



## Integral University, Lucknow

Effective from Session: 2018-19							
Course Code	MT133	Title of the Course	Mathematics in Agricultural Engineering -I	L	T	P	C
Year	I	Semester	I	2		1	
<b>Course Objectives</b>	1. To provide the knowledge about Matrices: Elementary transformations, rank of a matrix, reduction to normal form, Gauss- Jordan method to find inverse of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem, linear transformation, orthogonal transformations, diagonalisation of matrices, quadratic forms. 2. To provide the knowledge about PAQ form, Echelon form, Solution of linear equations, nature of rank, using Cayley-Hamilton theorem to find inverse of A. Differential calculus: Taylor's and Maclaurin's expansions; indeterminate form; curvature, function of two or more independent variables. 3. To educate the students about Partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, maxima and minima. Integral calculus: volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, application of double and triple integrals to find area and volume. 4. To aware the students about the Vector calculus: Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order 5. To provide Knowledge regarding differential operator; line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs).						

Course Outcomes	
<b>CO1</b>	Students able to provide the knowledge about Matrices: Elementary transformations, rank of a matrix, reduction to normal form, Gauss-Jordan method to find inverse of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem, linear transformation, orthogonal transformations, diagonalisation of matrices, quadratic forms
<b>CO2</b>	Able to know about provide the knowledge about PAQ form, Echelon form, Solution of linear equations, nature of rank, using Cayley-Hamilton theorem to find inverse of A. Differential calculus: Taylor's and Maclaurin's expansions; indeterminate form; curvature, function of two or more independent variables
<b>CO3</b>	Student able to understand about Partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, maxima and minima. Integral calculus: volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, application of double and triple integrals to find area and volume.
<b>CO4</b>	Able to know about about the Vector calculus: Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order
<b>CO5</b>	Students able to understand the basic Knowledge regarding regarding differential operator; line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs).

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Elementary transformations, rank of a matrix, reduction to normal form, Gauss- Jordan method to find inverse of a matrix, Eigen values and Eigen vectors, Cayley-Hamilton theorem, linear transformation, orthogonal transformations, diagonalisation of matrices, quadratic forms.	08	CO1
2	<b>Unit-2</b>	PAQ form, Echelon form, Solution of linear equations, nature of rank, using Cayley-Hamilton theorem to find inverse of A. Differential calculus: Taylor's and Maclaurin's expansions; indeterminate form; curvature, function of two or more independent variables.	10	CO2, 3
3	<b>Unit-3</b>	Partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, maxima and minima. Integral calculus: volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, application of double and triple integrals to find area and volume.	06	CO 4, 5
4	<b>Unit-4</b>	Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order	10	CO 4
5	<b>Unit-5</b>	line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs).	06	CO 5

Practicals	Contact Hrs.	Mapped CO
Tutorials on rank of a matrix, reduction to normal form, consistency and solution of linear equations, eigen values and eigen vectors, Cayley-Hamilton theorem, diagonalization of matrices, quadratic forms; Taylor's and Maclaurin's expansion, indeterminate form, curvature, tracing of curves, partial differentiation, maxima and minima, volume and surface of revolution, multiple integrals, Beta and Gama functions, differentiation of vectors, gradient, divergence and curl of a vector point function, line, surface and volume integrals, Stoke's divergence and Green's Theorems.	32	CO 1, 2, 3, 4,5

Reference Books:
Narayan Shanti. 2004 . Differential Calculus. S. Chand and Co. Ltd. New Delhi.
Grewal B S. 2004. Higher Engineering Mathematics. Khanna Publishers Delhi
Narayan Shanti. 2004. A Text Book of Vector. S. Chand and Co. Ltd. New Delhi.

**e-Learning Source:**

<https://ilizone.iul.ac.in/>

<https://youtu.be/gC99j9juviw>

<https://youtu.be/bWR0XSC8hks>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	1	2	1	2	1	2	1	3	2	1	2	3	3	3	1	1	2	2
CO2	3	3	3	1	1	1	2	1	1	1	2	3	1	3	3	3	2	1	1	2	2
CO3	3	3	2	2	1	1	1	1	2	2	3	2	1	3	3	2	2	1	1	1	2
CO4	3	3	3	1	2	2	1	2	1	2	2	3	1	3	3	2	2	1	1	1	3
CO5	3	3	2	2	1	2	2	1	2	1	3	2	1	3	2	3	2	1	1	1	3

