

Name of Institute: IITE

Name of Faculty: Dr. Jigna Panchal

Course code: MA0112

Course name: Multivariable Calculus

Credit points: 4

Offered Semester: I

Course coordinator (weeks 1 - 15)

Full name: Prof.Kinjal Shah

Department with siting location: Mathematics Department, ISHLS, 4th floor

Bhanwar building, Indus University, Ahmadabad

Telephone: 3425

Email: kinjalshah.gd@indusuni.ac.in

Consultation times: 10 am – 12 pm

Course lecturer (weeks 1 - 15)

Full name: Dr. Jigna Panchal

Department with siting location: Mathematics, 4th floor, Bhanwar Building.

Telephone: 3424

Email:jignapanchal.gd@indusuni.ac.in

Consultation times: Wednesday: 2:00 to 4:00 PM

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives

By participating in and understanding all facets of this course a student will:

- 1) To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
- 2) To provide an ability to apply knowledge of basic science and engineering fundamentals.
- 3) To provide an ability to undertake problem identification, formulation and solution.
- 4) To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
- 5) To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
- 6) To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.

- 7) To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

Course Outcomes (CO)

Upon the successful completion of the course, students will be able to:

CO: 1	Develop mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.	BT-4
CO: 2	Describe an ability to undertake problem identification, formulation and solution.	BT-1
CO: 3	Evaluate the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.	BT-5
CO: 4	Apply the knowledge of basic science and engineering fundamentals.	BT-3
CO: 5	Explain the concept of partial differentiation, differential calculus and vector algebra.	BT-2
CO: 6	Create different mathematical models within science and technology and work creatively, systematically and critically.	BT-6

Course Outline

Basics of Partial Derivatives and its applications, Vector Differential & integral Calculus.

Method of delivery

Chalk &Talk

Study time

4 Hrs/week

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

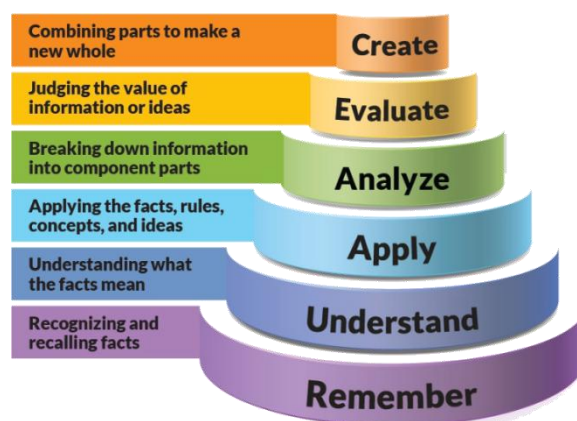


Figure 1: Blooms Taxonomy

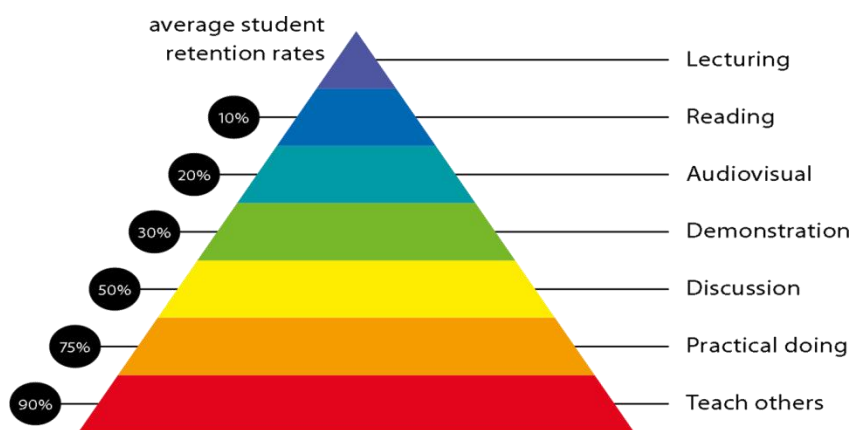


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered (Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of Metallurgical Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	1 Professional knowledge, grounding & awareness
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate	2 Information literacy, gathering & processing

information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work:

Not Applicable

Lecture/tutorial times

(Give lecture times in the format below)

Example:		
Lecture	Monday 2.25 pm - 3:20 pm	Room: LH-13
Lecture	Tuesday 1:30 pm - 2:25 pm	Room: LH-13
Lecture	Thursday 9:55 am - 10:50 am	Room: LH-14
Tutorial	Wednesday 9:00 am - 9:55 am	Room: LH-14

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Details of referencing system to be used in written work

Text books

B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill.

Additional Materials

Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics" (8th Edition), Wiley Eastern Ltd., New Delhi.
2. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi
3. Murray Spiegel, "Advanced Mathematics for Engineering & Science: Schaum's Outline Series", Tata McGraw Hill Publication
4. MerelC Potter, J.L. Goldberg, "Advanced Engineering Mathematics" (3rd Edition), Oxford India Publication.

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Internal Exam	60%	Objectives (2-5) (20 Marks- Class Test-1, 20 Marks - Class Test-2, 5 Marks- Attendance, 5 Marks Assignment, 10 Marks Quiz)
Final exam (<i>closed book</i>)	40%	Objectives (1-5)

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Partial Differentiation Variable Treated as Constant	Apply the knowledge of multivariable calculus and partial differentiation for solving various practical & engineering problems.	Chalk & Talk, Assignment Submission , Unit Test.
	Weeks 2	Total Derivative, Partial Differentiation of Composite Functions: Change of Variable, Jacobian	Apply the knowledge of multivariable calculus and partial differentiation for solving various practical & engineering problems.	Chalk & Talk, Assignment Submission , Unit Test.
	Week 3	Maxima and Minima of Functions of two Variables: with and without constraints, Lagrange's Method of Undetermined Multipliers	Apply the basic concept of partial derivatives and their applications. Apply the knowledge of Lagrange's method of undetermined multipliers.	Chalk & Talk, Assignment Submission , Unit Test.
	Week 4	Reduction formula, Curve tracing	Using some properties of the curve, one can identify the curve	Chalk & Talk, Assignment Submission , Unit Test.
	Week 5	Double Integral, Change of order, Change of variables,	Find the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.	Chalk & Talk, Assignment Submission , Unit Test.
	Week 6	Triple integral, Application of multiple integrals	Apply the knowledge to find multiple integration	Chalk & Talk, Assignment

				Submission , Unit Test.
Week 7	Curvilinear coordinate system, Cartesian, Spherical and Cylindrical coordinate system	Apply the Knowledge of Curvilinear coordinate system.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 8	Vector Differentiation, Directional Derivative, Gradient of a Scalar Function and Conservative Field	Apply the Knowledge of vector differentiation for Directional derivative and Conservative field.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 9	Directional Derivative, Gradient of a Scalar Function and Conservative Field	Apply the Knowledge of vector differentiation for Directional derivative and Conservative field.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 10	Divergence and Curl, Related Properties of Gradient, Sums of Divergence and Curl	Apply the Knowledge of vector differentiation for Directional derivative and Conservative field.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 11	Vector Integration: Integration of a Vector Function of a Scalar Argument	Apply the Knowledge of Vector Integration and Line Integral.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 12	Line Integrals: Work Done, Potential, , Conservative Field and Area	Apply the Knowledge of Vector Integration and Line Integral.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 13	Introduction to Surface Integrals, Volume Integrals	Apply the Knowledge of Vector Integration and Line Integral.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 14	Green's Theorem in Plane, Stokes' Theorem	Apply the Knowledge of Vector Integration and Line Integral.	Chalk & Talk, Assignment Submission , Unit Test.	
Week 15	Gauss Divergence Theorem	Apply the Knowledge of Vector Integration and Line Integral.	Chalk & Talk, Assignment Submission	

PROGRAM MAP for Bachelor of Engineering
(Department of Mathematics, ISHLS)

