating, and monitoring RE systems. This course is concerning "Energy" which is subject for all disciplines of engineering and mechanical engineers will have an important role to play in effective deployment of RE Systems in the Industries.

**2. COMPETENCY**

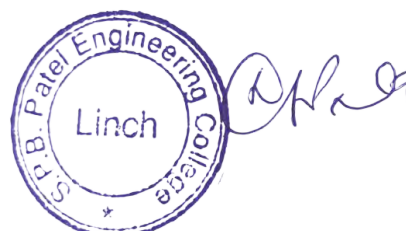
The course content should be taught and implemented to develop different skills so that students can acquire the following competency.

- Basic understanding of new Renewable Energy (RE) technologies and relate to the concepts, laws, and principles to design, deployment, operation, and maintenance of these new & renewable technologies.

**3. COURSE OUTCOMES (COs)**

The underpinning knowledge about rapidly depleting energy resources of the world and its environmental impacts and the relevance of advancements in the renewable & green energy sector in the country and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs: -

CO-1	Understand the Energy Scenario of the India and evaluate Renewable energy potential in India.
CO-2	Demonstrate the importance of solar energy collection & storage and evaluate the performance of various solar conversion systems.



# 12.Environmental Impact Assessment

## Subject Code: 3361306, Branch Code: 13

09/02/2024, 15:44

<https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE>



**Gujarat Technological University**  
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### TEACHING SCHEME / DETAIL SYLLABUS

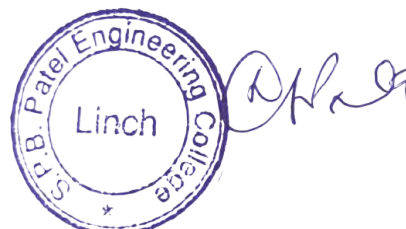
DIPLOMA  13 - ENVIRONMENTAL ENGINEERING  6   
 2012-13  Subject Code  Enter Subject Name  Search

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff_from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L.	T.	P.		E	M	I	V	
<input type="checkbox"/>	<a href="#">3361301</a>	13	Sept-2012	Biological Treatment Of Waste Water	Compulsory	6	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3361302</a>	13	Sept-2012	Environmental Monitoring	Compulsory	6	2	0	4	6	70	30	60	40	200
<input type="checkbox"/>	<a href="#">3361303</a>	13	Sept-2012	Air Pollution And Control	Compulsory	6	3	0	2	5	70	30	30	20	150
<input type="checkbox"/>	<a href="#">3361304</a>	13	Sept-2012	Cleaner Production Engineering	Compulsory	6	2	1	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3361305</a>	13	Sept-2012	Environmental Legislation And Audit	Elective	6	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3361306</a>	13	Sept-2012	Environmental Impact Assessment	Elective	6	3	0	0	3	70	30	0	0	100
<input type="checkbox"/>	<a href="#">3361307</a>	13	Sept-2012	PROJECT -II	Compulsory	6	0	0	12	12	0	0	200	100	300

<https://syllabus.gtu.ac.in/Syllabus.aspx?tp=BE>

1/1



## • Syllabus of Environment Impact Assessment



### GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering (Minor/Honours Degree Syllabus)

Subject Code : 116AB01

Subject Name : Environmental Impact Assessment

#### Reference Books:

1. Ramachandra T.V., Management of Municipal Solid Waste, Commonwealth of Learning, Canada and Indian Institute of Science, Bangalore, 2006.
2. Ramachandra T.V., Soil and Groundwater Pollution from Agricultural Activities, Commonwealth of Learning, Canada and Indian Institute of Science, Bangalore, 2006.
3. Vijay Kulkarni and Ramachandra T.V., Environmental Management, Commonwealth of Learning, Canada and Indian Institute of Science, Bangalore, 2006.

#### Course Outcome:

After Completion of the Course, Student will able to:

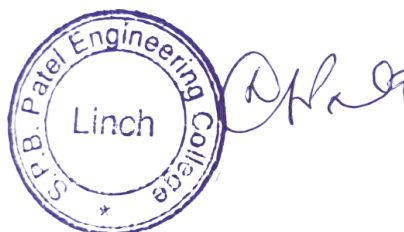
No	Course Outcomes	RBT Level
01	To understand Environmental Impact Assessment, Environmental Risk assessment -Legal and Regulatory aspects in India.	UN
02	To classify assessment techniques in EIA.	AN
03	To evaluate Standards and guidelines for evaluation through public participation, evaluation criteria and capacity building for quality assurance.	EL
04	To compare EIA through case studies including policies, planning of monitoring programs and case studies of EIA of developmental projects.	EL

\*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

#### List of Experiments: (Minimum 6 experiments need to be performed)

1. To study about the Environmental Impact Assessment.
2. To prepare checklist on environmental monitoring.
3. To evaluate the parameters for air quality monitoring.
4. To evaluate the parameters for soil quality monitoring.
5. To develop case studies of EIA developmental projects.
6. To evaluate the B.O.D parameter.
7. To monitor the noise quality parameters.
8. To provide Hands-on training on environmental audit (Partial field work)  
(A group activity where student can frame an audit team and perform audit).

\*\*\*\*\*





# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering (Minor/Honours Degree Syllabus)

Subject Code : 116AB01

Subject Name : Environmental Impact Assessment

WEF Academic Year :	2022-23
Semester :	6
Category of the Course :	Compulsory

**Prerequisite :** A good understanding about environmental science is required.

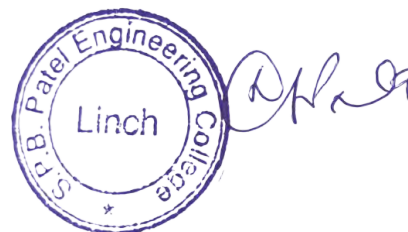
**Rationale :** The main objective of this subject is to gather knowledge about the environmental impact assessment, different assessment techniques along with the evaluation of case studies.

**Course Scheme :**

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	0	30	0	100

**Course Content:**

Sr. No.	Course Content	No. of Hours	% of Weightage
1	<b>Introduction to EIA:</b> Environmental Impact Assessment (EIA) - Environmental Impact Statement - Environmental Risk assessment - Legal and Regulatory aspects in India - Types and limitations of EIA - Terms of reference in EIA - Issues in EIA- National - social and cultural.	10	21
2	<b>Assessment Techniques In EIA:</b> Components - screening - setting - analysis - Prediction of impacts - mitigation. Matrices - Networks - Checklists - Importance assessment techniques - Cost benefit analysis - methods for prediction and assessment of impacts - air - water - soil - noise - biological - cultural - social - economic environments.	12	27
3	<b>Evaluation of EIA:</b> Standards and guidelines for evaluation, Public participation in environmental decision making trends in EIA practice and evaluation criteria - capacity building for quality assurance. Expert system in EIA - use of regulations.	12	27
4	<b>Evaluation of EIA Case studies:</b> Document planning - collection and organization of relevant information - use of visual display materials team writing - reminder checklist. Environmental monitoring - guidelines - policies - planning of monitoring programmes. Environmental management plan.	11	25



# 13. Disaster Management

## Subject Code: 3160622, Branch Code: 06

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### TEACHING SCHEME / DETAIL SYLLBUS

BE      06 - CIVIL ENGINEERING      6

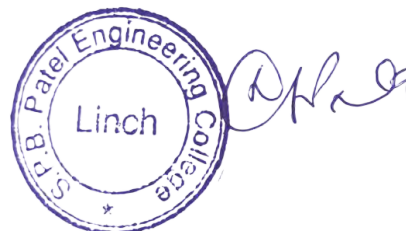
Academic Year      Subject Code      Enter Subject Name      Search