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**



## Integral University, Lucknow

Effective from Session: 2018-19							
Course Code	PY 110	Title of the Course	Engineering Physics	L	T	P	C
Year	I	Semester	I	2		1	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To analyze the connection between daily life observations and science. To realize that apparently different ideas of Dia, Para and ferromagnetism. To realize the simplicity of ideas involved in explaining complex phenomenon. To grow in ideas of different aspect of magnetism and develop connection between daily life applications and science.</li> <li>2. To analyze the process of development of a new theory while dealing with metals. insulators and semiconductors. To correlate that the conceptualization of an idea is far ahead than its practical realization while dealing with LASER and Holography. To grow in realization of totally different manifestation of Langevin theory. To find the most recent applications of light in terms of communication and storage of data.</li> <li>3. To realize that how the design of complex systems is based on the simple ideas. To realize that the conceptualization of an idea is far ahead than its practical realization while dealing with Optical Fibers. To grow in developing connection between philosophy and science. To find that seemingly different ideas such as Illumination and interrelationship between them.</li> <li>4. To understand the process of development of a new theory and its application in day to day life. To find that seemingly different ideas such as de-Broglie hypothesis and Quantum theory and interrelationship between them. To understand and analyze the process of development of a new theory and how the development of one idea leads to the development of an apparently different idea. To realize and appreciate the efforts made by the individuals to give a new understanding of science that led to the modern day applications.</li> <li>5. To grow in developing connection between daily life utility and material science. To realize that apparently different materials with respect to Electric and Magnetic properties have inter relationship between them. To evaluate that how totally different manifestation of Modern Science leads to new technology. To do the evaluation that how an idea is far ahead than its practical realization while dealing with Nano Technology and Super Conductivity.</li> </ol>						

Course Outcomes	
<b>CO1</b>	Students able to understand the conceptual knowledge about importance and scope of magnetic properties of materials, principles and methods of difference of magnetic properties of materials.
<b>CO2</b>	Able to analyze the process of development of a new theory while dealing with metals. insulators and semiconductors. To correlate that the conceptualization of an idea is far ahead than its practical realization while dealing with LASER and Holography. To grow in realization of totally different manifestation of Langevin theory. To find the most recent applications of light in terms of communication and storage of data.
<b>CO3</b>	Student able to understand about the design of complex systems is based on the simple ideas. To realize that the conceptualization of an idea is far ahead than its practical realization while dealing with Optical Fibers. To grow in developing connection between philosophy and science. To find that seemingly different ideas such as Illumination and interrelationship between them.
<b>CO4</b>	Able to know about the process of development of a new theory and its application in day to day life. To find that seemingly different ideas such as de-Broglie hypothesis and Quantum theory and interrelationship between them. To understand and analyze the process of development of a new theory and how the development of one idea leads to the development of an apparently different idea. To realize and appreciate the efforts made by the individuals to give a new understanding of science that led to the modern day applications.
<b>CO5</b>	Students able to understand the basic Knowledge regarding daily life utility of material science. To realize that apparently different materials with respect to Electric and Magnetic properties have inter relationship between them. To evaluate that how totally different manifestation of Modern Science leads to new technology. To do the evaluation that how an idea is far ahead than its practical realization while dealing with Nano Technology and Super Conductivity.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Dia, Para and ferromagnetism-classification. Langevin theory of dia and paramagnetism. Adiabatic demagnetization. Weiss molecular field theory and ferromagnetism. Curie-Weiss law. Wave particle quality, de-Broglie concept, uncertainty principle.	07	1
2	<b>Unit-2</b>	Wave function. Time dependent and time independent Schrodinger wave equation, Qualitative explanation of Zeeman effect, Stark effect and Paschan Back effect, Raman spectroscopy. Statement of Bloch's function. Bands iii solids, velocity of Bloch's electron and effective mass.	6	2
3	<b>Unit-3</b>	Distinction between metals. insulators and semiconductors. Intrinsic and extrinsic semiconductors, law of mass action. Determination of energy gap in semiconductors. Donors and acceptor levels. Superconductivity, critical magnetic field.	7	3
4	<b>Unit-4</b>	Meissner effect. Isotope effect. Type-I and II superconductors, Josephson's effect DC and AC, Squids. Introduction to high Tc superconductors. Spontaneous and stimulated emission, Einstein A and B coefficients. Population inversion, He-Ne and Ruby lasers.	6	4
5	<b>Unit-5</b>	Ammonia and Ruby masers, Holography-Note. Optical fiber. Physical structure. basic theory. Mode type, input output characteristics of optical fiber and applications. Illumination: laws of illumination, luminous flux, luminous intensity, candle power, brightness.	6	5
<b>Practicals</b>			<b>Contact Hrs.</b>	<b>Mapped CO</b>
To find out the frequency of A.C. supply using an electrical vibrator; To find the low resistance using Carey Foster bridge without calibrating the bridge wire; To determine dielectric constant of material using De Sauty's bridge; To determine the			30	CO 1, 2, 3, 4,5

