



# EXCEL ENGINEERING COLLEGE

## (Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai  
Accredited by NBA and NAAC with "A+" and Recognized by UGC (2f&12B)  
KOMARAPALAYAM - 637303

### B.E. AGRICULTURE ENGINEERING REGULATION - 2020 CHOICE BASED CREDIT SYSTEM I TO VIII SEMESTERS CURRICULUM AND SYLLABI

I SEMESTER									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20MA101	Mathematics - I for Bio Sciences	BS	3	2	0	4	40	60	100
20AG101	Basics of Agricultural Engineering	ES	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20ENEXX	Language Elective - I*	HSS	2	0	2	3	50	50	100
20CH101	Chemistry for Bio Sciences	BS	3	0	2	4	50	50	100
20ME101	Engineering Graphics	ES	1	0	4	3	50	50	100
<b>Practical Course (s)</b>									
20AG102	Agriculture Engineering Practices Laboratory	ES	0	0	2	1	50	50	100
<b>Mandatory Course (s)</b>									
20MC101	Induction Programme	MC	2 Weeks			0	100	0	100
<b>Total</b>			<b>12</b>	<b>2</b>	<b>10</b>	<b>18</b>	<b>380</b>	<b>320</b>	<b>700</b>

Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>*Language Electives - I</b>									
20ENE01	Communicative English	HSS	2	0	2	3	50	50	100
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100

II SEMESTER									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20MA201	Mathematics - II for Bio Sciences	BS	3	2	0	4	40	60	100
20ME201	Engineering Mechanics	ES	3	2	0	4	40	60	100
<b>Theory with Practical Course (s)</b>									
20ENEXX	Language Elective - II*	HSS	2	0	2	3	50	50	100
20PH201	Physics for Bio Sciences	BS	3	0	2	4	50	50	100
20CS201	Problem Solving using Python	ES	3	0	2	4	50	50	100
<b>Practical Course (s)</b>									
20AG201	Crop Husbandry Laboratory	PC	0	0	4	2	50	50	100
<b>Mandatory Course (s)</b>									
20MC201	Environmental Sciences	MC	2	0	0	0	100	0	100
<b>Total</b>			<b>16</b>	<b>4</b>	<b>10</b>	<b>21</b>	<b>380</b>	<b>320</b>	<b>700</b>

Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>*Language Electives - II</b>									
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100
20ENE03	Hindi	HSS	2	0	2	3	50	50	100
20ENE04	French	HSS	2	0	2	3	50	50	100
20ENE05	German	HSS	2	0	2	3	50	50	100

III SEMESTER									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20MA301	Transforms and Boundary Value Problems	BS	3	2	0	4	40	60	100
20AG301	Engineering Thermodynamics for Agriculture Engineering	ES	3	0	0	3	40	60	100
20AG302	Theory of Machines	ES	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20AG303	Fluid Mechanics and Machineries for Agriculture Engineering	PC	3	0	2	4	50	50	100

20AG304	Soil Science and Engineering	PC	3	0	2	4	50	50	100
20AG305	Surveying and Levelling	PC	2	0	2	3	50	50	100
<b>Practical Course (s)</b>									
20AG306	Computer Aided Design and Drawing Laboratory	PC	0	0	2	1	50	50	100
<b>Mandatory Course (s)</b>									
20MC302	Interpersonnal Skills	MC	0	0	2	0	100	0	100
<b>Total</b>			<b>17</b>	<b>2</b>	<b>10</b>	<b>22</b>	<b>420</b>	<b>380</b>	<b>800</b>

<b>IV SEMESTER</b>									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20MA401	Numerical Analysis and Statistics	BS	3	2	0	4	40	60	100
20AG401	Heat and Mass Transfer for Agriculture Engineering	PC	3	2	0	4	40	60	100
20AG402	Electrical and Electronics for Agriculture Engineering	ES	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20AG403	Tractor and Farm Engines	PC	3	0	2	4	50	50	100
20AG404	Strength of Materials for Agriculture Engineering	PC	3	0	2	4	50	50	100
20AG405	IoT in Agricultural Systems	PC	2	0	2	3	50	50	100
<b>Mandatory Course (s)</b>									
20MC401	Soft Skills	MC	2	0	0	0	100	0	100
<b>Total</b>			<b>19</b>	<b>4</b>	<b>6</b>	<b>22</b>	<b>370</b>	<b>330</b>	<b>700</b>

<b>V SEMESTER</b>									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20AG501	Farm Structures and Green House Technology	PC	3	0	0	3	40	60	100
20AG502	Farm Implements and Equipments	PC	3	2	0	4	40	60	100
20AGEXX	Professional Elective-I	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-I	OE	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20AG503	Unit Operations in Agricultural Processing	PC	3	0	2	4	50	50	100

20AG504	Hydrology, Soil and Water Conservation Engineering	PC	3	0	2	4	50	50	100
<b>Practical Course (s)</b>									
20AG505	Farm Machinery Laboratory	PC	0	0	4	2	50	50	100
<b>Total</b>			<b>18</b>	<b>2</b>	<b>8</b>	<b>23</b>	<b>310</b>	<b>390</b>	<b>700</b>

<b>VI SEMESTER</b>									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20AG601	Agricultural Economics	HSS	3	0	0	3	40	60	100
20AGEXX	Professional Elective-II	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-II	OE	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20AG602	Irrigation and Drainage Engineering	PC	3	0	2	4	50	50	100
20AG603	Food & Dairy Engineering	PC	3	0	2	4	50	50	100
20AG604	Renewable Energy Resources Technology	PC	3	0	2	4	50	50	100
<b>Employment Enhancement Course (s)</b>									
20AG611	Mini Project	EEC	0	0	2	1	50	50	100
20AG612	Internship	EEC	2 weeks			1	100	0	100
<b>Total</b>			<b>18</b>	<b>0</b>	<b>8</b>	<b>23</b>	<b>420</b>	<b>380</b>	<b>800</b>

<b>VII SEMESTER</b>									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20AG701	Entrepreneurship in Agricultural Engineering	HSS	3	0	0	3	40	60	100
20AG702	Groundwater and Well Engineering	PC	3	0	0	3	40	60	100
20AGEXX	Professional Elective-III	PE	3	0	0	3	40	60	100
20AGEXX	Professional Elective-IV	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-III	OE	3	0	0	3	40	60	100
<b>Theory with Practical Course (s)</b>									
20AG703	Post Harvest Technology	PC	3	0	2	4	50	50	100
<b>Employment Enhancement Course (s)</b>									

20AG711	Design Project	EEC	0	0	2	1	50	50	100
20AG712	Study Tour	EEC	1 Week			0	100	0	100
<b>Total</b>			<b>18</b>	<b>0</b>	<b>4</b>	<b>20</b>	<b>400</b>	<b>400</b>	<b>800</b>

<b>VIII SEMESTER</b>									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>Theory Course (s)</b>									
20AGEXX	Professional Elective-V	PE	3	0	0	3	40	60	100
20AGEXX	Professional Elective-VI	PE	3	0	0	3	40	60	100
<b>Employment Enhancement Course (s)</b>									
20AG811	Major Project	EEC	0	0	20	10	50	50	100
<b>Total</b>			<b>6</b>	<b>0</b>	<b>20</b>	<b>16</b>	<b>130</b>	<b>170</b>	<b>300</b>

## PROFESSIONAL ELECTIVE COURSES (PE)

Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
<b>STREAM-I AGRICULTURAL PROCESS ENGINEERING</b>									
20AGE01	Agricultural By Products and Management	PE	3	0	0	3	40	60	100
20AGE02	Sustainable Agriculture and Food Security	PE	3	0	0	3	40	60	100
20AGE03	Refrigeration and Air Conditioning for Agricultural Engineering	PE	3	0	0	3	40	60	100
20AGE04	Storage and Packaging Technology	PE	3	0	0	3	40	60	100
20AGE05	Seed Processing Technology	PE	3	0	0	3	40	60	100
20AGE06	Process Engineering of Fruits and Vegetables	PE	3	0	0	3	40	60	100
20AGE07	Fundamentals of Nano Science	PE	3	0	0	3	40	60	100
20AGE08	Agricultural Structures and Environmental Control	PE	3	0	0	3	40	60	100
20AGE09	Food Plant Design and Management	PE	3	0	0	3	40	60	100
20AGE10	Waste and By-products Utilization	PE	3	0	0	3	40	60	100
20AGE11	Processing of Fats and Oils	PE	3	0	0	3	40	60	100
20AGE12	Fish Production and Processing	PE	3	0	0	3	40	60	100
20AGE13	Food Safety Regulations and Standards	PE	3	0	0	3	40	60	100
<b>STREAM-II SOIL AND WATER CONSERVATION ENGINEERING</b>									
20AGE21	Watershed Management	PE	3	0	0	3	40	60	100
20AGE22	Micro Irrigation	PE	3	0	0	3	40	60	100
20AGE23	On Farm Water Management	PE	3	0	0	3	40	60	100
20AGE24	Automation in Irrigation	PE	3	0	0	3	40	60	100
20AGE25	Agricultural Waste Management	PE	3	0	0	3	40	60	100
20AGE26	Climate Change and adaptation	PE	3	0	0	3	40	60	100
20AGE27	Disaster Management	PE	3	0	0	3	40	60	100