\*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

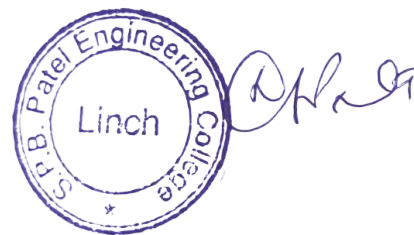
Exp.	Subcode	Branch code	Eff. from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L	T	P		E	M	I	V	
+	<a href="#">160601</a>	06	2008-09	Advanced Construction Technology	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160602</a>	06	2008-09	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160603</a>	06	2008-09	Railway Bridge and Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160604</a>	06	2008-09	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160605</a>	06	2008-09	Earthquake Engineering	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">160606</a>	06	2008-09	Geotechnical Engineering - II	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">2160601</a>	06	Dec 2015	Advanced Construction and Equipments	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160602</a>	06	Dec 2015	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160603</a>	06	Dec 2015	Railway, Bridge & Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160604</a>	06	Dec 2015	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160607</a>	06	Dec 2015	Elementary Structural Design	Compulsory	6	4	1	0	5	70	30	20	30	150
+	<a href="#">2160608</a>	06	Dec 2015	Urban Transportation system	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160609</a>	06	Dec 2015	Computational Mechanics	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">3160001</a>	06	Dec-2020	Design Engineering II B	Project Work	6	0	0	2	1	0	0	20	80	100
+	<a href="#">3160002</a>	06	Dec-2020	Contributor Personality Development Program	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160003</a>	06	Dec-2020	Integrated Personality Development Course	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160608</a>	06	Dec-2020	Urban Transportation Planning	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160610</a>	06	Dec-2020	Water Resources Engineering and Hydrology	Professional Core	6	4	0	2	5	70	30	20	30	150
+	<a href="#">3160611</a>	06	Dec-2020	Environmental Engineering	Professional Core	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160612</a>	06	Dec-2020	Design of Reinforced Concrete structures	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160613</a>	06	Dec-2020	Rock Mechanics and Tunneling	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160614</a>	06	Dec-2020	Contracts Management	Professional Elective - II	6	3	1	0	4	70	30	0	0	100
+	<a href="#">3160615</a>	06	Dec-2020	Traffic Engineering and Management	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160616</a>	06	Dec-2020	Foundation Engineering	Professional Elective - III	6	3	0	2	4	70	30	20	30	150

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	<a href="#">3160617</a>	06	Dec-2020	Construction Equipment and Automation	Professional Elective - III	6	3	1	0	4	70	30	0	0	100
	<a href="#">3160618</a>	06	Dec-2020	Open Channel flow	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
	<a href="#">3160619</a>	06	Dec-2020	Soft Computing Techniques	Open elective - II	6	2	0	2	3	70	30	20	30	150
	<a href="#">3160620</a>	06	Dec-2020	Instrumentation and Sensors	Open elective - II	6	2	0	2	3	70	30	20	30	150
	<a href="#">3160621</a>	06	Dec 2020	Earthquake Engineering	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
	<a href="#">3160622</a>	06	Dec-2020	Disaster Management	Open Elective - II	6	3	0	0	3	70	30	0	0	100



- **Syllabus of Renewable & Green Energy**



## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering  
Subject Code : 3160622

Semester – VI  
Subject Name: DISASTER MANAGEMENT

Type of course: Open Elective - II

Prerequisite: NA

Rationale: This subject is conceptual applications of principles of management to mitigate various disasters.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

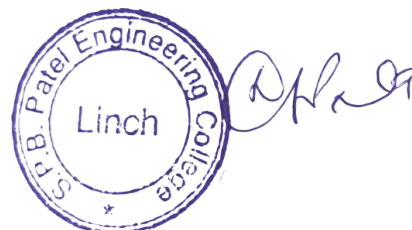
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Content:

Sr. No.	Content	Total Hrs
1	Understanding Disasters Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and disaster management	4
2	Types, Trends, Causes, Consequences and Control of Disasters Geological Disasters (earthquakes, landslides, tsunamis, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters); Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters	8
3	Disaster Management Cycle and Framework Disaster Management Cycle – Paradigm Shift in Disaster Management Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment;	8

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## GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject Code: 3160622**

	IDNDR, Yokohama Strategy, Hyogo Framework of Action	
4	Disaster Management in India Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter-Governmental Agencies	10
5	Applications of Science and Technology for Disaster Management & Mitigation Geo-informatics in Disaster Management (RS, GIS, GPS and RS) Disaster Communication System (Early Warning and Its Dissemination) Land Use Planning and Development Regulations Disaster Safe Designs and Constructions Structural and Non-Structural Mitigation of Disasters S&T Institutions for Disaster Management in India	12

### Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	50	30	10	0	0

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

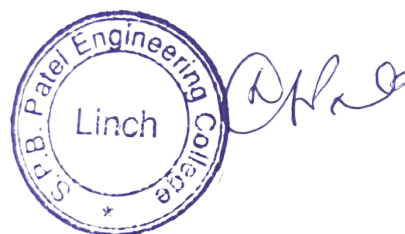
### Reference Books:

### Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Explain types, trends, causes consequences and control of disaster	30
CO-2	Recall disaster management cycle and frame work	20
CO-3	Summarize disaster management agencies and their roles in india.	20

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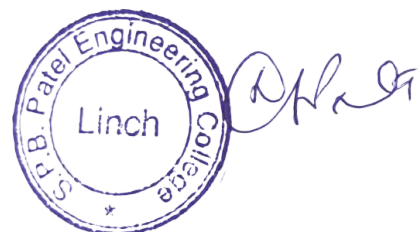
**GUJARAT TECHNOLOGICAL UNIVERSITY**

**Bachelor of Engineering**  
**Subject Code: 3160622**

CO-4	Relate applications of sciences and technology for disaster management and mitigation.	30
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# 14. Earthquake Engineering

## Subject Code: 3160621, Brach Code: 06

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### TEACHING SCHEME / DETAIL SYALLBUS

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Academic Year      Subject Code      Enter Subject Name      Search

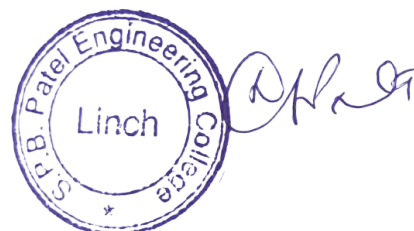
\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff from	SubjectName	Category	Sem /Year	Hours			Total	Max Marks				Total
							L.	T.	P.		E	M	I	V	
+	<a href="#">160601</a>	06	2008-09	Advanced Construction Technology	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160602</a>	06	2008-09	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160603</a>	06	2008-09	Railway Bridge and Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160604</a>	06	2008-09	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160605</a>	06	2008-09	Earthquake Engineering	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">160606</a>	06	2008-09	Geotechnical Engineering - II	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">2160601</a>	06	Dec 2015	Advanced Construction and Equipments	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160602</a>	06	Dec 2015	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160603</a>	06	Dec 2015	Railway, Bridge & Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160604</a>	06	Dec 2015	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160607</a>	06	Dec 2015	Elementary Structural Design	Compulsory	6	4	1	0	5	70	30	20	30	150
+	<a href="#">2160608</a>	06	Dec 2015	Urban Transportation system	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160609</a>	06	Dec 2015	Computational Mechanics	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">3160001</a>	06	Dec-2020	Design Engineering II B	Project Work	6	0	0	2	1	0	0	20	80	100
+	<a href="#">3160002</a>	06	Dec-2020	Contributor Personality Development Program	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160003</a>	06	Dec-2020	Integrated Personality Development Course	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160608</a>	06	Dec-2020	Urban Transportation Planning	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160610</a>	06	Dec-2020	Water Resources Engineering and Hydrology	Professional Core	6	4	0	2	5	70	30	20	30	150
+	<a href="#">3160611</a>	06	Dec-2020	Environmental Engineering	Professional Core	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160612</a>	06	Dec-2020	Design of Reinforced Concrete structures	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160613</a>	06	Dec-2020	Rock Mechanics and Tunneling	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160614</a>	06	Dec-2020	Contracts Management	Professional Elective - II	6	3	1	0	4	70	30	0	0	100
+	<a href="#">3160615</a>	06	Dec-2020	Traffic Engineering and Management	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160616</a>	06	Dec-2020	Foundation Engineering	Professional Elective - III	6	3	0	2	4	70	30	20	30	150

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### • Syllabus of Earthquake Engineering





**GUJARAT TECHNOLOGICAL UNIVERSITY**  
Bachelor of Engineering  
Subject Code: 3160621  
SUBJECT NAME: EARTHQUAKE ENGINEERING  
SEMESTER-VI

**Type of course: Professional Elective Course**

**Prerequisite:** Mechanics of Solids, Structural Analysis I, Design of Structure

**Rationale:** This subject is conceptual applications of principles of dynamics and earthquake resistant design & detailing of RC structures. Some special topics like Earthquake resistant masonry structures, liquefaction, structural controls and seismic strengthening are included aiming students know that these are challenges in this subject. This subject is useful to understand the behaviour of the structure subjected to earthquake forces and earthquake resistant design of the structure.