value of specific charge (e/m) for electrons by helical method; To study the induced e.m.f. as a function of velocity of the magnet; To obtain hysteresis curve (B-H curve) on a C.R.O. and to determine related magnetic quantities; To study the variation of magnetic field with distance along the axis of a current carrying circular coil and to detuning the radius of the coil; To determine the energy band gap in a semiconductor using a p-n Junction diode; To determine the slit width from Fraunhofer diffraction pattern using laser beam; To find the numerical aperture of optical fiber: To set up the fiber optic analog and digital link; To study the phase relationships in L.R. circuit; To study LCR circuit; To study the variations of thermo emf of a copper-constantan thermo-couple with temperature; To find the wave length of light by prism.

**Reference Books:**

1. Brijlal and Subramanyam. Text Book of optics. S. Chand and Co., New Delhi.
2. Sarkar Subir Kumar. Optical State Physics and Fiber Optics. S. Chand and Co., New Delhi.
3. Gupta S L, Kumar V Sharma R C. Elements of Spectroscopy. Pragati Prakasam, Meeruth.
4. Saxena B S and Gupta R C. Solid State Physics. Pragati Prakasam, Meeruth.
5. Srivastava B N. Essentials of Quantum Mechanics. Pragati Prakasam, Meeruth.

**e-Learning Source:**

<https://ilizone.iul.ac.in/>

<https://youtu.be/-FgJnQ-Zbqw>

<https://youtu.be/LNL418Osh-U>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	2	2	1	2	3	3	2	2	3	2	3	3	3	2	1	1	2	2
CO2	2	3	3	2	2	1	2	3	3	2	2	3	2	3	3	3	2	1	1	2	3
CO3	2	3	3	2	2	1	2	3	3	2	2	3	2	3	3	2	2	1	1	1	2
CO4	2	3	3	2	2	1	2	3	3	2	2	3	2	3	3	2	3	1	1	1	3
CO5	2	3	3	2	2	1	2	3	3	2	2	3	2	3	3	3	3	1	1	2	3

**2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**



## Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	CH116	<b>Title of the Course</b>	Engineering Chemistry	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	I	<b>Semester</b>	I	2		1	
<b>Course Objectives</b>	To provide the knowledge about the phase rules, fuels and colloids, corrosion, food chemistry, lubricants and polymers and fundamentals of thermo-gravimetric, polarographic, nuclear radiation.						

Course Outcomes	
<b>CO1</b>	Students are able to know about the role, advantage, significance and prospect of the chemistry related with the phase rules, fuels and colloids. That is provided extra strength to the students, to freely work in the field of agriculture.
<b>CO2</b>	Students are aware about the different types of chemical behavior/reactivity of corrosion and water quality; types of corrosion, theories of corrosion, corrosion control, and determination of water quality parameters, hardness, treatment as well as control of water contamination.
<b>CO3</b>	Students are able to know about the chemical composition, behavior, structure and types of lipids, proteins and carbohydrate, vitamin, coloring as well as flavoring reagents of food. They are also learned about the mechanism of enzyme action and its role in the chemical manufacturing such as EtOH and CH <sub>3</sub> COOH.
<b>CO4</b>	Students are aware about the fundamentals of the polymers and lubricant. Its properties, mechanisms, classification, types and tests. Role of polymers and lubricant in the domestic and agricultural practices. Also possess the knowledge of synthesis of polymers and preparation of lubricants.
<b>CO5</b>	Students able to know about the basics of thermo-gravimetric, polarographic, nuclear radiation, radioactive materials and IR spectroscopy. There instrumentation and fundamental principles with their roles in the characterization of chemical composition.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Phase rule and its application to one and two component systems. Fuels: classification, calorific value. Colloids: classification. properties.	08	1
2	<b>Unit-2</b>	Corrosion: causes. types and method of prevention. Water: temporary and permanent hardness. disadvantages of hard water, scale and sludge formation in boilers, boiler corrosion.	10	2
3	<b>Unit-3</b>	Analytical methods like thermo-gravimetric. polarographic analysis. nuclear radiation. detectors and analytical applications of radioactive materials. Enzymes and their use in the manufacturing of ethanol and acetic acid by fermentation methods.	10	3
4	<b>Unit-4</b>	Principles of food chemistry. Introduction to lipids, proteins, carbohydrates, vitamins, food preservatives, colouring and flavouring reagents of food.	06	4
5	<b>Unit-5</b>	Lubricants: properties. mechanism. classification and tests. Polymers. types of polymerization. properties. uses and methods for the determination of molecular weight of polymers. Introduction to IR spectroscopy.	06	5