Subject Mind Mapping

Sr. No.	Semester	Course Name	Compulsory/Open Elective
1	I	Calculus	Compulsory
2	II	Linear Algebra and Differential Equations	Compulsory
3	III	Probability , Statistics and Numerical methods	Compulsory
4	IV	Complex Analysis / Discrete Mathematics	Open elective
5	V	Finite Element method	Open elective
6	VI	Graph Theory	Open elective
7	VII	Optimization Techniques / Artificial neural network and soft computing	Open elective

Name of Institute: Indus Institute of Sciences, Humanities & Liberal Studies (IISHLS)

Name of Faculty: Mr. Bharat Prajapati

Course code: CH0011

Course name: Engineering Chemistry

Pre-requisites: 10+2

Credit points:

L	T	P	C
3	0	2	4

Offered Semester: I and II

Course Coordinator (weeks XX - XX)

Full name: **Prof. Bharat Prajapati**

Department with siting location: Chemistry Department

EDC Cell , 4th Floor, Bhanvar Building

Telephone: EXT : 3404

Email: bharatprajapati.gd@indusuni.ac.in

Consultation times: Friday (02:25 – 04:15)

Course Lecturer (weeks xx - XX)

Full name: **Mr.. Bharat Prajapati**

Department with siting location: Chemistry Department

B-404 , 4th Floor, Bhanvar Building

Telephone: EXT : 3404

Email: bharatprajapati.gd@indusuni.ac.in

Consultation times: Friday (02:25 – 04:15)

Full name: **Dr. Chetana Deoghare**

Department with siting location: Chemistry Department

EDC Cell , 4th Floor, Bhanvar Building

Telephone: EXT : 3414

Email: chetanadeoghare.gd@indusuni.ac.in

Consultation times: 04:00PM to 05:00 PM

Full name: **Dr. Paras Patel**

Department with siting location: Chemistry Department

EDC Cell , 4th Floor, Bhanvar Building

Telephone: EXT : 3404

Email: paraspatel.gd@indusuni.ac.in

Consultation times: 04:00PM to 05:00 PM

Full name: **Dr. Nikunj Valand**

Department with siting location: Chemistry Department

Faculty Room, 4th Floor

Telephone: EXT : 3425

Email: nikunjvaland.gd@indusuni.ac.in

Consultation times: 04:00PM to 05:00 PM

Full name: **Dr. Ujwal Trivedi**

Department with sitting location: Chemistry Department

Faculty Room, 4th Floor

Telephone: EXT : 3425

Email: ujwaltrivedi.ishls@indusuni.ac.in

Consultation times: 04:00PM to 05:00 PM

Full name: **Dr. Rawesh Kumar**

Department with sitting location: Chemistry Department

Chemistry lab, 2nd Floor

Telephone: EXT : 3214

Email: raweshkumar.ishls@indusuni.ac.in

Consultation times: 04:00PM to 05:00 PM

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives

By participating in and understanding all facets of this Course a student will:

1. To recall the various basic concepts of chemistry and green chemistry with direct application to the built environment.
2. To understand the basics of energy system, electrochemistry, surface chemistry and their practical applications.

3. To aware about various smart materials, composites of cement and ceramics materials and their applications.
4. To apply consciousness about the quality of water for industrial process, problems and troubleshooting techniques
5. To apply knowledge about the corrosion for industrial process, problems and its prevention techniques.

Course Outcomes (CO)

- CO1.** To understand the fundamental and advance concepts of chemistry applied in the various branches of engineering. [BT-2]
- CO2.** To analyze the various parameters of energy system and application of the catalyst in various fields of engineering. [BT-4]
- CO3.** To illustrate various kind of advance materials and composite materials and there application alloys in respective areas of expertise. [BT-4]
- CO4.** To identify problems caused by impurities of water as well as troubleshooting techniques for water purification for industry as well as potable water. [BT-1]
- CO5.** To evaluate various kind of corrosion process and their prevention process by various chemical techniques. [BT-5]
6. To design volumetric titration for the determination of acidic and basic species. [BT-6]

Course Outline

(Key in topics to be dealt)

- ❖ **General Chemistry**
- ❖ **Green Chemistry**
- ❖ **Energy System**
- ❖ **Catalyst and Surface Chemistry**
- ❖ **Advance Engineering Materials and its Applications**
- ❖ **Cement & Ceramic Materials**
- ❖ **Water Chemistry**
- ❖ **Corrosion and its prevention**

Method of delivery

(Face to face lectures, , Active Learning Techniques)

Study time

(How many hours per week including class attendance)

07 Hours (03-Theory+04 Practical) Hours per week

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	1	1	-	-	-	-	-
CO2	2	2	1	-	-	-	2	-	-	-	-	-
CO3	2	2	-	1	2	-	2	-	-	-	-	-
CO4	3	3	1	-	-	2	2	-	2	-	-	-
CO5	2	2	2	1	-	2	2	-	-	-	-	-
CO6	3	3	2	1	-	2	2	-	1	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

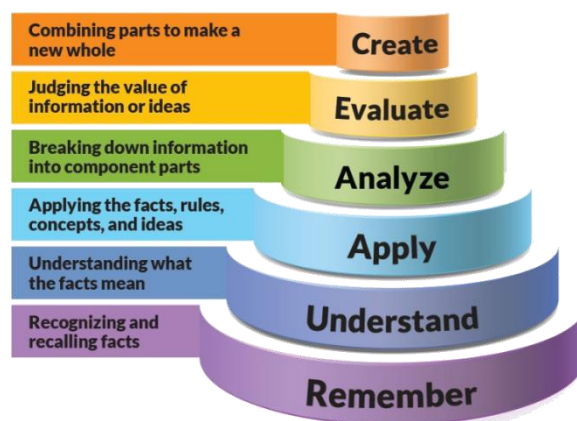


Figure 1: Blooms Taxonomy

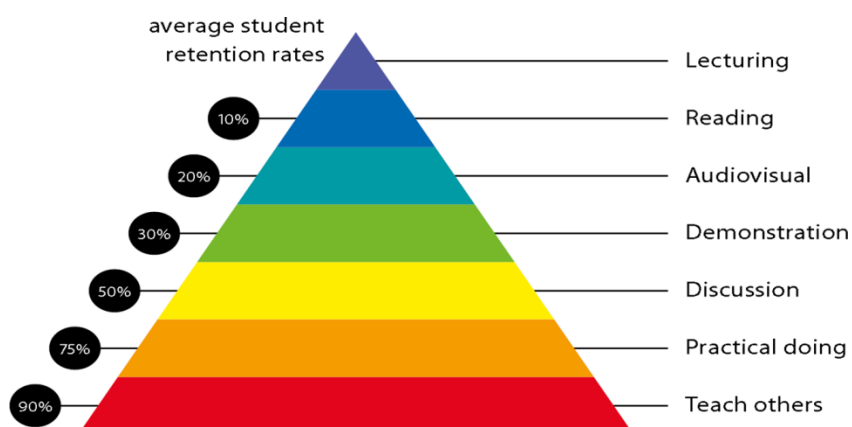


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____ Graduate Capabilities
Informed Have a sound knowledge of an area of	1 Professional knowledge, grounding & awareness:- Student's will gain knowledge about chemistry subject in the both areas

study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	i.e. theory as well as practical's. Professionally students will know how chemistry is important in our daily life as well as to build up any industry. Students will be having knowledge/awareness about chemicals' such as how to use them and how hazardous they are for the environment.
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	2 Information literacy, gathering & processing:- Student's will be able to identify the problems happening in the society as well as in the industry such as water quality, loss due to corrosion, pollutant coming from cement plant etc. with this basic information they will be having ability to gather the possible solutions.
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills: Chemistry education provides students with the tools to solve problems. This means that students should be able to apply the scientific method: define a problem clearly, develop testable hypotheses, design and execute experiments, analyze data using appropriate statistical methods, and draw appropriate conclusions. Students should be able to integrate knowledge across chemical sub disciplines and apply this knowledge to solve problems. In the laboratory, in addition to the characteristics described above, students should understand the fundamental uncertainties in experimental measurements.