20AGE28	Water Harvesting and Soil Conservation Structures	PE	3	0	0	3	40	60	100
20AGE29	Landscape Irrigation Design and Management	PE	3	0	0	3	40	60	100
20AGE30	Remote Sensing and GIS Applications	PE	3	0	0	3	40	60	100
20AGE31	Command Area Development	PE	3	0	0	3	40	60	100
20AGE32	Land Reclamation Techniques	PE	3	0	0	3	40	60	100
20AGE33	Advanced Drainage Engineering	PE	3	0	0	3	40	60	100
<b>STREAM-III : FARM MACHINERY AND POWER</b>									
20AGE41	Agricultural Economics and Farm Management	PE	3	0	0	3	40	60	100
20AGE42	Mechanics of Tillage and Traction	PE	3	0	0	3	40	60	100
20AGE43	Special Farm Equipment	PE	3	0	0	3	40	60	100
20AGE44	Ergonomics and Safety in Agricultural Engineering	PE	3	0	0	3	40	60	100
20AGE45	Energy Auditing and Management	PE	3	0	0	3	40	60	100
20AGE46	Bio-energy Systems: Design and Applications	PE	3	0	0	3	40	60	100
20AGE47	Tractor Design and Testing	PE	3	0	0	3	40	60	100
20AGE48	Thermal Power Engineering	PE	3	0	0	3	40	60	100
20AGE49	Human Engineering and Safety	PE	3	0	0	3	40	60	100
20AGE50	Farm Machinery Design and Production	PE	3	0	0	3	40	60	100
20AGE51	Testing of Farm Machineries	PE	3	0	0	3	40	60	100
20AGE52	Blue Print of Machines	PE	3	0	0	3	40	60	100
20AGE53	Modern Applications of Sensors	PE	3	0	0	3	40	60	100

## OPEN ELECTIVE COURSES (For Other Branches)

Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20AGO01	Air Pollution and Control Engineering	OE	3	0	0	3	40	60	100
20AGO02	Principles of Food Preservation	OE	3	0	0	3	40	60	100
20AGO03	Introduction to Bio Energy and Bio Fuels	OE	3	0	0	3	40	60	100
20AGO04	Energy Technology	OE	3	0	0	3	40	60	100
20AGO05	Green Building Design	OE	3	0	0	3	40	60	100
20AGO06	Low Cost Automation	OE	3	0	0	3	40	60	100
20AGO07	Process Modelling and Simulation	OE	3	0	0	3	40	60	100
20AGO08	Supply Chain Management	OE	3	0	0	3	40	60	100
20AGO09	Systems Engineering	OE	3	0	0	3	40	60	100

## ONE CREDIT COURSES

Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20AGA01	Plastic - Processing & Testing	EEC	0	0	2	1	100	0	100
20AGA02	Mushroom Cultivation Techniques	EEC	0	0	2	1	100	0	100
20AGA03	Honey Bee Keeping Techniques	EEC	0	0	2	1	100	0	100
20AGA04	Web Design and Internet Applications	EEC	0	0	2	1	100	0	100
20AGA05	Staad Pro. software course	EEC	0	0	2	1	100	0	100
20AGA06	Solidworks software course	EEC	0	0	2	1	100	0	100
20AGA07	Ansys software course	EEC	0	0	2	1	100	0	100
20AGA08	Research Methodology	EEC	1	0	0	1	100	0	100



## SUMMARY

Sl. No.	Category	Credits per Semester								Total Credits (AICTE)	Credits in %
		I	II	III	IV	V	VI	VII	VIII		
1	HSS	3	3				3	3		12 (10-14)	7.27%
2	BS	8	8	4	4					24 (22-28)	14.54%
3	ES	7	8	6	3					24 (24)	14.54%
4	PC		2	12	15	17	12	7		65 (48)	39.39%
5	PE					3	3	6	6	18 (18)	10.90%
6	OE					3	3	3		9 (9)	5.45%
7	EEC						2	1	10	13 (12-16)	7.87%
8	MC	0	0	0	0					0	0.00%
	<b>Total</b>	<b>18</b>	<b>21</b>	<b>22</b>	<b>22</b>	<b>23</b>	<b>23</b>	<b>20</b>	<b>16</b>	<b>165</b>	<b>100%</b>

- HSS - Humanities and Social Sciences  
BS - Basic Sciences  
ES - Engineering Sciences  
PC - Professional Core  
PE - Professional Electives  
OE - Open Electives  
EEC - Employability Enhancement Courses  
MC - Mandatory Courses (Non-Credit Courses)  
CA - Continuous Assessment  
FE - Final Examination

## I SEMESTER

20MA101	Mathematics - I for Bio Sciences (Common to AGRI and FOOD TECH)	L	T	P	C
		3	2	0	4
Nature of Course	Basic Sciences				
Pre requisites	Fundamentals of Basic Mathematics				

**Course Objectives**

The course is intended to

1. Acquire the concept of matrix algebra techniques.
2. Acquaint the mathematical tools needed in evaluating limits, derivatives and differentiation of one variable.
3. Learn the concept of calculus for solving the problems mathematically and obtaining solutions.
4. Learn the concepts of algebraic and transcendental functions.
5. Introduce the concept of evaluating multiple integrals and their usage in find the area and volume of two and three dimensional objects.

**Course Outcomes**

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply the idea of reducing complex problems into simple form using matrix technique.	Apply
CO2	Use both the limit definition and rules of differentiation to differentiate functions.	Understand
CO3	Identify the circle of curvature, evaluate and envelope of the curves.	Understand
CO4	Explain different methods of Integration used in Engineering problems	Understand
CO5	Apply Double and Triple integrals in Engineering real life problems.	Apply

**Course Contents:****Unit – I Matrices****12**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties(statement only) – Cayley-Hamilton theorem and its applications – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

**Unit –II Limits and Continuity****12**

Representation of functions – Limit of a function – continuity – derivatives-Differentiation rules – Maxima and Minima of a function of one variables

**Unit – III Differential Calculus****12**

Curvature – Curvature in Cartesian Co-ordinates Centre and Radius of curvature–Circle of curvature –Evolutesand Involutess – envelope

**Unit – IV Integral Calculus I****12**

Basic integration formulae for algebraic and transcendental functions - Integration by special devices - integration by parts - rationalizing substitution or trigonometric substitution - partial fractions - reduction formulas - improper integrals - convergence tests.

**Unit –V Integral Calculus II****12**

Basic integration formulae for algebraic and transcendental functions-Integration by special devices: enclosed by plane curves - Change of variables in double integrals(Polar coordinates) - Triple integrals - Volume of solids.

**Total: 60 Periods**

Passed in Board of studies Meeting on 21.10.2020

Approved in Academic Council Meeting on 06.11.2020

  
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**Text Books:**

1. Grewal B.S, "Higher Engineering Mathematics", Khanna Publishers, 44<sup>th</sup> Edition, 2019
2. Veerarajan.T, "Engineering Mathematics for Semester I and II", Tata McGraw Hill, 3<sup>rd</sup> Edition, 2014.
3. Smith RT and Minton RB, Calculus, , McGraw Hill, 2nd Edition, 2002

**Reference Books:**

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Company, 1<sup>st</sup> Edition, 2018
2. Bali.N.P and Manish Goyal N.P, "A text book of Engineering Mathematics", Laxmi Publications, 6<sup>th</sup> Edition, 2015

**Additional References:**

1. <https://nptel.ac.in/courses/111/105/111105121>
2. <https://nptel.ac.in/courses/122101003/2>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2										2		
CO2	3	3	2										1		
CO3	3	2	2										1		
CO4	3	2	1										2		
CO5	3	3	2										1		
	3	High				2	Medium					1	Low		

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz	5	15
Understand	Tutorial Class /Assignment	5	
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Exam			Final Examination
	IAE I (7.5)	IAE II (7.5)	IAE III (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyze				
Evaluate				
Create				

20AG101	Basics of Agricultural Engineering	L	T	P	C
		3	0	0	3
Nature of Course		Engineering Sciences			
Pre requisites		Nil			

### Course Objectives

The course is intended to

1. enhance the fundamental knowledge in Soil and Water Conservation and its applications relevant to various streams of Engineering and Technology.
2. gain knowledge on Farm Machinery and Power and its applications relevant to various streams of Engineering and Technology
3. learn about the basics of Agricultural Process Engineering
4. understand the scope of Civil engineering in Agriculture
5. recognize the scope of Mechanical engineering in Agriculture

### Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Gain knowledge on the basics of soil and water conservation engineering	Understand
CO2	Acquire knowledge on the basics of farm machinery and power	Understand
CO3	Have adequate knowledge on the concepts of agricultural process engineering	Understand
CO4	Understand the scope of civil engineering in agriculture	Understand
CO5	Understand the scope of mechanical engineering in agriculture	Understand

### Course Contents:

#### Unit - I Soil and Water Conservation

9

Soil: Definition, Properties of Soil and Types - Geology: Introduction, Classifications of Rocks and formation of Rocks - Surveying and Leveling: Definition and types of Surveying - Geoinformatics - Land Clearing - Soil Erosion: Principles - Processes – Types – Irrigation and Drainage Engineering - Rain water harvesting.