Practicals	Contact Hrs.	Mapped CO
Determination of temporary and permanent hardness of water by EDTA method: Estimation of chloride in water: Estimation of dissolved oxygen in water: Determination of BOD in water sample: Determination of COD in water sample: Estimation of available chlorine in bleaching powder: Determination of viscosity of oil: Estimation of activity of water sample: Estimation of alkalinity of water sample: Determination of carbonate and non-carbonate hardness by soda reagent: Determination of coagulation of water and chloride ion content: Determination of specific rotation of an optically active compound: Determination of $\lambda_{max}$ and verification of Beer Lambert Law: Determination of calorific value of fuel: Identification of functional groups (alcohol, aldehyde, ketones, carboxylic acid and amide) by IR: Chromatographic analysis: Determination of molar refraction of organic compounds.	30	CO 1, 2, 3, 4, 5

<b>Reference Books:</b>
Jain PL and Jain M. 1994. Engineering Chemistry. Danpat Rai publishing company Pvt. Ltd., Delhi.
Bahl BS, Arun Bahl and Tuli BD. 2007. Essentials of Physical Chemistry. S. Chand and Co. Ltd., Delhi.
<b>e-Learning Source:</b>

<https://ilizone.iul.ac.in/>

<https://youtu.be/gmSchweoSJg>

<https://youtu.be/3O6OfCaVadI>

<https://youtu.be/ZYqdAcnJA68>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	3	3	3	1	1	1	1	3	1	1	1	3	1	3	2	1	1	2	1
CO2	1	2	3	3	3	1	1	1	1	3	1	1	1	3	1	3	2	1	1	1	1
CO3	1	2	3	3	2	1	1	1	1	3	1	1	1	3	2	3	3	1	1	1	2
CO4	1	2	3	3	3	1	1	1	1	3	1	1	1	3	1	3	2	1	1	1	1
CO5	1	1	1	3	2	1	1	1	1	3	1	1	1	3	1	2	2	1	1	2	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



## Integral University, Lucknow

<b>Effective from Session:</b> 2018-19							
<b>Course Code</b>	AE112	<b>Title of the Course</b>	Principles of Soil Science	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	I	<b>Semester</b>	I	2		1	
<b>Course Objectives</b>	1. To gain basic knowledge of soil fertility and productivity 2. To study Importance or Significance of soil macronutrient and micronutrients 3. To Assess and develop importance of soil physical and chemical properties 4. To study about soil pollution and mitigation process						

Course Outcomes	
<b>CO1</b>	To gain basic knowledge of soil fertility and productivity
<b>CO2</b>	To study Importance or Significance of soil macronutrient and micronutrients
<b>CO3</b>	To Assess and develop importance of soil physical and chemical properties
<b>CO4</b>	To Assess and develop importance of soil physical and chemical properties
<b>CO5</b>	To study about soil pollution and mitigation process

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Soil origin and classification</b>	Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders	10	1
2	<b>Physical properties of soil</b>	important soil physical properties; and their importance; soil particle distribution; soil inorganic colloids – their composition, properties and origin of charge; ion exchange in soil and nutrient availability	10	2
3	<b>Soil organic matter</b>	soil organic matter – its composition and decomposition, effect on soil fertility; soil reaction – acidic, saline and sodic soils;	06	3
4	<b>Quality of irrigation water</b>	quality of irrigation water; essential plants nutrients – their functions and deficiency symptoms in plants; important inorganic fertilizers and their reactions in soils.	08	4
5	<b>Soil reactions and their reclamation</b>	Use of saline and sodic water for crop production, Gypsum requirement for reclamation of sodic soils and neutralizing RSC; Liquid fertilizers and their solubility and compatibility.	06	5