**Teaching and Examination Scheme:**

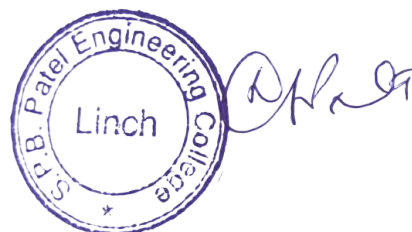
Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Earthquake Basics:</b> Interior of Earth, plate tectonics, faults, consequences of earthquake, Basic parameters of earthquake, seismic waves, magnitude & intensity, scales, Seismic zones of India, damages caused during past earthquakes (worldwide).	4	10
2	<b>Fundamentals of Earthquake Vibrations of buildings</b> Static load v/s Dynamic load, simplified single degree of freedom system, mathematical modelling of buildings, natural frequency, resonance v/s increased response, responses of buildings to different types of vibrations like free and forced, damped and un-damped vibration, response of building to earthquake ground motion, Response to multi degree (maximum three) of freedom systems up to mode shapes.	11	25
3	<b>Design Philosophy:</b> Philosophy of earthquake resistant design, earthquake proof v/s earthquake resistant design, four virtues of earthquake resistant structures (strength, stiffness, ductility and configuration), seismic structural configuration, Introduction to IS: 1893 (Part I) 2016, IS: 875 (Part V). Seismic load: <b>Seismic Coefficient Method</b> – base shear and its distribution along height. Introduction to Response spectrum, IS code provisions.	11	25
4	<b>Lateral Loads on Buildings:</b> <b>Lateral Load Distribution (SDOF):</b> Rigid diaphragm effect, centres of mass and stiffness, torsionally coupled and uncoupled system. <b>Lateral Load Analysis:</b> Analysis of frames using approximate methods like portal & cantilever methods	6	15
5	<b>Ductile Detailing:</b> Concepts of Ductile Design & Detailing of various structural components as per IS:	5	13

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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3160621

	13920 - 2016 provisions.		
6	<b>Special topics:</b> Introduction to Earthquake Resistant Features of un-reinforced & reinforced masonry Structure, Confined Masonry, Soil liquefaction, Structural controls, Seismic strengthening.	5	12

### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	30	20	20	5	5

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. Manish Shrikhande & Pankaj Agrawal; Earthquake resistant design of structures, PHI Publication, New Delhi
2. S.K.Duggal; Earthquake resistance design of structures; Oxford University Press, New Delhi.
3. A.K.Chopra; Dynamics of structures, Pearson, New Delhi
4. Clough & Penzin; Dynamics of structures
5. Park & Pauly; Behaviour of RC structure
6. John M.Biggs; Introduction to Structural Dynamics
7. C V R Murthy - Earthquake Tips, NICEE
8. IITK-GSDMA EQ26 – V -3.0 Design Example of a Six Storey Building
9. S S Rao; Mechanical Vibration; Pearson, New Delhi.
10. **IS Codes:**
  - a) Criteria for earthquake resistant design General provision & Building - IS: 1893 (Part I)- 2016
  - b) Code of Practice for Ductile Detailing of RC Structures - IS: 13920 (2016).
  - c) Code of Practice for earthquake resistant design & Construction of buildings – IS 4326 (2013).
  - d) Improving Earthquake Resistance of Earthen Buildings - IS 13827(1993) (R 2006)
  - e) Guide lines for Improving Earthquake Resistance low strength masonry buildings - IS 13828 (1993) (R2008)

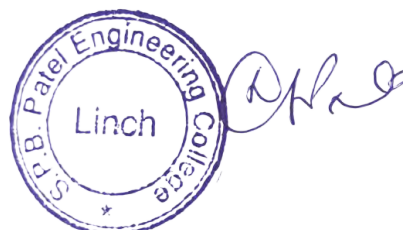
### Course Outcome:

After learning the course the students should be able to:

Sr.	CO statement	Marks % weightage
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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3160621

No.		
CO-1	Identify the causes of damages in structures during earthquake events	10
CO-2	Determine the response of SDOF & MDOF structural system subjected to vibration including earthquake	25
CO-3	Apply the concept of Earthquake Resistant Design & concept of lateral load distribution on buildings in design of RC structures	25
CO-4	Determine the lateral forces generated in the structure due to earthquake.	15
CO-5	Apply the concept of ductile detailing in RC structures & the concepts ERD to Masonry structures with knowledge of advanced technology	25

### Term Work :

Term work shall consist of satisfactory completion and submission of following list of Practicals/Tutorials.

#### List of Experiments:

Following experiments should be carried out in laboratory.

1. Spring Mass model
2. Mode shapes of multi-storey building
3. Response of structure with & without Shear wall and bracing system
4. Response of building with re-entrant corner
5. Behaviour of structure under pounding
6. (a) Liquefaction potential of clayey & sandy soil (b) Response of structure with isolated, raft & pile foundation under liquefaction

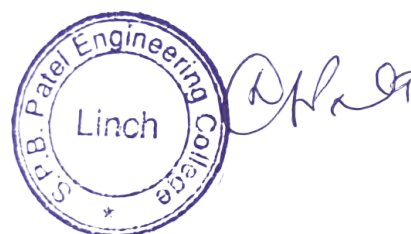
Practical examinations shall consist of oral based on the term-work and above course.

#### Major Equipment:

1. Shake table to simulate earthquake
2. Models required to perform above experiments

#### List of Open Source Software/learning website:

1. [www.nicee.org](http://www.nicee.org)
2. [www.eeri.org](http://www.eeri.org)
3. [www.gsdma.org](http://www.gsdma.org)
4. [www.ndma.gov.in](http://www.ndma.gov.in)
5. [www.nptel.iitm.ac.in/courses](http://www.nptel.iitm.ac.in/courses)
6. [www.nisee.berkeley.edu/elibrary/getpkg?id=NONLIN](http://www.nisee.berkeley.edu/elibrary/getpkg?id=NONLIN)



# 15.Environmental Engineering

## Subject Code: 3160611, Branch Code: 06

1/1/24, 11:19 AM

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### TEACHING SCHEME / DETAIL SYALLBUS

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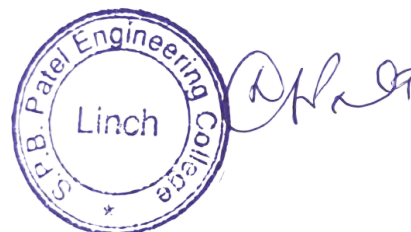
Academic Year      Subject Code      Enter Subject Name      Search

\*L=lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Exp.	Subcode	Branch code	Eff. from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L	T	P		E	M	I	V	
+	<a href="#">160601</a>	06	2008-09	Advanced Construction Technology	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160602</a>	06	2008-09	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160603</a>	06	2008-09	Railway Bridge and Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	50	0	150
+	<a href="#">160604</a>	06	2008-09	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	50	0	150
+	<a href="#">160605</a>	06	2008-09	Earthquake Engineering	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">160606</a>	06	2008-09	Geotechnical Engineering - II	Compulsory	6	4	0	2	6	70	30	50	0	150
+	<a href="#">2160601</a>	06	Dec-2015	Advanced Construction and Equipments	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160602</a>	06	Dec-2015	Applied Fluid Mechanics	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160603</a>	06	Dec-2015	Railway, Bridge & Tunnel Engineering	Compulsory	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160604</a>	06	Dec-2015	Water & Waste Water Engineering	Compulsory	6	3	0	2	5	70	30	20	30	150
+	<a href="#">2160607</a>	06	Dec-2015	Elementary Structural Design	Compulsory	6	4	1	0	5	70	30	20	30	150
+	<a href="#">2160608</a>	06	Dec-2015	Urban Transportation system	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">2160609</a>	06	Dec-2015	Computational Mechanics	Departmental Elective I	6	3	1	0	4	70	30	20	30	150
+	<a href="#">3160001</a>	06	Dec-2020	Design Engineering II B	Project Work	6	0	0	2	1	0	0	20	80	100
+	<a href="#">3160002</a>	06	Dec-2020	Contributor Personality Development Program	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160003</a>	06	Dec-2020	Integrated Personality Development Course	Personality development Elective	6	2	0	0	2	70	30	20	30	150
+	<a href="#">3160608</a>	06	Dec-2020	Urban Transportation Planning	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160610</a>	06	Dec-2020	Water Resources Engineering and Hydrology	Professional Core	6	4	0	2	5	70	30	20	30	150
+	<a href="#">3160611</a>	06	Dec-2020	Environmental Engineering	Professional Core	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160612</a>	06	Dec-2020	Design of Reinforced Concrete structures	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160613</a>	06	Dec-2020	Rock Mechanics and Tunneling	Professional Elective - II	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160614</a>	06	Dec-2020	Contracts Management	Professional Elective - II	6	3	1	0	4	70	30	0	0	100
+	<a href="#">3160615</a>	06	Dec-2020	Traffic Engineering and Management	Professional Elective - III	6	3	0	2	4	70	30	20	30	150
+	<a href="#">3160616</a>	06	Dec-2020	Foundation Engineering	Professional Elective - III	6	3	0	2	4	70	30	20	30	150