#### Unit - II Farm Machinery and Power

9

Farm Machineries - Farm Tractor - Power Tiller - Plant production equipments - Sowing equipments - tillage practices and equipments - harvesting equipments - Operation and maintenance of farm machineries and equipments

#### Unit - III Agricultural Process Engineering

9

Introduction – Engineering properties of foods - Seed processing techniques – Crop Processing Techniques – Vegetable processing techniques - Dairy process Techniques – Agricultural processing byproducts – Food preservation -

#### Unit - IV Scope of Civil Engineering in Agriculture

9

Civil Engineering materials: Bricks - stones - sand - cement - concrete - steel - timber - modern materials - Foundations: Types of foundations - Requirement of good foundations. Civil Engineering Structures: Brick masonry - stone masonry - beams - columns - lintels - roofing - flooring - plastering - floor area, carpet area and floor space index - introduction to high way and rail way.

#### Unit - V Scope of Mechanical Engineering in Agriculture

9

Internal combustion engines - Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines - Terminology of Refrigeration and Air Conditioning - Classification of Power Plants

Passed in Board of studies Meeting on 21.10.2020 Approved in Academic Council Meeting on 06.11.2020

  
CHAIRMAN - BOARD OF STUDIES

**Text Books**

1. T.P.Ojha and A.M.Micheal., "Principles of Agricultural Engineering Vol-I", Jain Brothers Publications, 10<sup>th</sup> Edition, 2018
2. A.M.Micheal and T.P.Ojha., "Principles of Agricultural Engineering Vol-II", Jain Brothers Publications, 2018
3. Ramamrutham S., "Basic Civil Engineering", Dhanpat Rai Publishing Co.(P) Ltd.1999.
4. Venugopal K. and Prahu Raja V., "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, 2000.

**Reference Books:**

1. Jagdishwar Sahay, "Elements of Agricultural Engineering", 4<sup>th</sup> Edition, Standard Publishers Distributors, 2006
2. Seetharaman S., "Basic Civil Engineering", Anuradha Agencies, 2005.
3. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2010.

**Web References:**

1. <https://nptel.ac.in/courses/126/105/126105009/>
2. <https://nptel.ac.in/courses/126/105/126105012/>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	3											
CO2	3	2	3											
CO3	3	2	3											
CO4	3	2	3											
CO5	3	2	1											
	<b>3</b>	<b>High</b>			<b>2</b>	<b>Medium</b>			<b>1</b>	<b>Low</b>				

Summative Assessment				
Bloom's Category	Internal Assessment Examinations			Final Examination (50)
	IAE 1 (7.5)	IAE 2 (7.5)	IAE 3 (10)	
Remember	20	20	20	20
Understand	20	20	20	70
Apply	10	10	10	10
Analyze				
Evaluate				
Create				

20CH101	CHEMISTRY FOR BIOSCIENCES (Common to Agriculture Engineering and Food Technology)	L	T	P	C
		3	0	2	4
Nature of Course	Basic Sciences				
Prerequisites	Nil				

### Course Objectives

The course is intended to

1. Learn the basic principles of analytical techniques.
2. Introduce the students to dairy industry, properties and processing of milk.
3. Understand the chemistry of sugar.
4. Learn about the nature, types and problems of the soil.
5. Gain knowledge about suitable fertilizers for different types of soil.

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Implement the analytical techniques like filtration and evaporation	Understand
CO2	Interpret the properties of proteins	Understand
CO3	Summarize the chemistry of sugar	Understand
CO4	Identify the nature and problems of the soil	Understand
CO5	Decide fertilizer for a particular soil depending on its nature	Apply

### Course Contents

#### Unit-I Analytical Techniques 9

Basic Principles: Precipitation, filtration, sample drying, transfer of precipitates. Distillation, vacuum distillation, fractional distillation and steam distillation, sublimation and crystallization.

#### Unit-II Proteins 9

Chemistry of proteins: structure, N-terminal and C-terminal, hydrogen bond, disulphide bond and salt linkages. Outlines of primary, secondary and tertiary structure of proteins. Physical properties of milk proteins: electrical properties, hydration and solubility.

#### Unit-III Chemistry of Sugar 9

Manufacture of sucrose from cane sugar, purification, concentration, crystallization, separation and refining of crystals, recovery of sucrose from molasses. Properties and uses of sucrose. Fermentation process: manufacture of alcohol from molasses.

#### Unit-IV Soil Chemistry 9

Types of soil: saline soil, acidic soil and alkaline soil. Formation: acid, acid sulphate, salt affected and calcareous soil. Characteristics and Reclamation. Methods of reclamation: mechanical, chemical and biological methods. Chemistry of submerged soils.

#### Unit-V Fertilizers 9

Effect of N, P, K, Secondary nutrients and micronutrients on plant growth and development. Importance of nitrogenous fertilizers. Nitrogen cycle and fixation of atmospheric nitrogen. Uses of mono and diammonium phosphates, super phosphates and triple super phosphates. Potassium fertilizers: examples and uses. Green manuring: definition and examples (red-clover and peas).

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**Laboratory Component**

S.No.	Name of the Experiment	CO Mapping	RBT
1	Potentiometric precipitation titration of bariumchloride and sodium sulphate	CO1	Apply
2	Finding out the melting point of ice and boiling point of water	CO1	Understand
3	Identification of the type of hardness of water by EDTA method	CO2	Understand
4	Determination of calcium in milk by EDTA method	CO2	Apply
5	Conduct metric titration of strong acid vs strong base	CO3	Apply
6	Determination of strength of HCl by pH metry	CO3	Apply
7	Measurement of pH of different soil samples using litmus paper and pH strips to classify the nature of the soil	CO4	Apply
8	Determination of the nature of sample solution of fertilizer(acidic, alkaline, neutral) using universal indicator	CO5	Apply

**Total: 30 Periods****TextBooks**

1. A. Tolanur, "Soil Chemistry, CBS Publishers, 2<sup>nd</sup> edition, 2015.
2. B. S. Bahl and ArunBahl, "Advanced Organic Chemistry", S.Chand& Company Ltd,22<sup>nd</sup> Edition, 2010.

**Reference Books**

1. HavlinTisda, "Soil Fertility and Fertilizers", Pearson Publishers,2<sup>nd</sup>edition, 2013.
2. G. C. Banerjee, "The Text Book of Animal Husbandry", Oxford Book Company, 1<sup>st</sup> Edition, 2010.
3. N. S. R. Sastry and C. K. Thomas, "Livestock Production Management", Kalyani Publishers, 4<sup>th</sup> Edition, 2005.

**Additional Resources**

1. [https://fac.ksu.edu.sa/sites/default/files/9\\_determination\\_of\\_calcium\\_in\\_milk.pdf](https://fac.ksu.edu.sa/sites/default/files/9_determination_of_calcium_in_milk.pdf)
2. <https://www.youtube.com/watch?v=xlz2YPBXuZU>
3. <https://www.youtube.com/watch?v=jFQeDef6bug>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes(PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2									1				
CO2	3	2									1				
CO3	3	2									1				
CO4	3	2									1				
CO5	3	2									1				

	3	High		2	Medium		1	Low	
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Summative Assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50]
	Theory				Practicals	
	IAE-I [7.5]	IAE-II [7.5]	IAE-III[10]	Attendance [5]	Rubric based CIA [20]	
Remember	30	20	10		20	40
Understand	10	20	30		20	40
Apply	10	10	10		10	20
Analyze						
Evaluate						
Create						



20ME101	Engineering Graphics (Common to Aeronautical, Agriculture, Civil, Mechanical, Safety and Fire Engineering & Food Technology)	L	T	P	C
		1	0	4	3
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

**Course Objectives:**

The course is intended to

1. Understand technical drawings in various fields of engineering
2. Imagine and visualize the geometric details of engineering objects.
3. Translate the geometric information of engineering objects into engineering drawings.
4. Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
5. Visualize and draw isometric and perspective views

**Course Outcomes**

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the conic sections, special curves, and draw orthographic views from pictorial views.	Apply
CO 2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	Apply
CO 3	Construct the projections of simple solids like prisms, pyramids, cylinder and cone.	Apply
CO 4	Build the sectional views of solids like cube, prisms, pyramids, cylinders & cones and development of its lateral surfaces.	Apply
CO 5	Organize and draw isometric and perspective sections of simple solids.	Apply

**Course Contents****Concepts and Conventions (Not for Examination)**

1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

**UNIT -I Plane Curves and Free Hand Sketching****(3+12)**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

**UNIT –II Projection of Points, Lines and Plane Surfaces****(3+12)**

Orthographic projection- principles-Principal Planes-First angle projection-projection of points Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method.Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT –III Projection of Solids (3+12)**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

**UNIT- IV Projection of Sectioned Solids and Development of Surface (3+12)**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section, Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

**UNIT -V Isometric and Perspective Projections (3+12)**

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

**TOTAL: (15+60) Periods****TEXT BOOKS**

1. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2011
2. Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2012.