<p>Effective communicators</p> <p>Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.</p>	<p>5 Written communication:-</p> <p>Students should be able to retrieve specific information from the chemical literature, critically evaluate technical articles, and manage many types of chemical information. Students should develop proficiency with electronic searching of appropriate technical databases, including structure-based searching.</p> <p>6 Oral communication:- Students should orally able to use communication technology such as computerized presentations as well as software for word processing, chemical-structure drawing, and poster preparation and research paper presentation to any conferences.</p> <p>7 Teamwork:- Students should be able to Solve scientific problems often involves working in disciplinary and multidisciplinary teams. This is especially true in industry and increasingly in academic settings. Students should learn to work productively with a diverse group of peers in classroom and laboratory activities. Students should be able to lead portions of an activity or be effective followers, as dictated by the situation. Peer- and self-assessment is often an effective way to evaluate student contributions to group activities.</p>
<p>Responsible</p> <p>Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.</p>	<p>10 Sustainability, societal & environmental impact: With this course students will know/ aware/ learn about the sustainable use of green products, proper management of renewable energy resources, and to find out new energy replacement sources. Students will be socially aware about the sources of pollutant that damages the water, soil, air etc. So they will be having capabilities/ knowledge how to tackled/ deal with different types of pollutions.</p>

Practical work:

(Mention what practical work this Course involves)

- 1 Determination of the alkalinity of unknown water sample.
- 2 Estimation of hardness of water sample by EDTA method.
- 3 Estimation of dissolved oxygen in water sample.
- 4 Determination of metal ions ($\text{Ca}^{2+}/\text{Zn}^{2+}$) from the mixture by EDTA titration.
- 5 Determination of metal ions ($\text{Pb}^{2+}/\text{Mg}^{2+}$) from the mixture by EDTA titration.
- 6 Determination of strength of Acid or Base by pH meter.
- 7 Determination of strength of Acid or Base by Conductometer.
- 8 To calculate the Acid value of the given sample of oil.
- 9 Determination of the saponification value of a given oil sample.
- 10 Adsorption of acetic acid by charcoal.
- 11 To determines the specific gravity of cement.
- 12 Determination of available lime (as CaO) in cement
- 13 Determination of sulphates in cement.

Lecture/tutorial times

(Give lecture times in the format below)_

Example: For Automobile Engineering

Lecture :

Lab :

Attendance Requirements

The University norms states that it is the responsibility of student s to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

1. Dara, S.S., Umare S.S.; A Text Book of Engineering Chemistry (Twelfth edition); S. Chand. Co. 2014, ISBN: 8121903599.
2. P. Atkins, J.D. Paula, Physical Chemistry, Oxford University Press, 2017, ISBN :9780198769866.
3. A. J. Mee, Physical Chemistry, 6th Ed. English Language Book Society and Heinemann Educational Books Ltd. London, 1962.ISBN: 0435665766
4. Douglas A. Skoog, Donald M. West, Fundamentals of Analytical Chemistry, Cengage Learning, Ninth Edition, 2014.ISBN: 9780495558347
5. Puri B. R., Sharma L. R. , Pathania M.S; Principles of Physica Chemistry; Vishal Publishing Co. (46nd Edition), 2013.ISBN :9789382956013.
6. Arthur E. Morris, Gordon Geiger and H. Alan Fine, Handbook on Material & Energy Balance Calculations in Material Processing, Third Edition, 2011. ISBN:9781118065655

Text books

1. 1. P.C. Jain, M. Jain, Engineering Chemistry 15th edition, Dhanpat Rai Publishing Company, New Delhi, 2005.ISBN 8187433175
2. Shashi Chawla, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co.2004.ISBN 9788126519880

Additional Materials

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

❖ **Theory**

❖ CIE_(60 marks)

1. Mid Semester Examination = 40 marks

2. Internal Evaluation = 20 marks

(Attendance = 5 Marks

Presentation = 5 Marks

Assignment or Case studies = 10 Marks)

ESE (40 marks)

1. Theory Exam = **40 marks**

❖ **Practical**

❖ CIE (60 Marks)

1. Viva exam = 30 marks

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e mid semester or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

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Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

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Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Unit-4 CH-1-Water Chemistry Sources of water, Soft Water & Hard Water, Types of hardness, Units of hardness measurement, I.S.I. specification of drinking water, Impurities in water, Disadvantages of hard water,	4	Chalk and Talk
	Weeks 2	Determination of water hardness by EDTA method, Alkalinity of water and its significance, Significance and determination of COD and BOD. Boiler feed water, Scale and sludge formation in boilers and pipes etc ,	4	Chalk and Talk
	Week 3	Boiler Corrosion, Water softening through Soda lime process, Zeolite Process & Ion-exchange Process, Characteristics of Potable water, Sources and quality of drinking water, Treatment of water for domestic use: Filtration, Coagulation, Sedimentation and Disinfection, Desalination through Electro Dialysis & Reverse Osmosis, Numerical problems.	4	Chalk and Talk
	Week 4	Unit-4 CH-2 Corrosion and its prevention. Definition and types of corrosion water line, pitting, stress, erosion and soil corrosion, Caustic embrittlement, Factors affecting on corrosion (Metallic and Environmental), Pourbaix diagram,	5	Chalk and Talk

Week 5	Protective measures to control Corrosion, Sacrificial anode and Cathode process for corrosion control., Dry (chemical corrosion), Wet (Electrochemical corrosion) and its mechanisms; Types of electrochemical corrosion, (differential aeration, galvanic, concentration cell.	5	Chalk and Talk Surprised Test-1
Week 6	Unit-1 CH-1- General Chemistry Introduction to Chemical Sciences, Basics includes: Periodicity, Types of reactions, various acid base concepts, Electrochemistry, Electrochemical Cell, Galvanic Cell, Electrolytic Cell, Types of electrodes,	1	Chalk and Talk
Week 7	Single electrode potentials, Reference Electrodes, Standard Hydrogen Electrode (SHE), Standard Calomel Electrode (SCE),	1	Chalk and Talk
Week 8	Glass Electrode, Quinhydrone Electrode, Nernst equation, Conductance, Cell constant and its determination, Conductometric titrations, Numerical. Unit-1-CH-2-Green Chemistry Introduction, Principles & Concepts of Green Chemistry,	1,6	Chalk and Talk
Week 9	Importance of green synthesis, methods for green synthesis, application of green synthesis, Greenhouse concepts	1	Chalk and Talk
Week 10	Unit-2 CH-1- Energy System Introduction, classification of fuel, characteristics of good fuel, determination of calorific value of	2	Chalk and Talk