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• **Syllabus of Environmental Engineering**



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Bachelor of Engineering**  
**Subject Code: 3160611**  
**SUBJECT NAME: ENVIRONMENTAL ENGINEERING**  
**SEMESTER-VI**

**Type of course: Professional Core course**

**Prerequisite: Mandatory course of Environmental Science**

**Rationale:**

1. Drinking water is one of the basic needs of the human being; this subject helps the civil engineer in planning of a water supply scheme that can provide potable water to the community.
2. To maintain the general hygiene in the habitation, proper handling and disposal of sewage and solid waste is important. This subject helps the civil engineer in dealing with the issues related to collection, treatment and disposal of sewage and solid waste.
3. To understand effect of noise and air pollution and its control measures

**Teaching and Examination Scheme:**

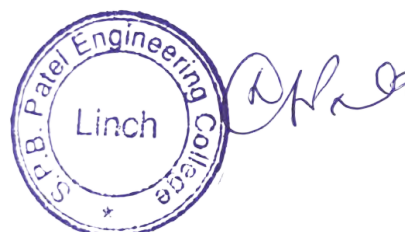
Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Water Supply scheme/System</b> Components and layout of water supply scheme, Sources of water, Types of water demand, Estimation of quantity of water required, Collection and conveyance of water, Quality characteristic of drinking water, Drinking water standard, Water borne diseases Water, Treatment processes: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes, Water Distribution system: components, type of layouts, determination of capacity of elevated reservoirs, The Water (prevention and control of pollution) Act-1974	12	30
2	<b>Sewage : Characteristics, Treatment and Disposal</b> Physical, chemical and biological characteristics of sewage, Methods of sewage disposal, Indian standards for disposal of sewage, Self purification capacity of river, Sewage farming, Unit operations and unit processes in sewage treatment, Layout of sewage treatment plant, Preliminary, Primary treatment of sewage, Aerobic and anaerobic biological treatment: attached growth and suspended growth processes, Low cost sanitation: septic tank and soak pit.	11	25
3.	<b>Collection of sewage</b> Type of sewerage systems: combined and separate, Quantity of Sewage, Sewage flow variations. Conveyance of sewage: Sewers, shapes design parameters, laying and testing of sewer, Sewer appurtenances.	5	10

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## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3160611

4	<b>House Drainage</b> Principles of house drainage, Pipes and traps, Classification of traps: nahn trap, gully trap, interception trap, grease trap, Sanitary fitting, System of plumbing, House drainage plan for building.	2	10
5	<b>Solid Waste Management</b> Quantity, composition and characteristics of solid wastes, Classification of solid wastes. Hazardous solid wastes, Biomedical solid wastes, Typical generation rate for solid wastes, Factors affecting the generation rate. Estimation of quantity of solid waste, Onsite handling, storage and processing, Collection services, Types of collection systems, Transfer stations, Solid waste processing techniques, Disposal of solid waste.	5	10
6	<b>Air and noise pollution</b> Classification and sources of air pollutants. Air quality standards, Effects of air pollution on human, plant and material, Basic Air pollution control methods, Salient features of the Air (Prevention and control of pollution) Act – 1981 Noise pollution: definition, measurement, standards, sources, effect and control measure.	4	10
7	<b>Environment Impact Assessment(EIA)</b> Environment Protection Act, Need of EIA, Steps for EIA, Role of EIA is sustainable develop met	3	5

### Suggested Specification table with Marks (Theory):

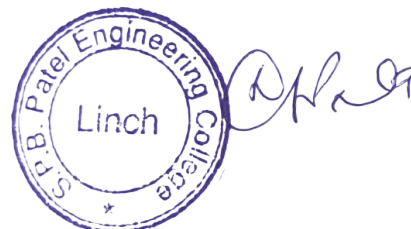
Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10%	25%	30%	15%	10%	10%

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. H.S. Peavy, D.R. Rowe and G. Tchobanoglous, Environmental Engineering, McGraw Hill International Edition
2. M. L. Davis, Water and waste water Engineering, Mc Graw Hill education (India).
3. Metcalf and Eddy, Wastewater Engineering: Treatment, disposal Reuse, Tata-McGraw Hill education (India).
4. Integrated Solid Waste Management, Tchobanoglous, Theissen & Vigil, McGraw Hill Publication
5. S.K. Garg, Environmental engineering Vol. I & II, Khanna Publication
6. Manual on Water Supply and Treatment, Ministry of Urban Development, New Delhi
7. Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health and
8. Environmental Engineering Organization, Ministry of Urban Development.







**GUJARAT TECHNOLOGICAL UNIVERSITY**  
Bachelor of Engineering  
Subject Code: 3160611

**Course Outcome:**

Sr. No.	CO statement	Marks % weightage
CO-1	Determine the quantity and quality of water required for public water supply	20%
CO-2	Interpret the effect of wastewater characteristics on human health and environment	15%
CO-3	Design different units of water and sewage treatment plant	40%
CO-4	Classify solid waste and interpret the components of solid waste management system	10%
CO-5	Analyze the effects of air and noise pollution on human and environment and develop its remedial measures.	15%

**List of Experiments:**

1. Physical Characterization of water: Turbidity, Conductivity, pH
2. Analysis of solids content of water: Dissolved, Settleable, suspended, total, volatile, inorganic etc.
3. Determination of Alkalinity and acidity
4. Determination of Hardness: total hardness, calcium and magnesium hardness
5. Determination of Chlorides
6. Determination of Optimum coagulant dose: Jar Test
7. Chemical Oxygen Demand (COD)
8. Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD)
9. Determination of residual chlorine in water
10. Bacteriological quality measurement: MPN,
11. Ambient Air quality monitoring (SPM, SO<sub>x</sub>, NO<sub>x</sub>)
12. Ambient noise measurement

**Assignments:**

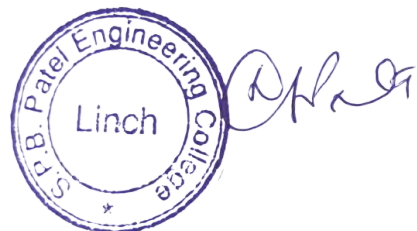
1. Design of various units of a conventional water treatment plant
2. Design of Trickling filter and Activated sludge unit.

**Major Equipment:**

1. BOD incubator
2. COD digester
3. Hot air oven
4. Muffle furnace
5. Electronic Balance (Accuracy: 1mg)
6. Jar Test Apparatus
7. pH, Turbidity, TDS and Conductivity meter
8. Sound level meter
9. High volume sampler
10. 3/5 Gas Analyzer
11. Microbial Incubator

**List of Open Source Software/learning website:**

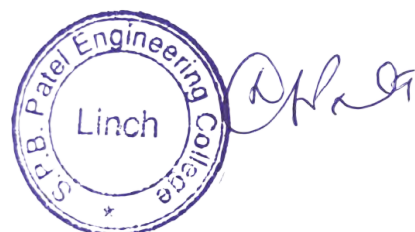
1. <http://nptel.ac.in/courses>





**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Bachelor of Engineering**  
**Subject Code: 3160611**

2. <http://moef.gov.in>
3. <http://jalshakti-ddws.gov.in>
4. <http://cpcb.nic.in>
5. EPANET



# 16.Environmental Sciences

## Subject Code: 3110007, Branch Code: 07

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### TEACHING SCHEME / DETAIL SYALLBUS

BE      07 - COMPUTER ENGINEERING      1

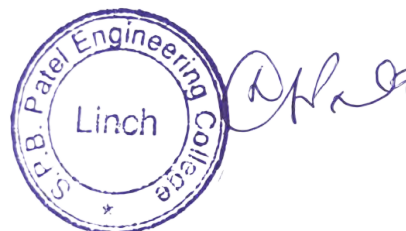
Academic Year      Subject Code      Enter Subject Name      Search

\*L=Lectures,T=tutorial,P=Practical,E=TheoryExternal,M=TheoryInternal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