**REFERENCE BOOKS**

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50<sup>th</sup> Edition, 2010.
2. BasantAgarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. ParthasarathyN S and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.

**Web References**

1. [http://nptel.ac.in/courses/112103019/Engineering drawing](http://nptel.ac.in/courses/112103019/Engineering%20drawing)
2. <http://pioneer.netserv.chula.ac.th/~kjiरण/self-practice.html>

**Publication of Bureau of Indian Standards**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawingsheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

**Special points applicable only to Final Examinations of Engineering Graphics:**

1. There will be five questions, each of either-or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2										1	2		
CO2	3	2										1	2		
CO3	3	2										1	2		
CO4	3	3										1	2		

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CO5	3	2								1	2		
	3	High			2	Medium			1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory				Practical	
	IAE-I [7.5 ]	IAE-II [7.5 ]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	10	10	10		20	20
Understand	20	20	20		40	40
Apply	20	20	20		40	40
Analyse						
Evaluate						
Create						

20AG102	Agriculture Engineering Practices Laboratory	L	T	P	C
		0	0	2	1
Nature of Course	Engineering Science				
Pre requisites	Nil				

### Course Objectives

The course is intended to

1. To learn about basic Agricultural tools working and trouble shooting.
2. To learn the use of basic hand tools and to know the need for safety in work place and to gain hands on experience in Carpentry, Sheet metal, Plumbing, Welding and Foundry.
3. To develop general machining skills among the students

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Identify and solve the plant protection tools and weeding practices	Understand
CO2	Gain knowledge on soil management practices	Understand
CO3	Identify and solve the basic engineering problems at home and in workplace	Understand
CO4	Develop the surfaces and make simple components like tray and funnel. Prepare pipe connections and sand moulds.	Understand
CO5	Make simple metal joints using welding equipment and wooden joints using carpentry tools. Demonstrate the fundamentals of machining.	Understand

### Course Content:

#### GROUP A (AGRICULTURE ENGINEERING)

Basic Weed tools: Hoe, Spade, Crow bar, Axe. Plant Protection: Different types of sprayers, nozzles, Duster, Plunger, pumps. Cultivation practices: Ploughing – One way ploughing, Two way Ploughing. Soil Management Practices – Intercultural operations.

#### List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Study and identification of different weeding tools with specification	4	Understand
2	Study and identification of various plant protection tools	4	Understand
3	Demonstration of Cultivation practices	1	Understand
4	Soil Management Practices	2	Understand
5	Study and identification of different intercultural operation tools	3	Understand

#### GROUP B (CIVIL & MECHANICAL)

Manufacturing Methods – Sheet metal operations - Welding - arc welding, gas welding, TIG & MIG welding - basic machining using lathe - metal casting - Carpentry work using power tools - Plumbing components and pipelines

#### List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Preparation of butt joints and lap joints using arc welding and TIG / MIG welding.	3	Understand
2	Sheet metal Forming and Bending, Model making – Trays and funnels.	2	Understand
3	Preparation of wooden joints by sawing, planning and cutting.	3	Understand
4	Making basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings.	2	Understand
5	Basic machining - simple turning operations.	1	Understand
6	Demonstration of foundry operations like mould preparation for solid	3	Understand

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and split piece pattern.		
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Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and PSOs															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	3	2											
CO2	2	1	3	2											
CO3	2	1	3	2											
CO4	2	2	3	2											
CO5	2	2	3	2											
	3	High				2	Medium				1	Low			

Summative assessment		
Bloom's Level	Rubric based Continuous Assessment [50 marks]	End Semester Examination [50 marks]
Remember	30	30
Understand	70	70
Apply		
Analyze		
Evaluate		
Create		

<b>20MC101</b>	<b>Induction Programme</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Nature of Course</b>	Mandatory, Non Credit				
<b>Pre requisites</b>	Completion of Schooling at Higher Secondary Level				

### Course Objectives

The course is intended to

1. To nurture the character and behavior as a student.
2. To have broad understanding of society and relationships.
3. To impart interpersonal and soft skills.
4. To inspire the students in the field of engineering.
5. To provide exposure to industries.

### Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Perform curricular and co-curricular activities excellently.	Knowledge
CO 2	Do the skill based training with excellence.	Understand
CO 3	Work as team for the given task	Apply
CO 4	Gain character and behaviour	Knowledge
CO 5	Demonstrate the acquired skills effectively	Apply

### Course Contents

#### PHYSICAL ACTIVITY

Yoga, Sports

#### CREATIVE ARTS (students can select any one of their choice)

Painting, sculpture, pottery, music, craft making and so on

#### UNIVERSAL HUMAN VALUES

Enhancing soft skills

#### LITERARY AND PROFICIENCY MODULES

Reading, Writing, Speaking- Debate, Role play etc., Communication and computer skills

#### LECTURES BY EMINENT PEOPLE

Guest lecture by subject experts

#### VISIT TO LOCAL CITIES

Meditation centers / Industry

#### FAMILARIZATION TO DEPARTMENT / BRANCH INNOVATION

Lectures by Departments Head and senior faculty members

**Total Hours: 45**

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Mapping of COs with POs and PSOs

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	1	2				3	2		
CO2						2	1	2				3	2		
CO3						2	1	2				3	2		
CO4						2	1	2				3	2		
CO5						2	1	2				3	2		
	3	High				2	Medium					1	Low		

Bloom's Level	Continuous Assessment (Non-Credit, Mandatory)				
	Test -I [20 ]	Test -II [20]	Test - III [20]	Assignment/ Activity [20]	Attendance [20]
Remember	10	10	10		
Understand	20	20	20	10	
Apply	20	20	20	10	
Analyse					
Evaluate					
Create					

20ENE01	<b>COMMUNICATIVE ENGLISH</b> (Common to all B.E. / B.Tech. Programmes)	L	T	P	C
		2	0	2	3
<b>Nature of Course</b>	Humanities and Social Science				
<b>Pre requisites</b>	Nil				

### Course Objectives

The course is intended to

- Improve lexical, grammatical and semantic competence.
- Enhance communicative skills in real life situations.
- Augment thinking in all forms of communication.
- Equip with oral and written communication skills.
- Gain employability skills.

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Use effectively the lexical, grammatical and semantic knowledge	Remember
CO2	Communicate with clarity using intentional vocabulary in English	Apply
CO3	Articulate perfectly and express their opinions confidently using communicative strategies	Remember
CO4	Accomplish listening and reading skills for lifelong learning	Understand
CO5	Comprehend, interpret and present data	Understand

### Course Contents

#### Unit - I Basic structure and Usage

6

Parts of Speech -- Articles – Tenses - Subject-Verb Agreement – Different Grammatical forms of the same word - Listening to Speeches and Conversations from Communication software – Listening to Announcements – Listening and Gap Filling.

#### Unit - II Vocabulary and Language Development

6

Intentional vocabulary used in and around Airport, Hospital, Hotel, Court – Abbreviations and acronyms - One Word Substitution - Compound words – Homophones and Homonyms – Types of sentences - Ordering Jumbled Sentences Letter writing – informal.

#### Unit –III Oral Communication Skills

6

Improving fluency – Articulation with pronunciation – Voice modulation in Speaking – One minute talk -Self Introduction and introducing ones friend – Telephonic conversations – Group Discussion – Modal Auxiliaries –discourse markers.

#### Unit –IV Comprehensive Listening and Reading

6

Effective listening Strategies — Listening to Interviews from Communication software– Phrasal verbs – Reading Comprehension – “An Astrologer’s Day” by R.K.Narayan and “Building a New State” by Dr. A.P.J. Abdul Kalam.

#### Unit – V Effective Writing

6

Interpretation and presentation of data – developing Hints – general essays and paragraph writing – Report Writing – survey report and accident report - Instructions and Recommendations.