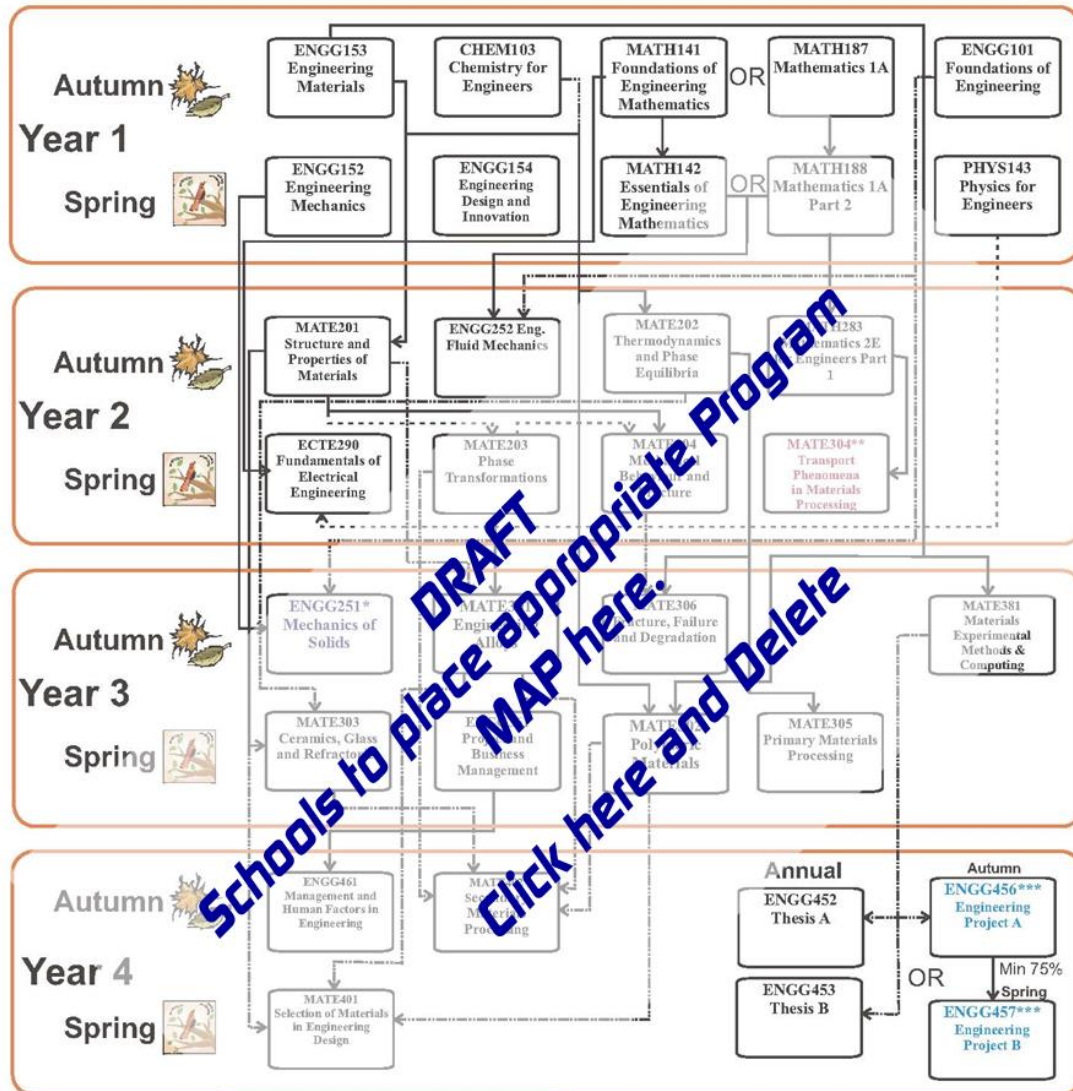
		solid/liquid fuel using bomb calorimeter, numerical problems.		
	Week 11	Power alcohol, unleaded petrol and biodiesel, Introduction, classification - primary, secondary and reserve batteries. Construction, working and applications of Li-ion batteries , Overview of Oil and lubricants	2,6	Chalk and Talk Planned Test-2
	Week 12	Unit-2 CH-2 Catalyst and Surface Chemistry Catalysis: Types of catalysis, Positive & Negative catalysis, Homogeneous and Heterogeneous catalysis, Characteristics of Catalytic action, Poisoning of catalysis, Promoters, Auto Catalysis, Acid-Base Catalysis, Theories of Catalysis process, Catalysis of metal salts Criteria for choosing the catalyst for industrial process , Industrial Applications of Catalysts.	2	Chalk and Talk
	Week 13	Adsorption: Introduction, Terminology, Factors affecting the adsorption of Gases by Solids, Types of adsorption, adsorption isotherm: Freundlich adsorption isotherm, Langmuir adsorption Isotherm, Determination of surface area by BET method, Application of adsorption.	2	Chalk and Talk
	Week 14	Unit-3-CH-1 Advance Engineering Materials and its Applications Liquid Crystals: Introduction, classification and applications, Organic Electronic Materials: Introduction, types and applications, Chemical Sensors: Introduction, types and applications, Ionic Liquids: Introduction and applications, Chromic Materials:	3	Chalk and Talk

		Introduction, types and applications, Synthesis and application of Nano materials.		
	Week 15	Unit-3 CH-2 –Cement & Ceramic materials Cement: Cement: Introduction, Cement and its classification, Manufacture, chemical composition, setting and hardening, I.S.I specification, physical properties of Portland cement, Lime and Plaster of Paris	3	Chalk and Talk
	Week 16	Ceramics and Refractories :Introduction, Refractories, Properties of Refractories, Some important high refractory materials, Glass, Porcelain.	3	Chalk and Talk



PROGRAM MAP for Bachelor of Engineering (Materials Engineering)

DEGREE - 2012



Electives *

MATE 411
Advanced
Materials
and Processing

MATE412
Electronic
Materials

MATE413
Structural
Characterisation
Techniques

MATE422
Iron and
Steelmaking

MATE433
Surface
Engineering

* Note: Students will take three electives

Some electives are only offered every 2nd year

ENG251* Note: Full time students entering Year 3 in 2012 will need to take one elective in Autumn as they have already completed ENG251

MATE304** Note: Full time students entering Year 3 in 2012 will need to take MATE304 in Spring of their 4th year or take it in 2012 and defer another subject to Spring 2012

ENG456***Note: If ENG456 Engineering Project A (6cp) is done instead of a thesis, a student needs to complete 4 electives and is not eligible for honours

Name of Institute: Indus Institute of Sciences, Humanities and Liberal Studies
Name of Faculty : Department of Languages (English)

Course code: EN0111

Course name: Technical Communication

Pre-requisites: Basic English Vocabulary & Grammar

Credit points: 03

Offered Semester: 01

Course Coordinator (weeks 12)

Full name: Dr. Mamta Pillai (HoD, Dept. of Languages, IISHLS, IU)

Department with sitting location: Computer Lab (Grd. Flr.) (MB)

Telephone: 9924241816

Email: mamtapillai.gd@indusuni.ac.in

Consultation times: 4:00 to 5:00PM from Monday to Friday

Course Lecturer (weeks 12)

Full name: Ms. Pranjal Bhatt/ Ms. Foram Patel/Ms. Nidhi Singh

Department with sitting location: Equinox Lab, Grd Floor (MB)

Telephone: 9429296329/9537384053/8160976525

Email:

pranjalbhatt.gd@indusuni.ac.in/forampatel.ishls@indusuni.ac.in/nidhisingh.ishls@indusuni.ac.in

Consultation times: 4 to 5PM from Monday to Friday

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives

By participating in and understanding all facets of this course a student will:

- 1) To enable students to do away with their inhibitions and stage-fright
- 2) To enhance their basic vocabulary and knowledge of sentence structure through Activities
- 3) To help them learn non verbal communication
- 4) To enable technology aided language learning

Course Outcomes (CO)

- 1) To help students develop comprehension and soft skills
- 2) To increase student's ability to improve and utilize the technical skills necessary for reading and writing.
- 3) To improve students' communication skills in both technical and professional contexts.
- 4) To help students improve the articulation and express thoughts fluently in the second language.

Course Outline

- 1) Listening Skills
- 2) Public Speaking activities
- 3) Grammar & Vocabulary
- 4) Reading and Comprehension

Course Content

Unit 1: Listening

- Icebreaking - Switch Introduction
- Icebreaking - Past, Present and Future
- Listening/ Cloze Test 1
- Listening/ Ted Talk
- Listening/ Josh Talk
- Listening/Celebrity Interviews
- Listening/ News Hour debates

Unit 2: Speaking

- Introduction and Polite Conversations
- Situational Dialogues
- Role Play
- Body Language
- Group Discussion

- JAM Sessions

Unit 3: Language Focus

- Teaching Remedial Grammar through Poem
- Vocabulary Building/Describing Words
- Movie Viewing and Discussion
- Book and Movie Adaptation
- Match Commentary and Review

Unit 4: Reading Skills

- Reading/Reading with Vocalic
- Read and Tweet
- Skimming/Scanning the Newspapers
- Reading/Play Enactment
- Reading/Short Stories

Method of delivery

- 1) Communicative Language Teaching (Learner Centric)
- 2) Face to face lectures
- 3) Task Based Language Learning
- 4) The Lexical Approach