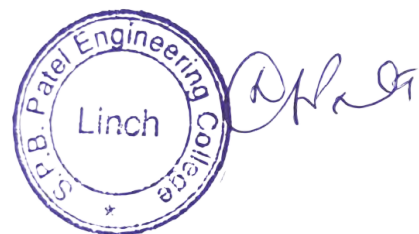
Exp.	Subcode	Branch code	Eff. from	SubjectName	Category	Sem /Year	Hours			Total	Credit				Total
							L.	T.	P.		E	M	I	V	
+	<a href="#">110001</a>	07	2008-09	Chemistry	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110002</a>	07	2008-09	Communication Skills	Compulsory	1	1	0	2	3	70	30	50	0	150
+	<a href="#">110003</a>	07	2008-09	Computer Programming and Utilization	Compulsory	1	2	0	4	6	70	30	50	0	150
+	<a href="#">110004</a>	07	2008-09	Elements of Civil Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110005</a>	07	2008-09	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110006</a>	07	2008-09	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	50	0	150
+	<a href="#">110007</a>	07	2008-09	Environmental Studies	Compulsory	1	3	0	0	3	70	30	50	0	150
+	<a href="#">110010</a>	07	2008-09	Mechanics of Solids	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110011</a>	07	2008-09	Physics	Compulsory	1	3	0	2	5	70	30	50	0	150
+	<a href="#">110012</a>	07	2008-09	Workshop	Compulsory	1	0	0	4	4	0	0	100	0	100
+	<a href="#">110013</a>	07	2008-09	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	50	0	150
+	<a href="#">110014</a>	07	2008-09	Calculus	Compulsory	1	3	2	0	5	70	30	50	0	150
+	<a href="#">110015</a>	07	2008-09	Vector Calculus and Linear Algebra	Compulsory	1	3	2	0	5	70	30	50	0	150
+	<a href="#">1990001</a>	07	2008-09	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	50	0	150
+	<a href="#">2110002</a>	07	June 2013	Communication Skills	Compulsory	1	2	0	2	4	70	30	20	30	150
+	<a href="#">2110003</a>	07	June 2013	Computer Programming And Utilization	Compulsory	1	3	1	2	6	70	30	20	30	150
+	<a href="#">2110005</a>	07	June 2013	Elements of Electrical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110006</a>	07	June 2013	Elements of Mechanical Engineering	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110007</a>	07	June 2013	Environmental Studies	Compulsory	1	3	0	0	3	70	30	0	0	100
+	<a href="#">2110011</a>	07	June 2013	Physics	Compulsory	1	3	0	2	5	70	30	20	30	150
+	<a href="#">2110013</a>	07	June 2013	Engineering Graphics	Compulsory	1	2	0	4	6	70	30	20	30	150
+	<a href="#">2110014</a>	07	June 2013	Calculus	Compulsory	1	3	2	0	5	70	30	20	30	150
+	<a href="#">2110015</a>	07	June 2013	Vector Calculus And Linear Algebra	Compulsory	1	3	2	0	5	70	30	20	30	150
+	<a href="#">2110016</a>	07	June 2013	Basic Electronics	Compulsory	1	4	0	2	6	70	30	20	30	150
+	<a href="#">2110017</a>	07	June 2013	Electrical and Electronics Workshop	Compulsory	1	0	0	4	4	0	0	20	80	100

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+	<a href="#">2990001</a>	07	June 2013	Contributor Personality Development	Compulsory	1	4	0	0	4	70	30	20	30	150
+	<a href="#">3110001</a>	07	Oct - 21	Chemistry	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110002</a>	07	2018-19	English	Humanities and Social Science	1	2	0	2	3	70	30	20	30	150
+	<a href="#">3110003</a>	07	2018-19	Programming for Problem Solving	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110005</a>	07	2018-19	Basic Electrical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110006</a>	07	2018-19	Basic Mechanical Engineering	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110007</a>	07	2018-19	Environmental Sciences	Mandatory	1	2	2	0	0	70	30	0	0	100
+	<a href="#">3110012</a>	07	2018-19	Workshop/ Manufacturing Practices	Engineering Science	1	0	0	4	2	0	0	20	80	100
+	<a href="#">3110013</a>	07	2018-19	Engineering Graphics & Design	Engineering Science	1	2	0	4	4	70	30	20	30	150
+	<a href="#">3110014</a>	07	2018-19	Mathematics - 1	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110015</a>	07	2018-19	Mathematics - 2	Basic Science	1	3	2	0	5	70	30	0	0	100
+	<a href="#">3110016</a>	07	2018-19	Basic Electronics	Engineering Science	1	3	0	2	4	70	30	20	30	150
+	<a href="#">3110017</a>	07	2018-19	Induction Program	Mandatory	1	0	0	0	0	0	0	0	0	0
+	<a href="#">3110018</a>	07	2018-19	Physics	Basic Science (Elective)	1	3	0	2	4	70	30	20	30	150



- **Syllabus of Environmental Sciences**



## GUJARAT TECHNOLOGICAL UNIVERSITY

### BACHELOR OF ENGINEERING SYLLABUS

1<sup>st</sup> Year, Subject Code : 3110007

<b>Semester/Year</b>	<b>: 1</b>
<b>Category of the Course</b>	<b>: Mandatory Course</b>
<b>Subject Name &amp; Code</b>	<b>: Environmental Science (3110007)</b>

**Type of course :** Engineering Science

**Prerequisite :** Interest in natural systems sustaining the life on the earth.

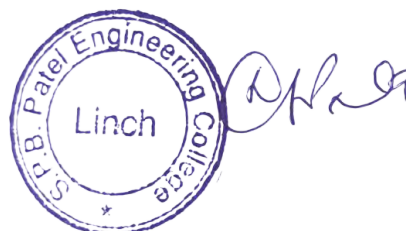
**Rationale :** To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

**Teaching and Examination Scheme :**

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	ESE (V)	PA(I)	
2	2	0	0	70	30	0	0	100

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	<b>INTRODUCTION TO ENVIRONMENT</b> Definition, principles and scope of Environmental Science. Impacts of technology on Environment, Environmental Degradation, Importance for different engineering disciplines	02	8 %





## GUJARAT TECHNOLOGICAL UNIVERSITY

### BACHELOR OF ENGINEERING SYLLABUS

1<sup>st</sup> Year, Subject Code : 3110007

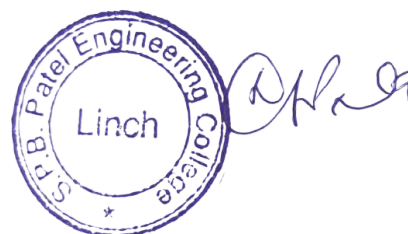
2	<b>ENVIRONMENTAL POLLUTION</b> a) Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants b) Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO <sub>2</sub> , NO <sub>x</sub> , Auto exhaust, Effects of common air pollutants c) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects d) Solid Waste: Generation and management e) Bio-medical Waste: Generation and management f) E-waste: Generation and management	14	44 %
3	<b>GLOBAL ENVIRONMENTAL ISSUES</b> Sustainable Development, Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer, Carbon Footprint, Cleaner Development Mechanism (CDM), International Steps for Mitigating Global Change	06	24 %
4	<b>Basic Concepts of Green Building &amp; Smart Cities :</b> Green Building : Introduction, Objectives, Fundamental Principles, Benefits of Green Buildings, Example of Green Buildings, Smart Cities Concepts.	04	16 %
5	<b>Concept of 4R's :</b> Principles, Application of 4R's.	02	8 %

Suggested Specification table with Marks (Theory) :

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
40	40	20	0	0	0

**Legends : R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate  
C: Create and above Levels (Revised Bloom's Taxonomy)**

**Note :** This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.





# GUJARAT TECHNOLOGICAL UNIVERSITY

## BACHELOR OF ENGINEERING SYLLABUS

1<sup>st</sup> Year, Subject Code : 3110007

### Reference Books :

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
2. Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP - Lambert Academic Publishing , Germany
3. Environmental Studies by Anindita Basak ,2009 Publisher: Driling Kindersley(India)Pvt. Ltd Pearson
4. Textbook of Environmental Studies by Deeksha Dave & S S Kateva , Cengage Publishers.
5. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
6. Environmental Studies by R. Rajagopalan, Oxford University Press
7. Environmental Studies by Benny Joseph, TMH publishers
8. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
9. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