Practicals			Contact Hrs.	Mapped CO
Identification of rocks and minerals; Examination of soil profile in the field; Collection of Soil Sample; Determination of bulk density; particle density and porosity of soil; Determination of organic carbon of soil; Determination of Nitrogen, Determination of Phosphorus and Determination of Potassium; Identification of nutrient deficiency symptoms of crops in the field; Determination of gypsum requirement of sodic soils; Determination of water quality parameters.			32	CO 1, 2, 3, 4, 5

Reference Books:	
Brady Nyle C and Ray R Well. 2002. Nature and properties of soils. Pearson Education Inc., New Delhi.	
Indian Society of Soil Science. 1998. Fundamentals of Soil Science. IARI, New Delhi.	
Sehgal J.A. Textbook of Pedology Concepts and Applications. Kalyani Publishers, New Delhi.	
Hillel D. 1982. Introduction to Soil Physics. Academic Press, London.	
e-Learning Source:	
<a href="https://ilizone.iul.ac.in/">https://ilizone.iul.ac.in/</a>	
<a href="https://youtu.be/l6v71LloCSQ">https://youtu.be/l6v71LloCSQ</a>	
<a href="https://youtu.be/r5gKvAFtd9k">https://youtu.be/r5gKvAFtd9k</a>	
<a href="https://youtu.be/vcuN9gPEMHE">https://youtu.be/vcuN9gPEMHE</a>	

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	2	3	2	1	1	1	1	3	2	3	2	3	2	3	3	2	1	1	1
CO2	3	3	3	2	1	1	1	1	3	3	2	3	2	3	3	3	3	1	1	1	3
CO3	3	3	2	2	1	1	2	2	3	3	2	3	2	3	2	3	3	1	1	2	3
CO4	3	3	2	1	1	1	1	1	3	3	2	3	2	3	3	3	3	1	1	1	3
CO5	3	3	2	3	1	1	1	1	3	3	2	3	2	3	3	3	2	1	1	1	3

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**



## Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	AE101	<b>Title of the Course</b>	Surveying and Levelling	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	I	<b>Semester</b>	I	1		2	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Students will be able to understand the importance of surveying and the basics of linear methods like chain surveying, Tape surveying and Modern Instruments.</li> <li>2. Students will understand about compass coordinates and different methods of calculating the horizontal and vertical angles.</li> <li>3. Student will be able to understand the fundamentals of plane table survey.</li> <li>4. Student will know the fundamentals of leveling work and to calculate the levels of different points above or below the earth surface.</li> <li>5. Students have an ability to understand the basics of contour and use modern equipment like total station, electronic theodolite and GPS.</li> </ol>						

Course Outcomes	
<b>CO1</b>	The students have the ability to understand the measurement techniques and equipment used in land surveying. They will take the liner measurement by chain and tape.
<b>CO2</b>	The students can take angular measurement from compass and correct them from different errors.
<b>CO3</b>	The students have an ability to find out the Reduced levels of different point on the ground.
<b>CO4</b>	The students will Gain the ability to prepare a map of the area.
<b>CO5</b>	The students will be able to represent the topography of the land graphically.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Surveying: Introduction, classification and basic principles, Linear measurements. Chain surveying. Cross staff survey, Compass survey.	04	1
2	<b>Unit-2</b>	Planimeter, Errors in measurements, their elimination and correction. Plane table surveying.	04	2
3	<b>Unit-3</b>	Levelling, levelling difficulties and error in leveling, Contouring, Computation of area and volume.	04	3
4	<b>Unit-4</b>	Theodolite traversing. Introduction to setting of curves. Total station, Electronic Theodolite.	04	4
5	<b>Unit-5</b>	Use modern equipment like total station, electronic theodolite and GPS.	04	5

Practicals	Contact Hrs.	Mapped CO
Chain survey of an area and preparation of map; Compass survey of an area and plotting of compass survey; Plane table surveying; Levelling. L section and X sections and its plotting; Contour survey of an area and preparation of contour map; Introduction of software in drawing contour; Theodolite surveying; Ranging by Theodolite, Height of object by using Theodolite; Setting out curves by Theodolite; Minor instruments. Use of total station.	60	CO 1, 2, 3, 4, 5

**Reference Books:**

Punmia, B C 1987. Surveying (Vol.I). Laxmi Publications, New Delhi.
Arora K R 1990. Surveying (Vol.I), Standard Book House, Delhi.
Kanetkar T P 1993. Surveying and Levelling. Pune Vidyarthi Griha, Prakashan, Pune.
Punmia, B C 1987. Surveying (Vol.I). Laxmi Publications, New Delhi.