Study time

03 Hours

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	1	1	2	1	-	1	2	3	-	2
CO2	-	2	1	1	1	1	-	1	3	3	1	2
CO3	-	3	1	1	2	1	-	2	3	3	1	2
CO4	-	2	1	1	1	1	-	1	3	3	1	2

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

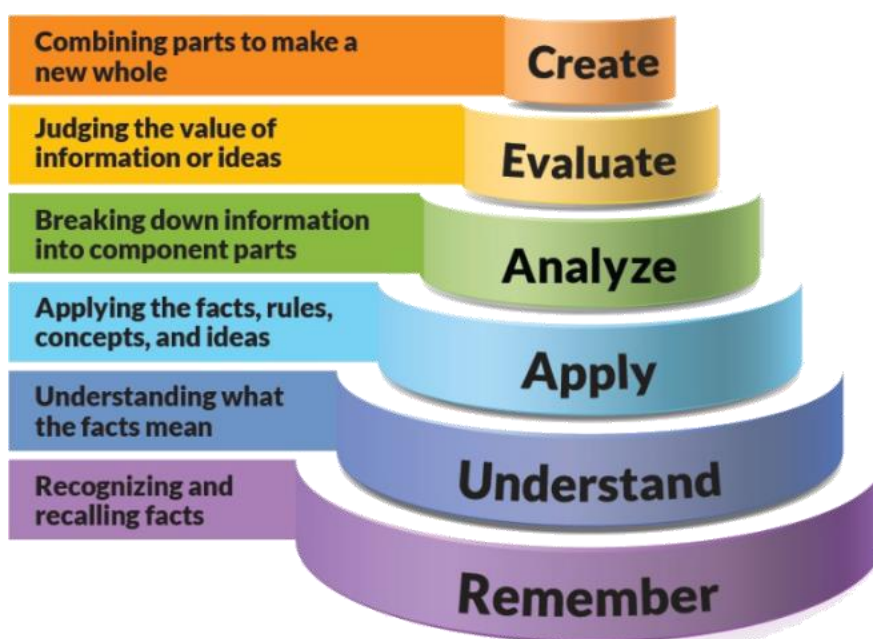


Figure 1: Blooms Taxonomy

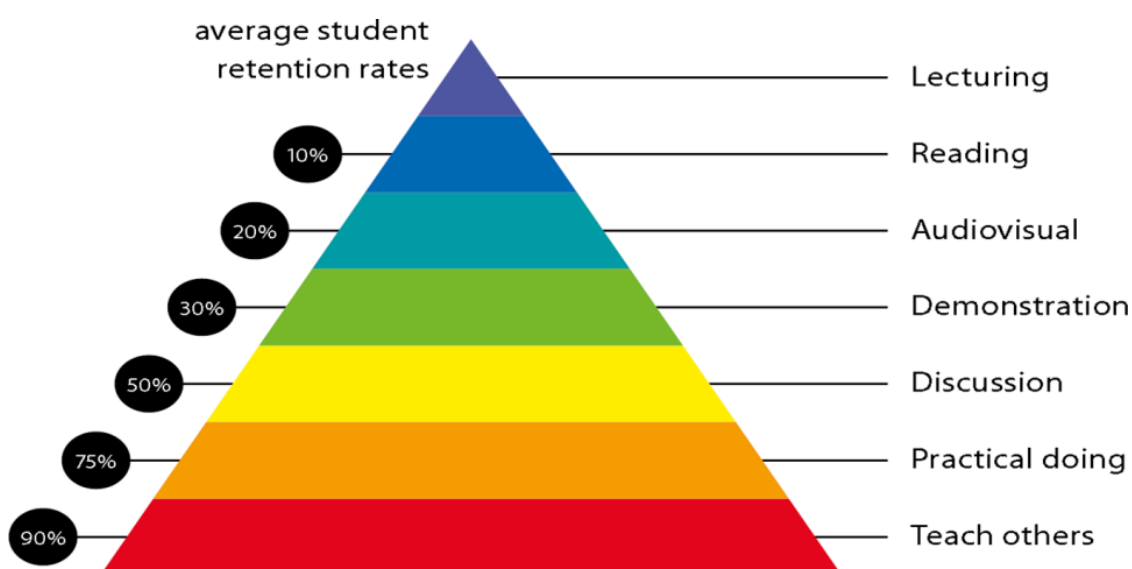


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____ Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	1 Professional knowledge, grounding & awareness
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	2 Information literacy, gathering & processing
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work: TUTORIAL SIMULATION TASKS

Lecture/Tutorial Time:

(Give lecture times in the format below)

(1Hour theory and 2Hours practical per week) As per the Master Time-Table of FY B.Tech Year -2021

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Details of referencing system to be used in written work: NIL

Text books: NIL

References:

- English for Engineers and Technologists, Volumes 1 and 2, Department of Humanities and Social Sciences, Anna University, Chennai, Orient Longmans Publication, 2008.
- Balasubramanyam, M and Anbalagan, G., Perform in English, Anuradha Publications, Kumbakonam, 2010.
- Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2004.
- KiranmaiDutt, P.et al., A Course on Communication Skills, Edition Foundation Books, New Delhi, 2007.
- Ashraf Rizvi, M., Effective Technical Communication, Tata McGraw Hill Publication, New Delhi, 2008.
- Geoffrey Leech, Jan Swartvik, 'A Communicative Grammar of English', ELBS – Longman.
- Norman and Lewis, 'English Made Easy', Oxford Publication.
- E- Writing: 21st –Century Tools for Effective Communication, Dianna Booher, Macmillan India Ltd., 2007, ISBN – 1403-93202-6

Additional Materials

Will be provided the study notes to students via Email

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Mid Semester Exam(MSE)	40 marks
Attendance	05 (80%)
Simulation Tasks	15 Marks
End Semester Exam(ESE)	40 marks

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of 2% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own

- if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment).

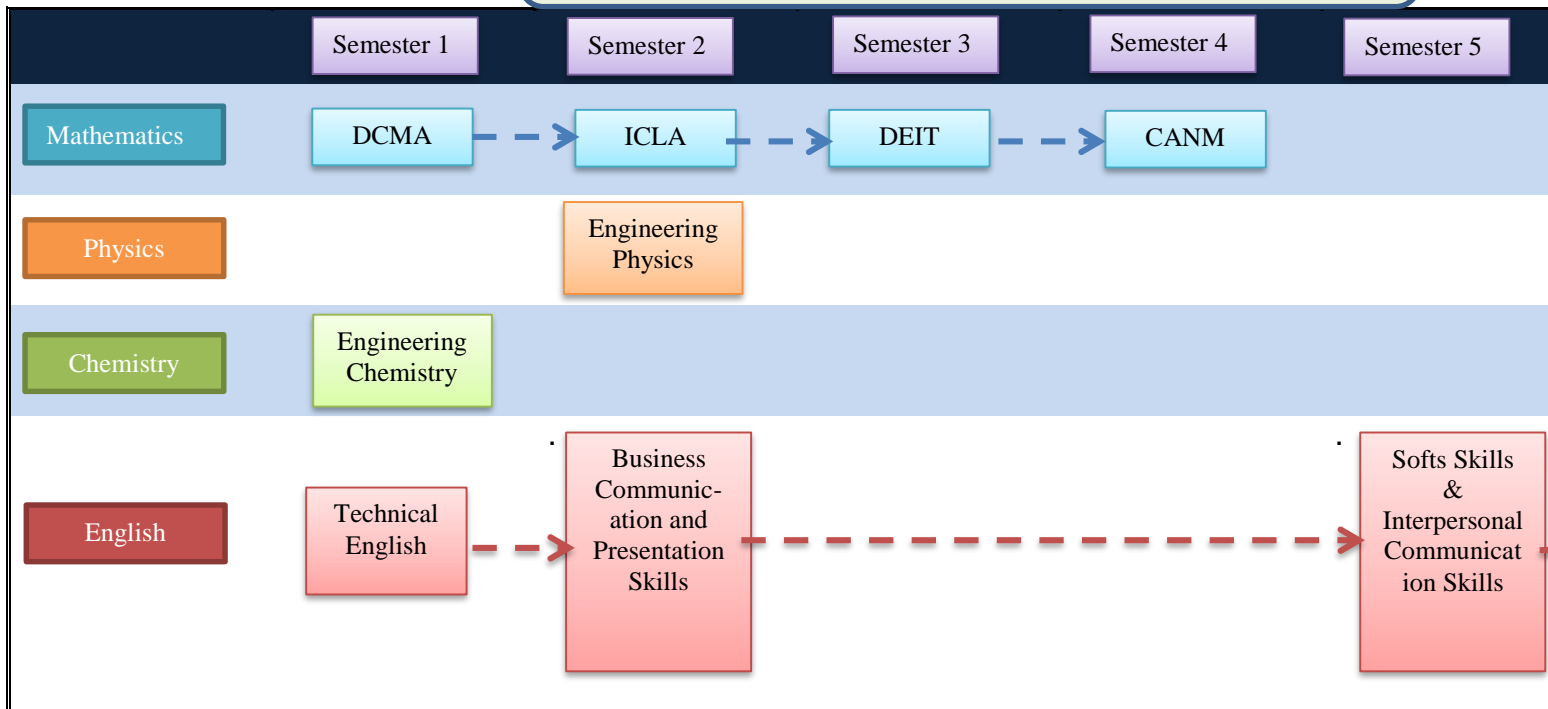
Course schedule(subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Ice Breaking Activity	1	Written test and ABL
	Weeks 2	Non Verbal Communication	1	Discussion and ABL
	Week 3	Role Play	2	ABL
	Week 4	Phonetics	2	Chalk & Talk
	Week 5	Vocabulary	2	ABL
	Week 6	Listening Theory and practice	3	ABL
	Week 7	Brushing up grammar through poem	4	Discussion
	Week 8	Movie Viewing& Discussing book adaptation into movies and series	4	Discussion
	Week 9	Writing dialogues	1	Writing
	Week 10	Reading Newspaper and social media	4	Discussion
	Week 11	Reading short stories & Play enactment	4	Discussion
	Week 12	Reading Test	4	Writing