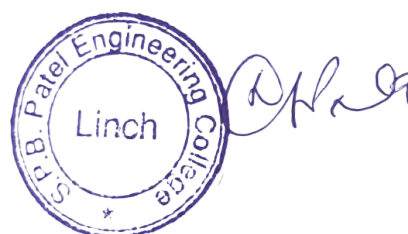
### Course Outcome :

Sr. No.	CO statement	Marks % weightage
CO-1	Identify the types of pollution in society along with their sources	45
CO-2	Realize the global environmental issues	25
CO-3	Conceptualize the principles of Green Buildings and Smart cities	15
CO-4	Implement the concept of recycle and reuse in all fields of engineering	15

### List of Tutorials : Based on

1. Introduction to Environment
2. Water Pollution
3. Air Pollution
4. Noise Pollution
5. Solid Waste
6. Bio-medical Waste
7. E-waste
8. Global Environmental Issues
9. Concept of Green Building
10. Concept of Smart Cities
11. Concept of 4R's

List of Open Source Software/learning website : MOEF, NPTEL



# 17.Principles of Economics and Management

## Subject Code: 3140709, Branch Code: 07

### • Syllabus of Principles of Economics and Management



#### GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering  
Subject Code: 3140709

9.	attributes culture, How does culture affect managers and employees Corporate Social Responsibility; meaning, importance Business Ethics; meaning, importance.	03	6%
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#### Reference Books:

1. Engineering Economics, R.Paneerselvam, PHI publication
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning
4. Principles and Practices of Management by L.M.Prasad
5. Principles of Management by Tripathy and Reddy
6. Modern Economic Theory, By Dr. K. K. Dewett & M. H. Navalur, S. Chand Publications

#### Course Outcomes:

After learning the course the students will be able to

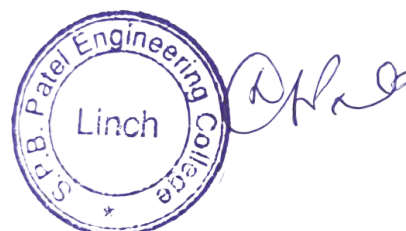
Sr. No.	CO statements	Marks %Weightage
CO-1	Analyze how elasticity affects revenue.	25
CO-2	Relate production function and cost function.	20
CO-3	Analyze the optimal quantity and pricing decisions of firms in different market structures (perfect competition, monopoly, monopolistic competition) to achieve profit maximization.	20
CO-4	Describe the basic principles of management: planning, organizing, controlling, and directing	25
CO-5	Analyze ethical dilemmas faced by business and managers	10

#### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
0	0	20	55	25	0

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.







## GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3140709

Semester – IV

Subject Name: PRINCIPLES OF ECONOMICS AND MANAGEMENT

Type of course: Undergraduate

Prerequisite: Linear and non-linear data structures, working experience of any one structured programming language

Teaching and Examination Scheme:

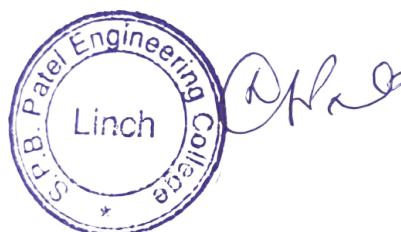
Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No	Topics	Hrs.	Module Weightage
1.	Introduction to Economics; Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity	5	12
2.	Theory of production; production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical	4	12
3.	Markets; meaning, types of markets & their characteristics ( Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly) National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP, NDP, Personal income, disposal income.	4	12
4.	Basic economic problems; Poverty-meaning, absolute & relative poverty, causes, measures to reduce Unemployment: meaning, types, causes, remedies Inflation; meaning, types, causes, measures to control	4	12
5.	Money; meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR.	4	12
6.	Introduction to Management; Definitions, Nature, Management Difference between Management & administration, skill, types and roles of managers Management Principles; Scientific principles, Administrative principles, Maslow's Hierarchy of needs theory	5	12
7.	Functions of Management; Planning, Organizing, Staffing, Directing, Controlling ( meaning, nature and importance) Organizational Structures; meaning, principles of organization, types-formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization, chain of command, centralization and decentralisation	6	12
8.	Organisational culture of Environment concept of culture and its importance,	4	10

Page 1 of 2

w.e.f. AY 2018-19



## Life skills

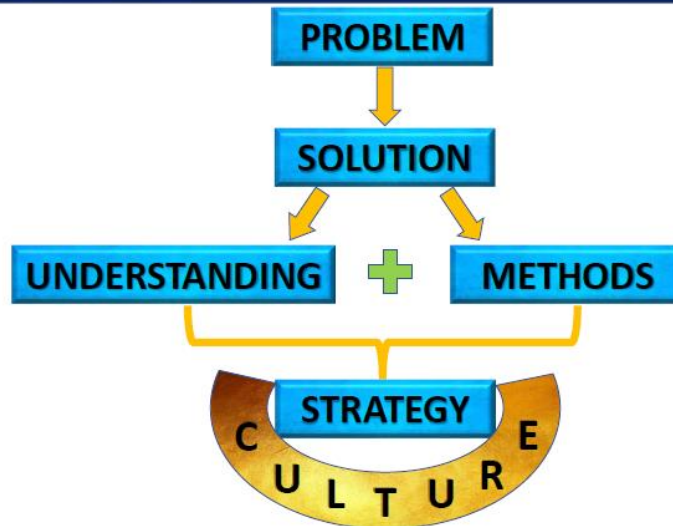
- Professional Life Social Development course

**PLSD: A CERTIFICATE PROGRAM FOR SAFFRONITES !**

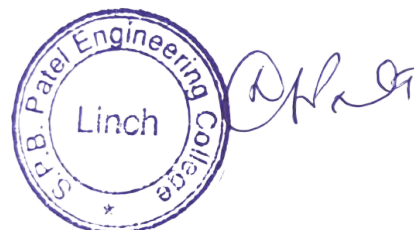


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## THOUGHT PROCESS



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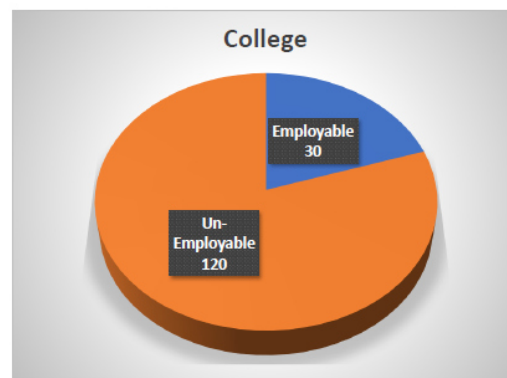
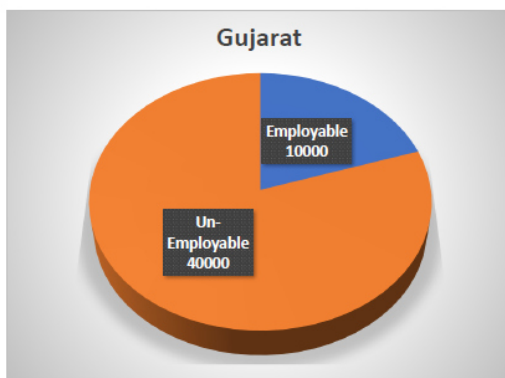
# THOUGHT PROCESS



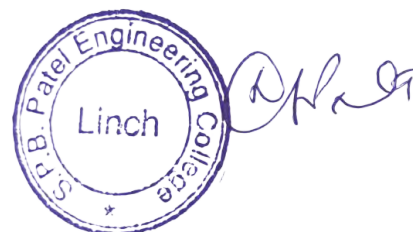
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# IDENTIFYING THE PROBLEM !

# of Engineers Graduating from Gujarat every year = 50000 (approx.)  
Percentage of "Employable" Engineers = 20%



4



## Certificate for the Program

# CERTIFICATE Of Achievement

This is to certify that  
*Swagatika Mohanty*

of the Batch 2019 has successfully completed the Professional & Life Skills  
Development (PLSD) course.



S. P. B. PATEL  
ENGINEERING COLLEGE  
SAFFRONY INSTITUTE OF TECHNOLOGY CAMPUS

*Abhimanava*

Principal

# CERTIFICATE Of Achievement

This is to certify that  
*Tej Soni*

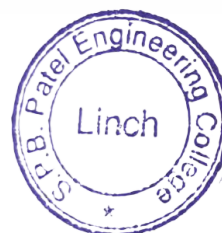
of the Batch 2019 has successfully completed the Professional & Life Skills  
Development (PLSD) course.