**e-Learning Source:**

- <https://ilizone.iul.ac.in/>
- <https://youtu.be/g17R2qRCikc>
- [https://youtu.be/1zW\\_mEx0E9w](https://youtu.be/1zW_mEx0E9w)

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
<b>CO1</b>	1	2	1	2	1	1	1	1	1	1	1	2	1	1	3	2	2	1	1	2	2
<b>CO2</b>	1	1	1	2	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1
<b>CO3</b>	1	1	1	2	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	2	3
<b>CO4</b>	1	2	1	2	1	1	1	1	1	1	1	2	1	1	3	2	2	1	1	2	1
<b>CO5</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	2	2

**3- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**





## Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	AE111	<b>Title of the Course</b>	ENGINEERING MECHANICS	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>I</b>	<b>Semester</b>	<b>I</b>	<b>2</b>		<b>1</b>	
<b>Course Objectives</b>	Students will be able to understand the basic concepts of engineering mechanics.						

Course Outcomes	
<b>CO1</b>	To share the basics of material properties (Mechanical).
<b>CO2</b>	To share the relevant problems and their solution by various methods.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Basic concepts of Engineering Mechanics. Force systems, Centroid, Moment of inertia, Free body diagram and equilibrium of forces. Frictional forces Analysis of simple framed structures using methods of joints, methods of sections and graphical method	18	1
2	<b>Unit-2</b>	Simple stresses. Shear force and bending moment diagrams. Stresses in beams. Torsion. Analysis of plane and complex stresses.	12	2

Practicals	Contact Hrs.	Mapped CO
Problems on composition and resolution of forces, moments of a force, couples, transmission of a couple, resolution of a force into a force & a couple; Problems relating to resultant of; Co-planer force system, collinear force system, concurrent force system, co-planer concurrent force system, co-planer non-concurrent force system, Non-co-planer concurrent force system, Non-co-planer non-concurrent force system, system of couples in space; Problems relating to centroids of composite areas; Problems on moment of inertia, polar moment of inertia, radius of gyration, polar radius of gyration of composite areas; Equilibrium of concurrent – co-planer and non concurrent – co-planer force systems; Problems involving frictional forces; Analysis of simple trusses by method of joints and method of sections; Analysis of simple trusses by graphical method; Problems relating to simple stresses and strains; Problems on shear force and bending moment diagrams; Problems relating to stresses in beams; Problems on torsion of shafts; Analysis of plane and complex stresses.	30	CO 1, 2, 3, 4, 5

<b>Reference Books:</b>	
Sundarajan V 2002. Engineering Mechanics and Dynamics. Tata McGraw Hill Publishing Co. Ltd., New Delhi.	
Timoshenko S and Young D H 2003. Engineering Mechanics. McGraw Hill Book Co., New Delhi.	
Prasad I B 2004. Applied Mechanics. Khanna Publishers, New Delhi.	
Prasad I B 2004. Applied Mechanics and Strength of Materials. Khanna Publishers, New Delhi.	
Sundarajan V 2002. Engineering Mechanics and Dynamics. Tata McGraw Hill Publishing Co. Ltd., New Delhi.	
<b>e-Learning Source:</b>	
<a href="https://ilizone.iul.ac.in/">https://ilizone.iul.ac.in/</a>	
<a href="https://youtu.be/26pvB8YpTIE">https://youtu.be/26pvB8YpTIE</a>	
<a href="https://youtube.com/playlist?list=PLDN15nk5uLiAyM7MbRBF1eIFC8y5vMRxI">https://youtube.com/playlist?list=PLDN15nk5uLiAyM7MbRBF1eIFC8y5vMRxI</a>	

Course Articulation Matrix: (Mapping of Cos with Pos and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	1	1	1	1	1	1	1	1	1	1	1	3	3	2	1	1	2	1
CO2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	3	3	2	1	1	2	2