PROGRAM MAP for Bachelor of Engineering
(Science & Humanities)

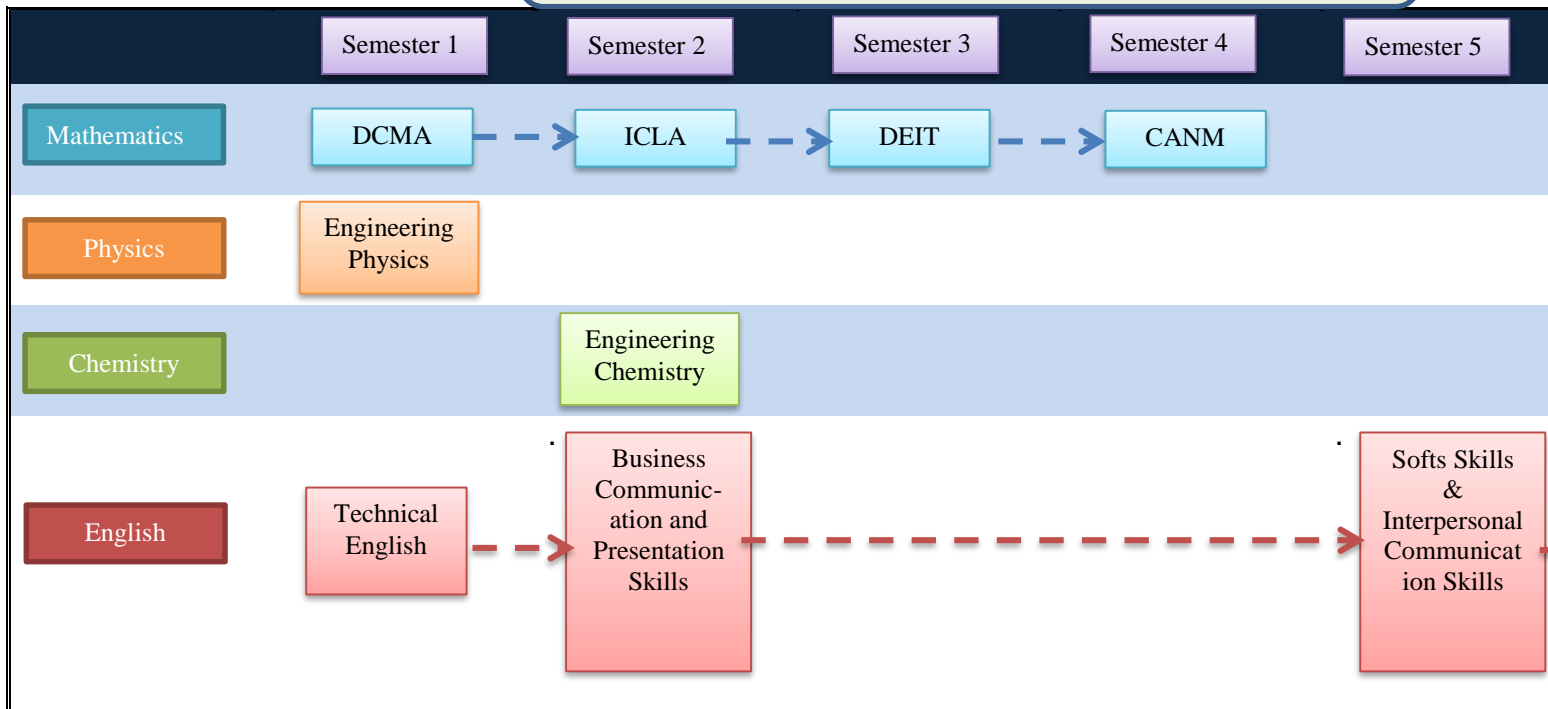
Subject Mind Mapping



To be used for the following Branches: Information & Technology, Computer, Computer Science, Electrical, Electrics & Communication

**PROGRAM MAP for Bachelor of Engineering
(Science & Humanities)**

Subject Mind Mapping



To be used for the following Branches: Automobile; Metallurgy; Civil; Mechanical

Teaching Scheme: Technical Communication

Subject: Technical Communication								
Program: B.Tech. All Branches				Subject Code: EN0111			Semester: I	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	Total
1	2	0	3	40	0	60	0	100

Course Objectives:

- To help students develop comprehension and soft skills.
- To increase student's ability to improve and utilize the technical skills necessary for reading and writing.
- To improve students' communication skills in both technical and professional contexts.

Course Content:

Unit 1: Listening

- Icebreaking - Switch Introduction
- Icebreaking - Past, Present and Future
- Listening/ Cloze Test 1
- Listening/ Ted Talk
- Listening/ Josh Talk
- Listening/Celebrity Interviews
- Listening/ News Hour debates

Unit 2: Speaking

- Introduction and Polite Conversations
- Situational Dialogues
- Role Play
- Body Language
- Group Discussion
- JAM Sessions

Unit 3: Language Focus

- Teaching Remedial Grammar through Poem
- Vocabulary Building/Describing Words
- Movie Viewing and Discussion
- Book and Movie Adaptation
- Match Commentary and Review

Unit 4: Reading Skills

- Reading/Reading with Vocalic
- Read and Tweet
- Skimming/Scanning the Newspapers
- Reading/Play Enactment
- Reading/Short Stories

Reference Books:

- English for Engineers and Technologists, Volumes 1 and 2, Department of Humanities and Social Sciences, Anna University, Chennai, Orient Longmans Publication, 2008.
- Balasubramanyam, M and Anbalagan, G., Perform in English, Anuradha Publications, Kumbakonam, 2010.
- Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2004.
- KiranmaiDutt, P. et al., A Course on Communication Skills, Edition Foundation Books, New Delhi, 2007.
- Ashraf Rizvi, M., Effective Technical Communication, Tata McGraw Hill Publication, New Delhi, 2008.
- Geoffrey Leech, Jan Swartvik, 'A Communicative Grammar of English', ELBS – Longman.
- Norman and Lewis, 'English Made Easy', Oxford Publication.
- E- Writing: 21st –Century Tools for Effective Communication, Dianna Booher, Macmillan India Ltd., 2007, ISBN – 1403-93202-6
- R. K Bansal, spoken English for India (Orient Longman, Madras, 1972.