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*Abhimanava*

Principal



*Abhimanava*

- **Let's Celebrate Life**

**"Let's Celebrate Life: Joy of Giving"**

**S.P.B Patel Engineering College**

**February 11, 2022**

**Program Overview:**

In the spirit of communal generosity and compassionate outreach, Saffrony Institute of Technology, uplifted "Let's Celebrate Life: Joy of Giving" extension activity during the academic year 2022-23. On the memorable date of February 11, 2022, the campus transformed into a hub of altruism as students and ten dedicated faculty members joined hands for a shared mission.

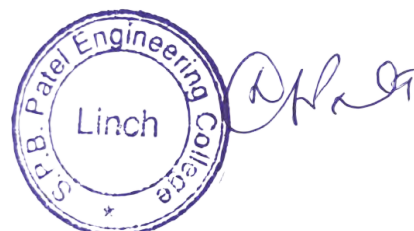
**Participation Details:**

- Faculty Team: A committed team of 10 educators.
- Student Participation: A heartening turnout of approximately 500 students.
- Event Date: February 11, 2022

The essence of the "Joy of Giving" event lay in its simplicity yet profound impact. Students and teachers joined hands to tidy up their lives by giving away clothes they no longer needed. These clothes, which were once special to them, became tools for doing good for people who are not as fortunate. It's like turning something personal into a positive force to help others. The act of giving away these clothes showed a strong sense of care and a real effort to make a meaningful impact on the lives of those who might be struggling.

**Fostering Community Bonds and Compassion:**

Beyond the material donations, the event became a catalyst for fostering a deeper sense of community and compassion within the college. The shared act of giving served as a reminder that, even in our individual pursuits, we are bound by a common humanity and shared responsibility towards the well-being of others.



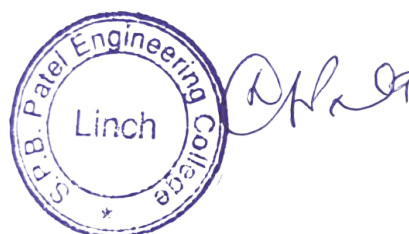
### Impactful Benevolence and Lasting Connections:

The "Joy of Giving" event transcended the mere act of donation; it became a powerful expression of collective kindness. The positive impact rippled through the S.P.B Patel Engineering College community, creating lasting connections and reinforcing the notion that the joy derived from selfless giving extends far beyond the immediate recipients.

### Extension Activity Recognition:

Saffrony Institute of Technology proudly recognizes the "Let's Celebrate Life: Joy of Giving" event as a significant extension activity. This acknowledgment underscores the institute's steadfast commitment to instilling values of generosity, compassion, and community service, shaping not just academically proficient individuals but compassionate contributors to society.

### Photographs:





S. P. B. Patel Engineering College  
Linch  
*[Signature]*

- **Women's Day**

12/13/23, 12:40 PM

Saffrony Institute of Technology Mail - Re: Summary Report on Nurturing Our Inner Wisdom - A Workshop for Women's Sel...



Dr. Pooja Mehta <pooja.mehta@saffrony.ac.in>

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**Re: Summary Report on Nurturing Our Inner Wisdom - A Workshop for Women's Self-Exploration**

1 message

Avani Dedhia <avani.dedhia@saffrony.ac.in>

Mon, May 15, 2023 at 11:58 AM

To: projects@saffrony.ac.in

Cc: sit.academic@saffrony.ac.in, gulab.bambhaniya@saffrony.ac.in, "Dr. Pooja Mehta" <pooja.mehta@saffrony.ac.in>

Attaching other documents and photos for future reference.

**Avani Dedhia | Assistant Professor - Civil Engineering Department | M.Tech - Structural Engineering Design | Pursuing PhD | Saffrony Institute of Technology | S.P.B. Patel Engineering College | Near Dholasan Approach Road, Ahmedabad-Mehsana Highway, At. & P.O. Linch, Dist. Mehsana, Gujarat - 384 435 | +91-2762-285721 | avani.dedhia@saffrony.ac.in |**

On Sat, May 13, 2023 at 2:48 PM <projects@saffrony.ac.in> wrote:

Greetings!

Prof. Avani Dedhia,

Here is the copy of your report generated though google form at 5/12/2023 16:26:42.

Report Title: Nurturing Our Inner Wisdom - A Workshop for Women's Self-Exploration

Summary: The team of Women Cell at Saffrony Institute of Technology was thrilled to organise an exciting event for all the female students, faculty members, and staff members of Diploma & Degree Engineering titled 'Nurturing Our Inner Wisdom-A Workshop for Women's Self-Exploration'. This even was organised on Thursday, 27th April 2023 from 9:30 AM to 12:30 PM in association with Dada Bhagwan Foundation, Adalaj.

The speakers for the event were Dr. Sonal Vora & Ms. Manjul Maldhari, two highly intellectual and spiritual counsellors from Dada Bhagwan Foundation, Adalaj

topics covered were how to stay focused on your goals, to find the leakages or distractions in our day to day life which no matter how insignificant they might seem to be, may result in a great harm in the long term. And these topics were covered through a series activities & experiments. Students and faculty members had to observe, understand and decode the hidden meaning each activity was trying to convey and they all did this job wonderfully! The session was very interactive and everyone not only participated whole-heartedly but also learned a lot! Overall, it was an empowering and inspiring experience for all the participants. It was also a great opportunity to celebrate, connect with like-minded individuals, and learn so much about personal growth and development.

Attachments:

Report (Word) :

Report (PDF) :

Images: <https://drive.google.com/open?id=1GGTaksopeZfqjrErbZLnBWrPZZ7cYxdM>,  
<https://drive.google.com/open?id=1HTEO7hu8EJtOzhLRUaeEoWJvsm1zY11R>, [https://drive.google.com/open?id=1aC2-d\\_YtukHX2OCmSNmgGsxMBTDcDgTT](https://drive.google.com/open?id=1aC2-d_YtukHX2OCmSNmgGsxMBTDcDgTT), [https://drive.google.com/open?id=1hLSOmzsygBb\\_vBphs\\_iczbjJCzJRGH4o](https://drive.google.com/open?id=1hLSOmzsygBb_vBphs_iczbjJCzJRGH4o), <https://drive.google.com/open?id=1WV-aWUcbTfUqkFBrO34lkotHvCCQILKob>,  
<https://drive.google.com/open?id=131hfvQPggHgX1jdQRLThLF9q9DbexeQl>

Note: You will receive an another email from Google Forms if you want to upload your remaining documents afterwards. Click on "Edit Response button".

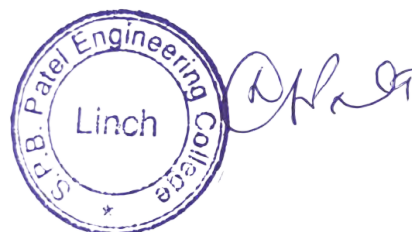
Regards,

Sit-Academic

Saffrony Institute of Technology

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12/13/23, 12:40 PM

Saffrony Institute of Technology Mail - Re: Summary Report on Nurturing Our Inner Wisdom - A Workshop for Women's Sel...

6 attachments



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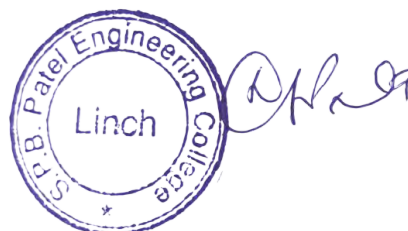
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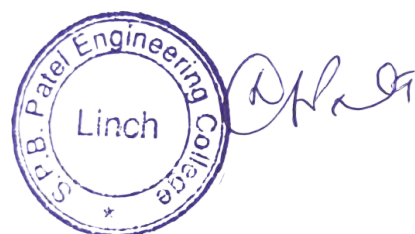
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 Half day workshop on Nurturing our inner wisdom .pdf  
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## UDAAN Sports Fest Photos



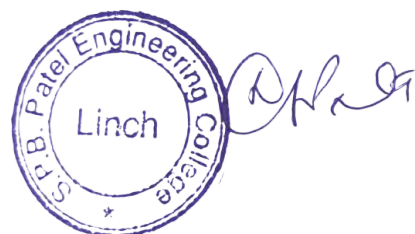
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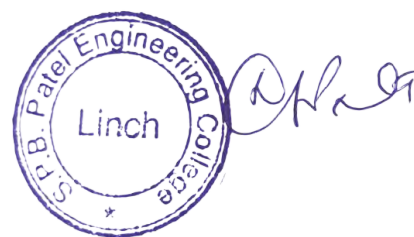
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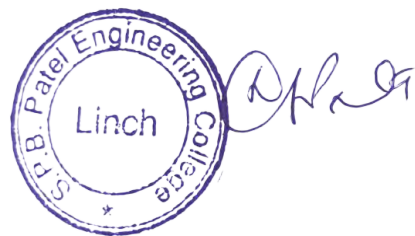