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**



## Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	AE-113	<b>Title of the Course</b>	Engineering Drawing	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>I</b>	<b>Semester</b>	<b>I</b>	<b>0</b>		<b>2</b>	
<b>Course Objectives</b>	<p>To educate the students about drawing scales, orthographic projections and drawing of points, lines, planes and solids.</p> <p>To educate the students about sections of solids, interpenetration of solid surfaces and development of surfaces.</p> <p>To educate the students about Isometric projections and drawing of missing views.</p> <p>To teach the students about preparation of working drawing from models.</p> <p>TO understanding different methods of dimensioning.</p>						

<b>Course Outcomes</b>	
<b>CO1</b>	To educate the students about drawing scales, orthographic projections and drawing of points, lines, planes and solids.
<b>CO2</b>	To educate the students about sections of solids, interpenetration of solid surfaces and development of surfaces.
<b>CO3</b>	To educate the students about Isometric projections and drawing of missing views.
<b>CO4</b>	To teach the students about preparation of working drawing from models.
<b>CO5</b>	Understanding different methods of dimensioning.
<b>CO6</b>	Understanding the concept of sectioning, revolved and oblique sections.
<b>CO7</b>	To educate the students about sectional drawing of simple machine parts.
<b>CO8</b>	Types of rivets, welds, and their joints.
<b>CO9</b>	Learning symbols for different welded joints.
<b>CO10</b>	To educate the students about types of threads, bolts, nuts, screws, foundation bolts, etc.

Experiment No.	Title of the Experiment	Content of Experiment	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Introduction of drawing scales; First and third angle methods of projection. Principles of orthographic projections; References planes; Points and lines in space and traces of lines and planes; Auxiliary planes and true shapes of oblique plain surface; True length and inclination of lines;	10	1,2
2	<b>Unit-2</b>	Projections of solids (Change of position method, alteration of ground lines); Section of solids and Interpenetration of solid surfaces; Development of surfaces of geometrical solids;	10	3
3	<b>Unit-3</b>	Isometric projection of geometrical solids. Preparation of working drawing from models and isometric views. Drawing of missing views. Different methods of dimensioning.	10	4,5
4	<b>Unit-4</b>	Concept of sectioning. Revolved and oblique sections. Sectional drawing of simple machine parts. Types of rivet heads and riveted joints. Processes for producing leak proof joints.	10	6
5	<b>Unit-5</b>	Symbols for different types of welded joints. Nomenclature, thread profiles, multi start threads, left and right hand threads. Square headed and hexagonal nuts and bolts. Conventional representation of threads.	10	7,8
6	<b>Unit-6</b>	Different types of lock nuts, studs, machine screws, cap screws and wood screws. Foundation bolts. Forms of screw threads, representation of threads, Bolts- headed centre, stud screws, set screws, butt, hexagonal and square; keys-types, taper, rank taper, hollow saddle etc.	10	9,10

<b>Reference Books:</b>	
Bhat N D. 2010. Elementary Engineering Drawing. Charotar Publishing House Pvt. Ltd., Anand.	
Bhatt N D and Panchal V M. 2013. Machine Drawing. Charotar Publishing House Pvt. Ltd., Anand.	
Narayana K L and Kanniah P. 2010. Machine Drawing. Scitech Publications (India) Pvt. Ltd., Chennai.	
Bhat N D. 2010. Elementary Engineering Drawing. Charotar Publishing House Pvt. Ltd., Anand.	
<b>e-Learning Source:</b>	
<a href="https://ilizone.iul.ac.in/">https://ilizone.iul.ac.in/</a>	
<a href="https://youtu.be/rp3swbAYZJU">https://youtu.be/rp3swbAYZJU</a>	
<a href="https://youtu.be/K_2uJpKcV0Y">https://youtu.be/K_2uJpKcV0Y</a>	
<a href="https://youtu.be/YMS8TI34sTU">https://youtu.be/YMS8TI34sTU</a>	

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	3
CO2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1
CO3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	2	2
CO4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2
CO5	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2
CO6	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2
CO7	3	3	3	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	2	2
CO8	3	3	3	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	2	1
CO9	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2
CO10	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**



# Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	ME111	<b>Title of the Course</b>	Heat and Mass Transfer	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	I	<b>Semester</b>	I	2		0	
<b>Course Objectives</b>	The students will be able to gain knowledge regarding the Heat, conductivity and mass transfer						