Web resources/ MOOCs:

Grammar Clauses: <https://www.khanacademy.org/humanities/grammar/syntax-sentences-and-clauses>

Parts of Speech Conjunctions & Prepositions:
<https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-preposition-and-the-conjunction>

Nouns: <https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-noun>

Verbs: <https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-verb>

Pronouns: <https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-pronoun>

Adjectives & Adverbs: <https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-modifier>

Syntax: Conventions of Standard English:
<https://www.khanacademy.org/humanities/grammar/syntax-conventions-of-standard-english>

Name of Institute: Indus Institute of Technology and Engineering

Name of Faculty: Dr.Bansi Raja

Course code: ME0211

Course name: Engineering Graphics

Pre-requisites: None

Teaching Scheme			Examination Scheme						
					Theory		Practical		
L*	T*	P*	Cr	Hrs	CIE	ESE	CIE	ESE	TOTAL
1	0	4	3	5	60	40	60	40	200

Credit points: 3

Offered Semester: II

Course Coordinator

Full name: Dr.Bansi Raja

Department with siting location: HMT Lab,FF,Bhanwar Building

Telephone: 3113,

Email: bansiraja.me@indusuni.ac.in

Consultation times: Friday (9.30am to 11.00 am)

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives

- 1) To make students understand the conventions and the methods of engineering drawing.
- 2) To make students interpret engineering drawings using fundamental technical mathematics.
- 3) To improve visualization skills of students so that they can apply these skills in developing new products.
- 4) To improve student's technical communication skill in the form of communicative drawings.
- 5) To make students comprehend the theory of projection.

Course Outcomes (CO)

After learning the course, the students should be able to,

1. Understand the conventions and the methods of engineering drawing.
2. Interpret engineering drawings using fundamental techniques of mathematics.
3. Construct basic and intermediate geometry.
4. Improve their visualization skills so that they can apply these skills in developing new products.
5. Improve their technical communication skill in the form of communicative drawings.
6. Comprehend the theory of projection.

Course Outline

Key in topics to be dealt:

1. Engineering curves
2. Projection of various geometries.
3. Orthographic Projection
4. Isometric view.

Method of delivery

(Face to Face Lecture), PPT & Video, Self-study material, Problem Based Learning)

Study time

(How many hours per week including class attendance)

	Lecture	Tutorial	Practical
No of hours	1	0	4

CO-PO Mapping (PO: Program Outcomes)

PO/PSO CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3					2	1	-				
CO2	3	-	-	1	3	-	-	-	-	-	-	-
CO3	3	2	2	2	3	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-
CO5	3	-	3	1	3	-	-	-	-	-	-	-
CO6	2	3	-	1	-	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)



Figure 1: Blooms Taxonomy

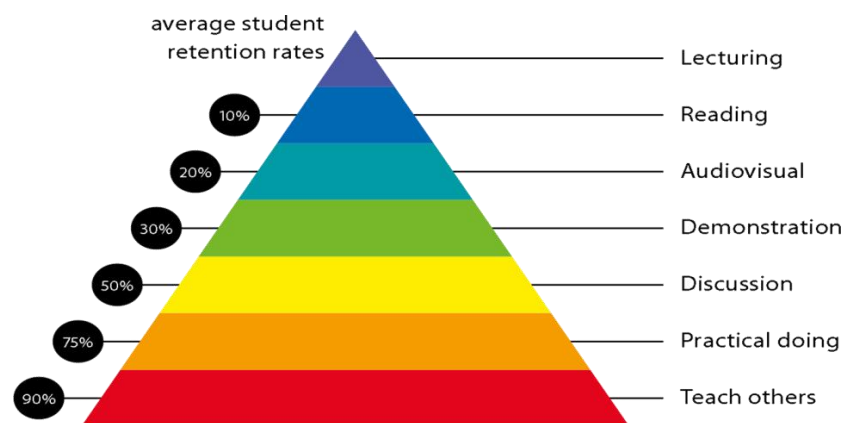


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	1 Professional knowledge, grounding & awareness

Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	2 Information literacy, gathering & processing
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work: LIST OF PRACTICALS (SHEETS)

1. Engineering curves – I (Ellipse, parabola and Hyperbola)
2. Engineering curves – II (Cycloid, Hypocycloid, Epicycloids, Involute, Spirals)
3. Projections of Points and Line
4. Projections of Planes
5. Projections of solids
6. Orthographic projection
7. Section Orthographic projection
8. Isometric Projection/view

Lecture/tutorial times

(Give lecture times in the format below)

As per Time Table

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Details of referencing system to be used

in written workText books

1. P. J. Shah, "A Text Book of Engineering Graphics" Publication: S. Chand.
2. P. D. Patel, "Engineering Graphics" Publication: Mahajan

Reference Books

1. N. D. Bhatt, "Elementary Engineering Drawing", Charotar Publishing House, Anand
2. A text book of Engineering Drawing by R. K. Dhawan, S. Chand & Company Ltd., New Delhi
3. A text book of Engineering Drawing by P. S. Gill, S. K. Kataria & sons, Delhi
4. A Text Book of Machine Drawing By P. J. Shah S. Chand & Company Ltd., New Delhi

Additional Materials

<http://nptel.ac.in/courses/112103019/>

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Tentative CIE Theory 60 Marks Bifurcation		Tentative Duration
10 Marks	3 Drawing Sheets(2 drg sheet of Engg.Curves and 1 drg sheet of Projection of Plane)	After completion of each Topic
10 Marks	Assignments (Engg.Curves and Projection of Plane)	After completion of each Topic
40 Marks	Mid Sem exam	As per academic Calendar
Tentative CIE Practical 60Marks Bifurcation		Tentative Duration
10 Marks	Lab Participation	Academic Session
20 Marks	Maximum 4 Assignments	After completion of each Topic
30 Marks	4 Drawing Sheets [Proj. Of Point and Line(1 Sheet),Orthographic and Sectional Orthographic(1 Sheet),Isometric Projection (1 Sheet)& Projection of Solids (1 sheet)]	After completion of each Topic

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

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**Do not copy the work of other students.
Do not share your work with other students (except where
required for a group activity or assessment).**

Course schedule (subject to change)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Week 1	Principles of Engineering Graphics and their Significance - Drawing Instruments and their Use - Conventions in Drawing - Lettering -	1 , 2	Assignment Submission
Week 2	BIS Conventions- Dimensioning systems - polygons-types of lines. Classification and application of Engineering Curves, Construction of different methods of Ellipse, parabola and Hyperbola.	1 , 2	Worksheet Submission
Week 3	construction of Conics, Cycloid Curves - Cycloid, Hypocycloid, Epicycloids, Involute and Spirals.	2 , 3	Worksheet submission, Quiz
Week 4	Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes.	3 , 4	Assignment and Worksheet Submission
Week 5	True length and inclination with the reference planes.	3 , 4	Assignment and Worksheet Submission
Week 6	Projections of planes (polygons, circle, and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.	4	Assignment and Worksheet Submission
Week 7	Classification of solids. Projections of solids (Cylinder, Cone, Pyramid, Prism) along with frustum of cone and pyramid with their inclinations to one reference plane and with two reference planes.	4 , 6	Assignment and Worksheet Submission

Week 8	Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method.	4 , 6	Assignment and Worksheet Submission, Quiz
Week 9	Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method.	5 , 6	Assignment and Worksheet Submission, Quiz
Week 10	Introduction of section of objects, fullsectional view.	4 , 5 , 6	Assignment and Worksheet Submission, Quiz
Week 11	Isometric orthographic projection. Scale, views Conversion of into isometric	5 , 6	Assignment and Worksheet Submission, Quiz
Week 12	Isometric view or drawing	4 , 6	Assignment and Worksheet Submission, Quiz

Name of Institute: Indus Institute of Technology & Engineering

Name of Faculty: Prof. Jainisha Patel/ Prof. Pradnya Tikhe

Course code: CV0004

Course name: Environmental Science

Pre-requisites:

Basic knowledge on Environmental issues.