**VOLLEYBALL**





**BADMINTON**





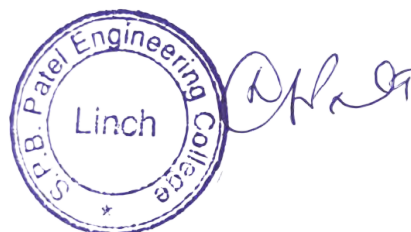
**S. P. B. PATEL  
ENGINEERING COLLEGE**  
SAFFRONY INSTITUTE OF TECHNOLOGY CAMPUS

8<sup>th</sup> March, 2022

Report on  
**Women's Day Celebration**

at  
Saffrony Institute of Technology

Prepared By:  
**Prof. Avani Dedhia**  
Civil Engineering Department  
&  
**Dr. Pooja Mehta**  
H & Sc. Department



## **Women's Day 2022 Celebration Report**

**Organized by:** Prof. Avani Dedhia & Dr. Pooja Mehta

**Designation and Institute details:** Assistant Professors, Saffrony Institute of Technology.

**Date:** 8<sup>th</sup> March, 2022

**Duration:** 02:50 pm to 4:30 pm

**Venue:** Auditorium, Saffrony Institute of Technology

**No. of Participants:** Around 60 girl students from Diploma and Degree Engineering, 3 female staff members and 4 female faculty members.

### **Introduction and Objective:**

This day was celebrated in the spirit of Women's Day. Also after the lockdown, this would be the first celebration offline with such a large attending of students. The objective was to celebrate the various hidden qualities and talents that the girls and women at Saffrony Institute have and to celebrate their very own Women's Day.

### **Celebration details:**

Students and female staff members were gathered in the Auditorium. There was smile on everyone's face and an excitement that itself showed the spirit of Women's Day. Prof. Avani Dedhia, Assistant Professor in Civil Engineering and Dr. Pooja Mehta, Assistant Professor in English designed and coordinated the event. After a warm welcome, the session started off with a group activity, a game. The game of 'Fire on the Mountain' was played and attendees were divided into 4 groups of roughly 15 students with a faculty in each group. The music, cheering sound set the tone of the celebration.

### **Activity 1: The A to Z Game**

The first game played was 'A to Z – A Total Strength Within'. The girls were asked to make a list of items from A to Z and find those items in their bag in less than 8 minutes. There were two restrictions – they cannot use names of people like 'Fiza's handkerchief', or colours like 'green bottle' or adjective like 'very nice girl'. Every group was working hard finding out the items and almost 3 groups completed before the time. Then each group presented the items alphabet wise

1

and it was fun sharing the findings. The game ended with a message that we have everything already available with us, within us or surrounding us. We just need to realize, believe and try to find it. The strength, courage and other virtues leading and directing us towards success and fulfilment in our life are nowhere else but within us, or we get from the surroundings, friends and well-wishers. All the attendees took a resolution to believe in one's self, in their strength, if missing, go and find and help others find their strength.

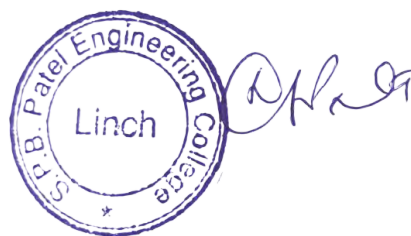
### **Activity 2: A Talent Showcase**

The second activity was regarding knowing the talent of each other in the group and showcasing it. Each group was given around 15 Minutes time to interact and know the talents of each group members. After the preparation time, each group was given a challenge to showcase their talent in 150 seconds. That was sheer fun. Each group was filled with so much of energy and each member with unique talent and skills. They discussed, interacted, practiced and finally presented and showcased their talent on stage in creative way, undoubtedly with a swag. The talents and skills included singing, acting, yoga and acrobatics, martial arts, decoration, art and craft, photography, stunts and many more.

The celebration of Women's Day ended with a dance on a very energetic song. Everyone participated with enthusiasm. The dance was followed by the group photograph at the entrance of the institute. The radiance, smile and strength was beautifully captured in the group photograph. Here is the glimpse of the event.









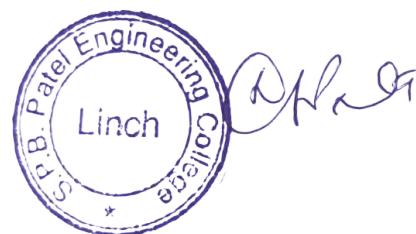
**Yours Sincerely,**

---

**Prof. Avani Dedhia**  
**Assistant Professor, Civil Engineering Department**

---

**Dr. Pooja Mehta**  
**Assistant Professor, H& Sc. Department**





Dr. Pooja Mehta &lt;pooja.mehta@saffrony.ac.in&gt;

## [For Approval-1] Institute Updates - Women's Day - Female Students and Faculty members of all the departments - A Women's Day Celebration at Saffrony Institute on 12th March 2020

3 messages

Hima Soni &lt;hima.soni@saffrony.ac.in&gt;

Wed, Mar 18, 2020 at 10:52 AM

To: pooja mehta &lt;pooja.mehta@saffrony.ac.in&gt;, avani dedhia &lt;avani.dedhia@saffrony.ac.in&gt;

Cc: Chitralekha Nahar &lt;chitralekha.nahar@saffrony.ac.in&gt;, Gulab Bambhaniya &lt;gulab.bambhaniya@saffrony.ac.in&gt;, Prachi Singh &lt;180390107062@saffrony.ac.in&gt;

To celebrate the very special eve of **Women's day** at Saffrony Institute of Technology, a **fun-n-learn workshop** was organised for all the budding women of the college on **12th March 2020**.

The day was initiated with the introduction of the guests cum speakers, **Dr. Hiral Bhalara, PhD graduate from Cambridge University, UK and Ms. Tejal Shah, an MBA graduate from Schulich School of Business in Toronto, Canada.**

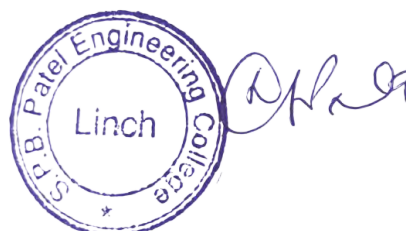
The workshop started with a **few amazing activities and inspirational video clips** which later dealt with **finding one's PURPOSE** which directs all the positive energy into our actions, **knowing one's STRENGTHS** which leads to the realization of **PASSION**, which automatically comes finding us when we get involved in different activities and at last having a **DEDICATED ACTION**. All these combined, results into productivity and success. Through such teachings, the topic of the workshop was revealed to be **"KUCHH KARIYE"**.

The first half was completed with the speakers receiving gifts and the final vote of thanks was delivered by Dr. Pooja Mehta. Further, the lunch was organised in the form of **'dubba party'** and the next half turned out to be **'game time' at the amphitheatre.**

All in all, **the day was an enriching one with lots of learnings involved. Everyone laughed, enjoyed and went home with an optimistic and a purposeful zeal.**

Here are the glimpses of the wonderful day:

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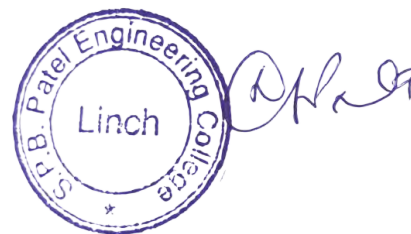


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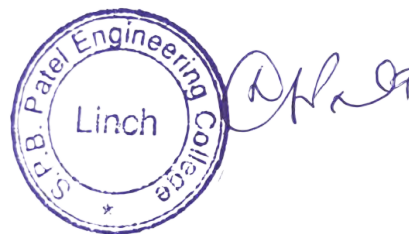
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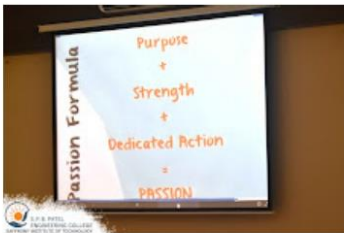
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