**Total:30 Periods**

### Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – One minute talk	3	Understand
2	Role-play – Telephonic conversations	3	Understand



3	Listening to speeches and lectures and gap filling	4	Understand
4	Group Discussion.	4	Understand
5	Articulation with pronunciation practice	3	Apply
6	Listening to Announcements – Listening and Gap Filling	4	Understand
7	Listening to Interviews & Native speakers' Conversations	4	Understand
8	Reading practice with articles in magazine and news papers.	4	Understand
9	Model – Job Interviews	4	Understand
10	Introspective report – Personal analysis	5	Understand
11	Telephone etiquette	3	Remember
12	Reading – Shorter texts and News Articles	4	Understand
13	Role Play – Getting and Giving Permission	3	Remember
14	Self Introduction( Formal )	3	Understand
15	Recommendations/Suggestions	3	Apply

**Total: 30 Periods**

**Text Books**

1. Rizvi, Ashraf M., "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5<sup>th</sup> Edition, 2007.
2. Board of Editors, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2<sup>nd</sup> Edition, 2017.

**Reference Books:**

1. Meenakshi Raman and Sangeetha Sharma, "Technical Communication", Oxford University Press, USA, 10<sup>th</sup> Edition, 2007.
2. John Cunnison Catford, "A Practical Introduction to Phonetics", Clarendon Press, Jamaica, 2<sup>nd</sup> Edition, 2001.
3. Hewings. M, "Advanced English Grammar", Cambridge University Press, Chennai, 3<sup>rd</sup> Edition, 2000.
4. S P Dhanavel "English and Soft Skills", Orient BlackSwan Private Limited, Hyderabad, 1<sup>st</sup> Edition, 2010.

**Web reference:**

[https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwjj4dCTucfsAhXE1pYKHch4ABMYABABGgJ0bA&ohost=www.google.com&cid=CAASEuRo76H-Vx9BpazOOBfXeJSKVQ&sig=AOD64\\_3O-HNEuUO4A5sc31MsUfaTBGG-dQ&q&adurl&ved=2ahUKEwjC3ceTucfsAhXBeisKHatIBewQ0Qx6BAgEAE](https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwjj4dCTucfsAhXE1pYKHch4ABMYABABGgJ0bA&ohost=www.google.com&cid=CAASEuRo76H-Vx9BpazOOBfXeJSKVQ&sig=AOD64_3O-HNEuUO4A5sc31MsUfaTBGG-dQ&q&adurl&ved=2ahUKEwjC3ceTucfsAhXBeisKHatIBewQ0Qx6BAgEAE)

<b>Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1							1			3	2	2	2		
CO2							1			3	2	2	2		
CO3							1			3	2	2	2		
CO4							1			3	2	2	2		
CO5							1			3	2	2	2		
	<b>3</b>	<b>High</b>				<b>2</b>	<b>Medium</b>				<b>1</b>	<b>Low</b>			

<b>Summative assessment</b>						
<b>Bloom's Level</b>	<b>Continuous Assessment</b>					<b>Final Examination (Theory) [50 marks]</b>
	<b>Theory Marks</b>				<b>Practical</b>	
	<b>IAE-I [7.5]</b>	<b>IAE-II [7.5]</b>	<b>IAE -III [10]</b>	<b>Attendance [5]</b>	<b>Rubric based CIA [20 Marks]</b>	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyze						
Evaluate						
Create						

20ENE02	<b>Advanced Communicative English</b> (Common to all B.E./ B.Tech Programmes)	L	T	P	C
		2	0	2	3
<b>Nature of Course</b>	Humanities and Social Sciences				
<b>Pre requisites</b>	Basics of Communicative English				

### Course Objectives

The course is intended to

- Demonstrate satisfactory control over complex structures and mechanics in English.
- Develop fluency and accuracy in oral communication.
- Communicate effectively and actively in social interactions.
- Read English at inspectional level.
- Face interviews with confidence.

### Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand
CO3	Build self-confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

### Course Contents

#### Unit – I Grammar and usage

6

Active voice and passive voice – Prefixes and suffixes – Connotation – Clauses - If conditionals – Idioms & Phrases - Right forms of verbs– Modal Auxiliaries - Spotting errors.

#### Unit - II Lexical competence

6

Technical Vocabulary- Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - Idioms and Phrases.

#### Unit - III Conversational etiquette

6

Processes description– Tone and accent in speech– Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal subjective and objective introduction – Body Language – Mock Interview.

#### Unit – IV Listening reading and writing

6

Listen to Scientific/Technical talks and gap filling – Listening to TED/INK Talks – Reading – “Water: The Elixir of Life” by Sir. C.V.Raman. “Progress” by St. John Ervine - Instructions and Recommendations – Letter writing formal –Job application- Report writing–Introspective report – Creative writing – Essays and Paragraphs.

#### Unit – V Phonetics

6

Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

**Total: 30Periods**

**Laboratory Components**

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand
14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

**Total: 30 Periods****Text Books**

- Rizvi, Ashraf.M, "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5<sup>th</sup> Edition, 2007.
- Hewings. M, "Advanced English Grammar", 3rd Edition, Cambridge University Press, Chennai, 5<sup>th</sup> Edition, 2000.
- Board of Editors, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2<sup>nd</sup> Edition, 2017.

**Reference Books:**

- Raman M &Sangeetha Sharma, "Technical Communication",Oxford University Press,USA,10<sup>th</sup>Edition,2007.
- John CunnisonCatford, "A Practical Introduction to Phonetics",Clarendon Press, Jamaica,2<sup>nd</sup> Edition, 2001.
- Norman Whitby, Business Benchmark – "Pre-Intermediate to Intermediate, Students Book", Cambridge University Press, 1<sup>st</sup> Edition, 2006.
- DhanavelS. P., "English and Soft Skills", 1<sup>st</sup>Edition,OrientBlackSwan Private Limited, Hyderabad, 1<sup>st</sup> Edition, 2010.

**Web reference:**

- [https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm\\_source=mobile&utm\\_medium=page\\_share&utm\\_content=vlp&utm\\_campaign=top\\_button](https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button)

2. blob:https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	1	2	2		
CO2										3	1	2	2		
CO3										3	1	2	2		
CO4										3	1	2	2		
CO5										3	1	2	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE -III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

## II SEMESTER

20MA201	Mathematics-II for Bio Sciences (Common to AGRI and FOOD TECH)	L	T	P	C
		3	2	0	4
Nature of Course	Basic Sciences				
Pre requisites	Fundamentals of Basic Mathematics				

**Course Objectives**

The course is intended to

1. Acquire the mathematical skills to solve the differential equations.
2. Acquaint the concept of Vector calculus needed in Agriculture engineering field.
3. Acquire knowledge of analytic approach to analyze the conformal mapping.
4. An understanding of Fourier Series to solve real world problems
5. Learn the mathematical analysis to understand the sequences.

**Course Outcomes**

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

CO. No.	Course Outcome	Bloom's Level
CO1	Explain various techniques in solving Ordinary differential equations with constant coefficients	Understand
CO2	Apply complex variables in finding ,Gradient, divergence, curl of a vector point function	Apply
CO3	Identify the concepts of analytic functions and its properties and apply it in conformal mapping.	Apply
CO4	Represent periodic functions using Fourier series	understand
CO5	Observe how the term of a sequence is represented graphically.	Understand

**Course Contents:****Unit – I Ordinary Differential Equations**

12

First order linear Differential equations- Exact differential equations- Second order linear differential equations with constant coefficients – Method of variation of parameters – Homogenous equation of Euler's and Legendre's Equations.

**Unit - II Vector calculus**

12

Differentiation of vectors -scalar and vector point functions - Gradient of a scalar point function - Divergence and Curl of a vector point function operator – line - surface and volume integrals - Stoke's - divergence and Green's theorems (Statement only) and applications.

**Unit - III Complex Differentiation and Conformal Mapping**

12

Functions of a complex variable – Analytic functions –Statement of Cauchy –Riemann equations – Harmonic functions–Harmonic conjugate –Construction of analytic functions –Conformal mapping :  $w = z+c$ ,  $cz$ ,  $1/z$  and Bilinear transformation.

**Unit IV Fourier Series**

12

Fourier series - Euler's formulae – Dirichlet's conditions - functions having arbitrary period- even and odd functions - half range series - Harmonic analysis -Fourier Sine and Cosine Series - Fourier series for function having period  $2L$  .

**Unit – V Sequence and Series**

12

Sequences and series - convergence and divergence of series - absolute convergence- conditional convergence - test for convergence and divergence - Power series for functions- interval of convergence - Taylor and Maclaurin series - Taylors Theorem with remainder.

**Total: 60 Periods**

**Text Books:**

1. Grewal B.S, "Higher Engineering Mathematics", KhannaPublishers,Delhi, 44<sup>th</sup> Edition, 2019.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons (Asia) Limited, 10<sup>th</sup> Edition, 2016.