Knowledge on chemistry and laboratory equipment.

Credit points: 2

Offered Semester: 1st (Information & Technology)

Course Coordinator

Full name: Prof. Pradnya Tikhe

Department with siting location: 3rd Floor staff Room, Bhanwar Building

Telephone: 3006

Email: pradnyatikhe.cvl@indusuni.ac.in

Consultation times: 9.00 to 5.00

Course Lecturer

Full Name: Prof. Jainisha Patel

Department with siting location: Environmental Engineering Lab, Ground floor, Extension building

Telephone: 3006

Email: jainishapatel.cvl@indusuni.ac.in

Consultation times: 9.00 to 5.00

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives

By participating in and understanding all facets of this Course a student will:

- Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Course Outcomes (CO)

- Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Course Outline

To introduce students to the integrated science, engineering, design and management concepts of engineered environmental systems. The course will cover environmental regulations and standards, environmental parameters, mass balance and natural systems, water quality management, water and wastewater treatment, air pollution control, noise pollution, and solid and hazardous waste management. Background material and laboratories in the environmental sciences and management areas will be covered. Group term papers and presentations will be required.

Method of delivery

60% of Lectures consist of Face to face lectures which are conducted in classrooms, 30% of lectures comprise of PowerPoint Presentation through which various videos and images of related topics are shown to the students, and 10% of lectures consist of hands on session.

Study time

2 hours of lectures (theory) per week.

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	-	-	-	1	-	-
CO2	-	3	-	-	-	-	3	2	-	-	-	1
CO3	-	-	-	-	-	3	2	-	-	-	1	-
CO4	-	3	2	-	-	-	1	-	-	1	-	-
CO5	-	2	-	3	-	-	-	-	-	-	-	-
CO6	3	-	2	-	1	1	-	-	-	-	-	-

1-Lightly Mapped 2- Moderately Mapped 3- Highly Mapped

Blooms Taxonomy and Knowledge retention (For reference)

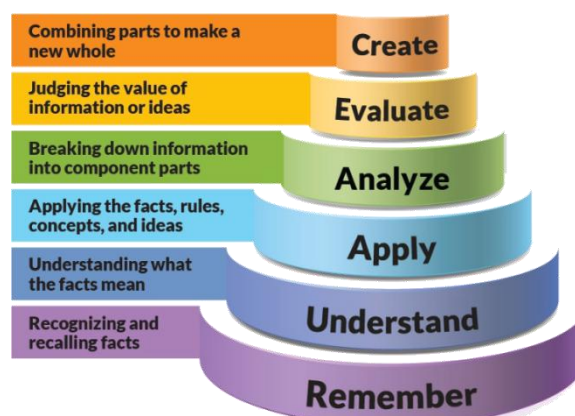


Figure 1: Blooms Taxonomy

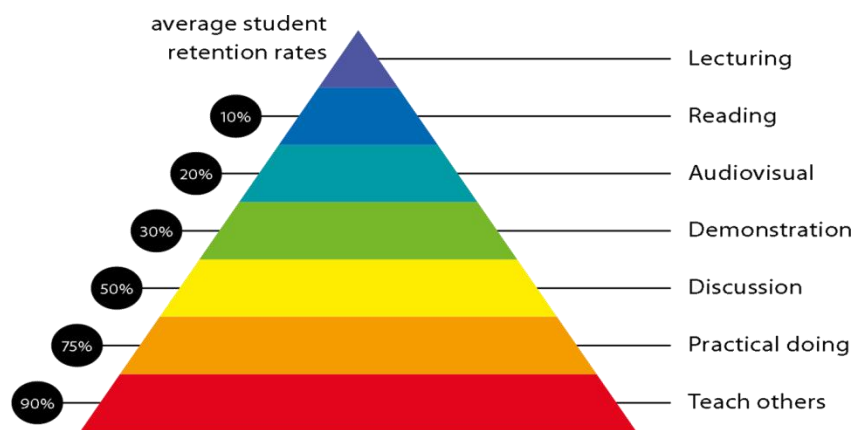


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____ Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	1 Professional knowledge, grounding & awareness
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	2 Information literacy, gathering & processing
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work:

Lecture/laboratory times

Lecture (IT-I)
Tuesday 09:55 to 10:50
Wednesday 11:55 to 12:50

Lecture (IT-II)
Thursday 09:00 to 09:55
Friday 2:25-3:20

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

Text books

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha
Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad

Reference Books:

Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP Lambert Academic Publishing , Germany
Environmental Studies by Anindita Basak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd
Pearson Textbook of Environmental Studies by Deeksha Dave & S S Kateva , Cengage Publishers.
Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
Environmental Studies by R. Rajagopalan, Oxford University Press
Environmental Studies by Benny Joseph, TMH publishers
Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by: S K Kataria & Sons New Delhi

Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

Additional Materials

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Example:

Class test	05
Power Point Presentation	15
Final exam (<i>closed book</i>)	40

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e mid semester or end semester) of semester concerned. Students must make them available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Environment: Levels of organizations in environment, Structure and functions in an ecosystem Biosphere: Its Origin and distribution on land, in water and in air, Ecosystem and functioning of Ecosystem	1,3	PPT and BB
	Weeks 2	Natural Resources	2,1,4	PPT
	Week 3	Biodiversity and its conservation	3,2	BB and PPT
	Week 4	Environmental Pollution:	2,4,6	BB
	Week 5	Environmental Pollution, and Environmental Prevention	1,3	BB and PPT
	Week 6	Concept of clean Environment, man-made disasters, Case Studies of Indian Studies, Urban flooding, Heat Island Effect	2,4	BB
	Week 7	Management of pollution Technologies for Pollution Control Environmental Monitoring	1,5	BB and PPT
	Week 8	Research and Policies relating to environmental Protection	2,4,6	BB and PPT
	Week 9	Concept of sustainability and environmental Sustainability Index Environmental Ethics, people's participation	2,4,6	BB and PPT
	Week 10	Green Business (Profitability in managing Environment) Sustainable Development,	1,5,6,3	BB and PPT
	Week 11	Public awareness, public participation	5.6.4	BB and PPT
	Week 12	Revision		PPT

Subject: Environmental Science								
Program: B.Tech. offered by Civil Dept.				Subject Code:CV0004			Semester: I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	University Theory Examination	University Practical Examination	Total
02	00	-	02	24/60	-	16/40	-	100

Course Objectives:

- Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Course Outcomes:

- Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

COURSE CONTENTS

Unit I

Concepts of Environmental Sciences: Environment: Levels of organizations in environment, Structure and functions in an ecosystem;

Biosphere: Its Origin and distribution on land, in water and in air, Ecosystem and functioning of Ecosystem.

Natural Resources: Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternatives), State of Indian Environment.

Biodiversity and its conservation:

Biodiversity at global, national and local levels; India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation.

Unit II

Environmental Pollution:

Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear, Solid Waste (Organic and Inorganic), Concept of clean Environment; Case Studies of Indian Studies.

Introduction to man-made disasters(Urban Flooding, Heatwave)

Unit III

Pollution prevention:

Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

Environmental Monitoring:

Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil sampling techniques

Technologies for Pollution Control: Bio-remediation, phytoremediation, bio-pesticides, bio-fertilizers;

Legal issues: Environmental legislation (Acts and issues involved), Environmental Protection Acts : (Swachh Bharat Abhiyan, state Action Plans)

Research and Policies relating to environmental Protection

Unit IV

Social Issues and the Environment:

Concept of sustainability and Sustainable Development, environmental Sustainability Index, Environmental Ethics, Public awareness and people's participation, Green Business (Profitability in managing Environment)

SEMESTER-WISE SUBJECT DEPENDENCY CHART 2017 BATCH (CIVIL DEPARTMENT)