**Reference Books:**

1. Ramana B.V, "Higher Engineering Mathematics",Tata McGraw Hill Publishing Company, 1<sup>st</sup> Edition, 2018.
2. Bali.N.P and ManishGoyal N.P, "A text book of Engineering Mathematics",8<sup>th</sup>Laxmi Publications, 6<sup>th</sup> Edition, 2015.

**Additional References:**

1. [https://onlinecourses.nptel.ac.in/noc16\\_ma05](https://onlinecourses.nptel.ac.in/noc16_ma05)
2. <https://nptel.ac.in/courses/122/104/122104017>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2										2		
CO2	2	3	2										1		
CO3	3	2	1										2		
CO4	3	2	1										1		
CO5	3	1	1										1		
	3	High				2	Medium					1	Low		

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz	5	15
Understand	Tutorial Class /Assignment	5	
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Exam			Final Examination (60)
	IAE I (7.5)	IAE II (7.5)	IAE 3 (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyze				
Evaluate				
Create				

20ME201	<b>Engineering Mechanics</b> (Common to Aeronautical, Agriculture, Civil, Mechanical and Safety and Fire Engineering)	L	T	P	C
		3	2	0	4
<b>Nature of Course</b>	Engineering Sciences				
<b>Pre requisites</b>	Fundamentals of Basic Mathematics and Physics				

### Course Objectives

The course is intended to

1. Develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.
2. Make the students understand the vector and scalar representation of forces and Moments and the static equilibrium of particles and rigid bodies.
3. Understand the effect of friction on equilibrium, laws of motion, kinematics of motion and the interrelationship.
4. Make the students understand the properties of surfaces and solids, prediction of behavior of particles and rigid bodies under motion.
5. Make the students familiar with frictional laws and its application

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO 1	Illustrate the vectorial and scalar representation of forces and moments	Apply
CO 2	Find the rigid body in equilibrium.	Apply
CO 3	Determine the properties of surfaces and solids.	Apply
CO 4	Calculate dynamic forces exerted in rigid body	Apply
CO 5	Determine the friction and the effects by the laws of friction	Apply

### Course Contents

#### UNIT - I Statics of Particles

12

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces — Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

#### UNIT - II Equilibrium of Rigid Bodies

12

Free body diagram – Types of supports – Action and reaction forces – stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions.

#### UNIT- III Properties of Surfaces and Solids

12

Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula – Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

#### UNIT – IV Dynamics of Particles

12

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion - Newton's laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.



**UNIT - V Friction and Elements of Rigid Body Dynamics****12**

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction – wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder and fly wheel

**TOTAL: 60 Periods****Text Books**

1. Rajasekaran, S. and Sankarasubramanian. G, "Fundamentals of Engineering 17 Mechanics", Vikas Publishing House Pvt. Ltd., New Delhi, 2009
2. Kumar, K.L., "Engineering Mechanics", Tata McGraw-Hill Publishing Company, New Delhi, 3rd Revised Edition, 2008

**References**

1. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", Tata McGraw-Hill Publishing Company, New Delhi, 8th Edition 2004
2. Hibbeler, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", Pearson Education, 11th Edition, 2010

**Web References**

1. <http://nptel.ac.in/courses/122104015/>
2. <http://nptel.ac.in/courses/112103109/>

**Online Resources**

1. <https://ocw.mit.edu/courses>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2		1									3		
CO2	3	2		1									3		
CO3	3	2		1									3		
CO4	3	2		1									3		
CO5	3	2		1									3		
	3	High				2	Medium				1	Low			

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz or Tutorial Class	5	15
Understand	Assignment	5	
	Attendance	5	

Summative Assessment				
Bloom's Category	Internal Assessment Examinations			Final Examination (60)
	IAE 1 (7.5)	IAE 2 (7.5)	IAE 3 (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	20	20	20	40
Analyse				
Evaluate	10	10	10	20
Create				

20PH201	<b>Physics for Bio Sciences</b> (Common to Agricultural Engineering & Food Technology)	L	T	P	C
		3	0	2	4
<b>Nature of Course</b>	Basic Sciences				
<b>Pre requisites</b>	Fundamentals of Basic Physics				

**Course Objectives:** The course is intended to

1. Impart knowledge of properties of matter like elasticity and its applications
2. Provide knowledge of optics, especially laser and their applications in fiber optics.
3. Understand the thermal properties of materials and their applications.
4. Develop the clear understanding about the concept of crystal structure.
5. Deliver knowledge on basic concept of seismic and flood hazard.

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Explain the knowledge about elastic modulus	Understand
CO2	Compare the working of lasers and propagation of light through optical fibers and its applications	Understand
CO3	Demonstrate the thermal conductivity of good and bad Conductors.	Understand
CO4	Demonstrate about the atomic arrangement in crystals	Understand
CO5	Classify the natural calamities like seismic hazards, flood hazards in detail	Understand

### Course Contents:

#### UNIT I Properties of Matter 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever – uniform and non-uniform bending - I-shaped girders - stress due to bending in beams.

#### UNIT II Laser and Fiber Optics 9

Lasers: population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index, mode) – optical fiber communication system- fiber optic endoscope.

#### UNIT III Thermal Physics 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever – uniform and non-uniform bending - I-shaped girders - stress due to bending in beams.

#### UNIT IV Crystal Physics 9

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures.

#### UNIT V Hazards 9

Seismology and Seismic waves - Earth quake ground motion - Basic concepts and estimation techniques - site effects - Probabilistic and deterministic Seismic hazard analysis - Cyclone and flood hazards - Fire hazards and fire protection, fire-proofing of materials, fire safety regulations and firefighting equipment - Prevention and safety measures.

**Laboratory Components**

S.No	List of Experiments	CO Mapping	RBT
1	Determination of rigidity modulus – Torsion pendulum	CO1	Apply
2	Determination of Young's modulus by non-uniform Bending method.	CO1	Apply
3	Determination of wavelength, and particle size using Laser	CO2	Apply
4	Determination of acceptance angle in an optical fiber	CO2	Apply
5	Determination of thermal conductivity of a bad conductor by Lee's Disc method	CO3	Apply
6	Determination of velocity of sound and compressibility of liquid - Ultrasonic interferometer	CO1	Apply
7	Determination of Coefficient of viscosity of liquid	CO1	Apply

**Total 30 Periods****TEXT BOOKS:**

1. Bhattacharya, D.K and Poonam, T, "Engineering Physics", 2nd edition, Oxford University Press, 2015.
2. M.N. Avadhanulu, M.N. & Kshirsagar PG. "A Text book of Engineering Physics", 10th edition, S.Chand and company, Ltd., New Delhi, 2014.
3. Ulrich Ranke., "Natural Disaster Risk management", Springer International Publishing, 1<sup>st</sup> Edition, 2016

**REFERENCES:**

1. David Halliday. Robert Resnick. and Jearl Walker., "Principles of Physics", Wiley, 10<sup>th</sup> Edition, 2014.
2. Raymond A Serway. and John W Jewett., "Physics for Scientists and Engineers", Cengage Learning, 9<sup>th</sup> Edition, 2019.

**Web References:**

1. <https://nptel.ac.in/courses/115/107/115107095/>
2. <https://scienceworld.wolfram.com/physics/TorsionalPendulum.html>
3. <https://spaceplace.nasa.gov/laser/en/>
4. <https://www.youtube.com/watch?v=uv0LxMoalEQ>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1												
CO2	3	1	1												
CO3	3	2	1												
CO4	3	1	1												
CO5	3		2												
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50marks]
	Theory Marks				Practical	
	IAE-I [7.5 ]	IAE-II [7.5]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	10	10	10		-	20
Understand	35	35	35		40	70
Apply	5	5	5		60	10
Analyse	-	-	-		-	-
Evaluate	-	-	-		-	-
Create	-	-	-		-	-

20CS201	PROBLEM SOLVING USING PYTHON ( Common to all Branches)	L	T	P	C
		3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Mathematical and Logical Knowledge				

### Course Objectives

The course is intended

1. To think logically and write algorithm and draw flow charts for problems.
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures -- lists, tuples, dictionaries and files.

### Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Develop algorithmic solutions to simple computational problems and read, write, execute by simple python programs.	Apply
CO2	Structure simple python programs for solving problems.	Understand
CO3	Administer the role of control statements and functions involving the idea of modularity.	Apply
CO4	Represent compound data using python strings and lists.	Apply
CO5	Read and write data from/to files in python Programs.	Understand

### Course Contents:

- Unit I Basics of Computers & Problem Solving 9**  
Computer Basics – Components-Computer organization - Computer Software- Types of software - Software Development steps -Need for logical analysis and thinking- Algorithms – Flowchart - Number system.
- Unit II Introduction of Python Programming 9**  
Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, Input and Output Statements.
- Unit III Control statements and Functions 9**  
Conditional (if), alternative (if-else), chained conditional (if-elif-else)-Iteration-while, for, break, continue, pass – Functions - Introduction, inbuilt functions, user defined functions, passing parameters, return values, recursion, Lambda functions.
- Unit IV Strings and Lists 9**  
Strings-String slices, immutability, string methods and operations -Lists-creating lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions-list processing-list comprehension, searching and sorting.
- Unit V Tuples, Dictionaries and Files 9**  
Tuples- Tuple assignment, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Files and Exception-Text files, reading and writing files, format Operator, Exception handling.

**TOTAL : 45 Periods**

**Laboratory Components**

S.No	List of Experiments	COMapping	RBT
1	Write a algorithm & draw flowchart for simple computational problems	CO1	Understand
2	Write a program to perform different arithmetic operations on numbers in python.	CO2	Understand
3	Write a python program to implement the various control structures	CO3	Apply
4	Write a python program for computational problems using recursive function.	CO3	Apply
5	Demonstrate use of list for data validation.	CO4	Apply
6	Develop a python program to explore string functions	CO4	Analyze
7	Implement linear search and binary search.	CO4	Apply
8	Develop a python program to implement sorting methods	CO4	Analyze
9	Develop python programs to perform operations on dictionaries.	CO5	Analyze
10	Write a python program to read and write into a file	CO5	Apply

**TOTAL: 30 Periods****Text Books:**

1. ReemaThareja, "Problem Solving and Programming with Python", Oxford University Press, 2018
2. Dr. R. NageswaraRao, "Core Python Programming", Dreamtech Press, 2017 Edition

**Reference Books:**

1. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012
2. Ashok NamdevKamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python", Mc-Graw Hill Education, 2018.
3. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013
4. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1										3	1	
CO2	3	2	1										3	1	
CO3	3	2	2										3	1	
CO4	3	2	2										3	1	
CO5	3	2	2										3	1	
	3	High				2	Medium				1	Low			

<b>Summative assessment</b>						
<b>Bloom's Level</b>	<b>Continuous Assessment</b>					<b>Final Examination (Theory) [50 marks]</b>
	<b>Theory Marks</b>				<b>Practical</b>	
	<b>IAE-I [7.5]</b>	<b>IAE-II [7.5]</b>	<b>IAE-III [10]</b>	<b>Attendance [5]</b>	<b>Rubric based CIA [20 Marks]</b>	
Remember	10	10	10			20
Understand	20	20	20		30	50
Apply	20	20	20		50	30
Analyse	-	-	-		20	-
Evaluate	-	-	-		-	-
Create	-	-	-		-	-

20AG201	Crop Husbandry Laboratory	L	T	P	C
		0	0	4	2
Nature of Course	Professional Core				
Pre requisites	Nil				

### Course Objectives

The course is intended to

1. introduce the different crop production practices in wet land, dry land and garden land through hands on experience and demonstrations.
2. understand the field preparation techniques
3. get knowledge on sowing and transplanting techniques
4. visualize the water and nutrients management in crop cultivation
5. learn the various harvesting techniques

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Identify and selection of seeds	Understand
CO2	Prepare the seed bed and sowing/transplanting techniques	Understand
CO3	Analyze the biometric observation measurements	Understand
CO4	Explain the Weed, Water and Nutrients management	Understand
CO5	Knowledge on Harvesting techniques	Understand

### List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Field preparation studies	2	Understand
2	Seed selection and seed treatment procedures	1	Understand
3	Seed bed and nursery preparation	1	Understand
4	Sowing / Transplanting	4	Understand
5	Biometric observation for crops	4	Understand
6	Nutrient management studies	4	Understand
7	Water management and irrigation scheduling	4	Understand
8	Weed management studies	4	Understand
9	Integrated Pest Management studies	5	Understand
10	Harvesting and Post Harvesting Techniques	5	Understand

**Total: 60 Periods**

### List of Equipments:

- A wet land / garden land for a minimum of 5 cents area for each / group of students.
- An open / borewell as water source to support cultivation
- Required quantity of seeds, nutrients and other materials for filed preparation



Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and PSOs															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	3							2					
CO2	2	1	3							2					
CO3	2	1	3							2					
CO4	2	1	3							2					
CO5	2	1	3							2					
	3	High				2	Medium				1	Low			

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment [50 marks]	End Semester Examination [50 marks]
Remember	30	30
Understand	70	70
Apply		
Analyze		
Evaluate		
Create		

20MC201	ENVIRONMENTAL SCIENCE (Common to Agriculture, Food Technology, Aero, Civil, Mechanical and Fire&Safety Engineering)	L	T	P	C
		2	0	0	0
Nature of Course	Mandatory				
Prerequisites	Nil				

### Course Objectives

The course is intended to

1. Understand the concept of eco system and environment.
2. Become conversant with ecological balance and values of bio diversity.
3. Know the role of human in prevention of pollution and making a clean environment.
4. Get knowledge about conservation of non conventional energy resources.
5. Study about the nature and management of e-waste and solid waste.

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	Describe the ecosystem and environment	Understand
CO2	Understand the ecological balance and preservation of bio diversity	Understand
CO3	Demonstrate various types of pollution in order to control pollution	Apply
CO4	Classify the energy sources for the conservation of non conventional energy sources	Understand
CO5	Identify the nature and management of e-waste and solid waste	Apply

### Course Contents

#### Unit-I Ecosystem

6

Eco system-Food chains, Food webs and Ecological pyramids. Ecosystem-(a) Forest eco system, (b) Aquatic eco system (pond ecosystem and marine ecosystem).

#### Unit-II Biodiversity

6

Introduction to Bio diversity, Values of Bio diversity, Threats to Bio diversity, Endangered and Endemic species of India, Hotspots of biodiversity. Conservation of Bio diversity: In-Situ and Ex-Situ conservation of bio diversity.

#### Unit-III Environmental Pollution

6

Definition, Causes, Effects and Control of (a) Air pollution (b) Water pollution (c) Soil pollution. Electrostatic Precipitator for controlling air pollution.

#### Unit-IV Non Conventional Energy Resources

6

Introduction, Types: Solar Energy, Wind Energy and Geo Thermal Energy.

#### Unit-V Environmental Management

6

Sustainable Development, Role of Information technology in Environment and Human. HIV and AIDS: causes and control measures. Green chemistry: Definition and Principles

### Activity Component

S.No	Name of the Experiment	CO Mapping	RBT
1	Field study of simple eco system: pond, river and hill slopes	CO1	Understand
2	Case study regarding environmental management	CO5	Apply

**Total: 30 periods**

**TextBooks**

1. AnubhaKaushik and C.P. Kaushik, “Environmental Science and Engineering, New Age International Publishers, New Delhi, 2<sup>nd</sup> Edition, 2015.
2. V. Kumar, “An Introduction to Green Chemistry” Vishal publishing Co. Reprint Edition,2010.

**Reference Books**

1. Masters, Gilbert M, “Introduction to Environmental Engineering and Science”, Pearson Education, New Delhi, 2<sup>nd</sup> Edition, 2012.
2. Santosh Kumar Garg andRajeshwariGarg“Ecological and Environmental Studies”,Khanna Publishers, NaiSarak, Delhi, 2<sup>nd</sup> Edition, 2014.

**Additional Resources**

1. <https://nptel.ac.in/courses/122103039/38>
2. <https://bch.cbd.int/cms/ui/collaboration/download/download.aspx?id=909>
3. [https://nptel.ac.in/courses/105102089/air%20pollution%20\(Civil\)/Module-3/3a.htm](https://nptel.ac.in/courses/105102089/air%20pollution%20(Civil)/Module-3/3a.htm)
4. [www.vssut.ac.in/lecture\\_notes/lecture1428910296.pdf](http://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf)
5. [nptel.ac.in/courses/120108004/module7/lecture8.pdf](https://nptel.ac.in/courses/120108004/module7/lecture8.pdf)

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1							3					3				
CO2							3					3				
CO3							3					3				
CO4							3					3				
CO5							3					3				
	3	High					2	Medium					1	Low		

Bloom's Level	Continuous Assessment				
	IAE-I [20]	IAE-II [20]	IAE-III [20]	Attendance [10]	Activity [30]
Remember	30	20	20		
Understand	10	20	20		
Apply	10	10	10		
Analyze					
Evaluate					
Create					

20ENE02	<b>Advanced Communicative English</b> (Common to all B.E./ B.Tech Programmes)	L	T	P	C
		2	0	2	3
<b>Nature of Course</b>	Humanities and Social Sciences				
<b>Pre requisites</b>	Basics of Communicative English				

### Course Objectives

The course is intended to

- Demonstrate satisfactory control over complex structures and mechanics in English.
- Develop fluency and accuracy in oral communication.
- Communicate effectively and actively in social interactions.
- Read English at inspectional level.
- Face interviews with confidence.

### Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand
CO3	Build self-confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

### Course Contents

#### Unit – I Grammar and usage

6

Active voice and passive voice – Prefixes and suffixes – Connotation – Clauses - If conditionals – Idioms & Phrases - Right forms of verbs– Modal Auxiliaries - Spotting errors.

#### Unit - II Lexical competence

6

Technical Vocabulary- Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - Idioms and Phrases.

#### Unit - III Conversational etiquette

6

Processes description– Tone and accent in speech– Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal subjective and objective introduction – Body Language – Mock Interview.

#### Unit – IV Listening reading and writing

6

Listen to Scientific/Technical talks and gap filling – Listening to TED/INK Talks – Reading – “Water: The Elixir of Life” by Sir. C.V.Raman. “Progress” by St. John Ervine - Instructions and Recommendations – Letter writing formal –Job application- Report writing–Introspective report – Creative writing – Essays and Paragraphs.

#### Unit – V Phonetics

6

Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

**Total: 30 Periods**

**Laboratory Components**

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand
14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

**Total: 30 Periods****Text Books**

1. Rizvi, Ashraf.M, "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5<sup>th</sup> Edition, 2007.
2. Hewings. M, "Advanced English Grammar", 3rd Edition, Cambridge University Press, Chennai, 5<sup>th</sup> Edition, 2000.
3. Board of Editors, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2<sup>nd</sup> Edition, 2017.

**Reference Books:**

1. Raman M &Sangeetha Sharma, "Technical Communication",Oxford University Press,USA,10<sup>th</sup>Edition,2007.
2. John CunnisonCatford, "A Practical Introduction to Phonetics",Clarendon Press, Jamaica,2<sup>nd</sup> Edition, 2001.
3. Norman Whitby, Business Benchmark – "Pre-Intermediate to Intermediate, Students Book", Cambridge University Press, 1<sup>st</sup> Edition, 2006.
4. DhanavelS. P., "English and Soft Skills", 1<sup>st</sup>Edition,OrientBlackSwan Private Limited, Hyderabad, 1<sup>st</sup> Edition, 2010.

**Web reference:**

1. [https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm\\_source=mobile&utm\\_medium=page\\_share&utm\\_content=vp&utm\\_campaign=to\\_p\\_button](https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vp&utm_campaign=to_p_button)
2. <blob:https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	1	2	2		
CO2										3	1	2	2		
CO3										3	1	2	2		
CO4										3	1	2	2		
CO5										3	1	2	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE -III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

20ENE03	HINDI	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basic Perceptive of Language				

**Course Objectives**

The course is intended for learners.

1. To help students acquire the basics of Hindi
2. To teach them how to converse in Hindi on simple day-to-day situations
3. To help students acquire the ability to understand a simple technical text in Hindi

**Course Outcomes**

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

CO.No.	Course Outcome	Bloom's Level
CO.1	Construct simple sentences and use vocabulary required for day-to-day conversation	Remember
CO.2	Distinguish and understand the basic sounds of Hindi language.	Remember
CO.3	Appear for Hindi examinations conducted by Dakshin Bharat Hindi Prachar Sabha.	Remember

**Course Contents:****UNIT I: Introduction****6**

Hindi Alphabet: Introduction - Vowels - Consonants - Plosives - Fricatives - Nasal sounds - vowel Signs- Chandra Bindu & Visarg - Table of Alphabet - Vocabulary.

**UNIT II: Reading****6**

Nouns: Genders (Masculine & Feminine Nouns long vowels and short vowels - Masculine & Feminine - Reading Exercises

**UNIT III: Grammar****6**

Pronouns and Tenses: Categories of Pronouns - Personal Pronouns - Second person you & honorific) - Definite & Indefinite pronouns - Relative pronouns - Present tense - Past tense - Future tense - Assertive & Negative Sentences – Interrogative Sentences.

**UNIT V : Vocabulary****6**

Classified Vocabulary: Parts of body - Relatives - Spices - Eatables - Fruit & Vegetables - Clothes - Directions - Seasons - Professions

**UNIT V: Speaking****6**

Speaking: Model Sentences and Rhymes - Speaking practice for various occasions.

**Total: 30 Periods****Reference:**

1. Hindi Prachar Vahini-1 by Dakshin Bharat Hindi Prachar Sabha Chennai
2. B.R.Kishore, Self Hindi Teacher for Non-Hindi Speaking People, VeeKumar Publications(P)Ltd., New Delhi, 2009
3. Videos, Stories, Rhymes and Songs.

20ENE04	FRENCH	L	T	P	C
		2	0	2	0
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basic Perceptive of Language				

### Course Objectives

The course is intended for learners.

1. To prepare the students for DELFA1 Examination
2. To teach them to converse fluently in French in day-to-day scenarios

### Course Outcomes

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

CO.No.	Course Outcome	Bloom's Level
CO1	To help students acquire familiarity in the French alphabet & basic vocabulary	Remember
CO2	listen and identify individual sounds of French	Remember
CO3	Use basic sounds and words while speaking	Remember
CO4	Read and understand short passages on familiar topics	Understand
CO5	Understand and use basic grammar and appropriate vocabulary in completing language tasks	Understand

### Course Contents:

#### UNIT I : Entrer En Contact

6

La langue française, alphabets, les numeros, les jours, les mois. Grammaire Les verbes s'appeler, être, avoir, les articles définis, indéfinis Communication - Saluer, s'informer sur quelqu'un, demander de se présenter Lexique - Les alphabets, les nationalités, âge, les pays, les couleurs, les jours de la semaine, les mois de l'année, les professions

#### UNIT II : Partager Son Lieu De Vie

6

Les français et leur habitat, des habitations insolites Grammaire- Verbes - Conjugaison : Présent (Avoir / être / ER, IR, RE : Régulier et Irrégulier) – Adjectifs de lieu Communication - Chercher un logement, d'écrire son voisin, s'informer sur un logement Lexique - L'habitat, les pièces, l'équipement, la description physique

#### UNIT III: Vivre Au Quotidien

6

Grammaire - Articles contractés, verbes vouloir, pouvoir, devoir, adjectifs interrogatifs, futur proche Communication- Exprimer ses goûts, parler de ses loisirs, justifier un choix, exprimer une envie Lexique - le temps libre et les loisirs, les saisons, les activités quotidiennes, le temps (le matin, le soir, la nuit)

#### UNIT IV: Comprendre Son Environnement Ouvrir La Culture

6

Grammaire - Verbes- Finir, Sortir, les adjectifs démonstratifs, le passé composé, l'imparfait Communication - Proposer à quelqu'un de faire quelque chose, raconter une sortie au cinéma, parler d'un film Lexique - Les sorties, la famille, art, les vêtements et les accessoires



**UNIT V: GouterALaCampagne**

Grammaire La forme negative, les verbes acheter, manger, payer, articles partitifs, le pronom de quantite  
 Communication Accepter et refuse une invitation, donner des instructions, commander au restaurant  
 Lexique Les services et les commerces, les aliments, les ustensiles, argent.

**Total: 30 Periods**

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										2					
CO2										2					
CO3										3					
CO4										3					
CO5										2					
	3	High				2	Medium					1	Low		

20ENE05	GERMAN	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basic Perceptive of Language				

### Course Objectives

The course is intended for learners.

1. To help students appear for the A1 level Examination
2. To teach them how to converse fluently in German in day-to-day scenarios

### Course Outcome

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

CO.No.	Course Outcome	Bloom's Level
CO1	listen and identify individual sounds of German	Remember
CO2	use basic sounds and words while speaking	Remember
CO3	read and understand short passages on familiar topics	Remember
CO4	use basic sentence structures while writing	Understand
CO5	understand and use basic grammar and appropriate vocabulary in completing language tasks	Understand

### Course Contents:

#### UNIT I Introduction

6

Introduction to German language: Alphabet - Numbers - Greetings - Days and Seasons- Working with Dictionary

#### UNIT II Pronunciation

6

Nouns - articles - Speaking about one self - Listening to CD supplied with the books, paying special attention to pronunciation

#### UNIT III Basic Syntax

6

Regular & Irregular verbs - Personal pronouns - family - Introduction to type's of sentences

#### UNIT IV Vocabulary

6

Question words-Types of Questions - Nominative case- Verb Conjugation - country - nationalities

#### UNIT V: Action Words

6

Verbs - to be & to have - conjugation - Hobbys - Framing basic Questions and answers

**Total: 30 Periods**

### Reference(s)

1. Kursbuch and Arbeitsbuch, NETZWERK A1 DEUTSCH ALS FREMDSPRACHE, Goyal Publishers & Distributers Pvt. Ltd., New Delhi, 2015
2. Langenscheidt Eurodictionary - German - English / English - German, Goyal Publishers & Distributers Pvt. Ltd., New Delhi, 2009
3. Grundkurs, DEUTSCH Lehrbuch Hueber München, 2007

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										2					
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	3	High				2	Medium					1	Low		