Course Outcomes	
<b>CO1</b>	Formulate and predict heat conduction problems with and without heat generation in composite walls, critical insulation thickness and extended surfaces subjected to convective boundaries. Analyze 1D steady conduction problems.
<b>CO2</b>	Explain the concept of free convection mechanics, dimensionless number and introduction to the empirical correlation.
<b>CO3</b>	Explain the concept of radiation, monochromatic emissive power, total radiations, intensity of radiation and heat exchange between two black surfaces
<b>CO4</b>	Calculate fluid temperatures, mass flow rates and heat exchange during parallel and counter in heat exchangers.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-1</b>	Concept, modes of heat transfer, thermal conductivity of materials, measurement. General differential equation of conduction. One dimensional steady state conduction through plane and composite walls, tubes and spheres with and without heat generation.	08	1
2	<b>Unit-2</b>	Electrical analogy. Insulation materials. Fins, Free and forced convection. Newton's law of cooling, heat transfer coefficient in convection. Dimensional analysis of free and forced convection. Useful non dimensional numbers. Equation of laminar boundary layer on flat plate and in a tube. Laminar forced convection on a flat plate and in a tube. Combined free and forced convection.	11	2
3	<b>Unit-3</b>	Introduction. Absorptivity, reflectivity and transmissivity of radiation. Black body and monochromatic radiation, Planck's law, Stefan- Boltzman law, Kirchoff's law, grey bodies and emissive power, solid angle, intensity of radiation. Radiation exchange between black surfaces, geometric configuration factor.	10	3
4	<b>Unit-4</b>	Heat transfer analysis involving conduction, convection and radiation by networks. Types of heat exchangers, fouling factor, log mean temperature difference, heat exchanger performance, transfer units. Heat exchanger analysis restricted to parallel and counter flow heat exchangers. Steady state molecular diffusion in fluids at rest and in laminar flow, Flick's law, mass transfer coefficients. Reynold's analogy.	11	4

<b>Reference Books:</b>	
Geankoplis C.J. 1978. Transport Port Processes and Unit Operations. Allyn and Bacon Inc., Newton, Massachusetts.	
Holman J.P. 1989. Heat Transfer. McGraw Hill Book Co., New Delhi.	
Incropera F.P. and De Witt D.P. 1980. Fundamentals of Heat and Mass Transfer. John Wiley and Sons, New York.	
Gupta C.P. and Prakash R. 1994. Engineering Heat Transfer. Nem Chand and Bros., Roorkee.	
<b>e-Learning Source:</b>	
<a href="https://ilizone.iul.ac.in/">https://ilizone.iul.ac.in/</a>	
<a href="https://youtu.be/4UegAJ1JBXI">https://youtu.be/4UegAJ1JBXI</a>	
<a href="https://youtu.be/xOmzVrmEWys">https://youtu.be/xOmzVrmEWys</a>	
<a href="https://youtu.be/zE2RW-5dHAM">https://youtu.be/zE2RW-5dHAM</a>	

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
<b>CO1</b>	2	3	3	1	1	1	1	2	1	2	1	3	1	3	3	3	3	1	1	2	1
<b>CO2</b>	3	3	2	1	1	2	1	1	1	3	1	3	1	3	3	2	2	1	1	1	1
<b>CO3</b>	3	3	2	1	2	2	1	1	1	3	2	3	1	3	3	2	2	1	1	1	1
<b>CO4</b>	3	3	3	1	1	1	2	2	1	3	2	3	1	3	2	3	2	1	1	1	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

Effective from Session: 2018-19													
Course Code	MT134	Title of the Course	Mathematics in Agricultural Engineering -II			L	2	T	0	P	1	C	
Year	I	Semester	II										
<b>Course Objectives</b>	1. To provide the knowledge about Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation												
	2. To provide the knowledge about Differential equations of higher orders, methods of finding complementary functions and particular integrals, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients, series solution techniques, Bessel's and Legendre's differential equations.												
	3. To educate the students about Functions of a Complex variable: Limit, continuity and analytic function, Cauchy-Riemann equations, Harmonic functions. Infinite series and its convergence, periodic functions, Fourier series, Euler's formulae, Dirichlet's conditions, functions having arbitrary period, even and odd functions, half range series, Harmonic analysis												
	4. To aware the students about the Fourier Sine and Cosine Series, Fourier series for function having period 2L, Elimination of one and two arbitrary function.												
	5. To provide Knowledge regarding Partial differential equations: Formation of partial differential equations Higher order linear partial differential equations with constant coefficients, solution of non-linear partial differential equations, Charpit's method, and application of partial differential equations (one dimensional wave and heat flow equations, Laplace Equation.												
<b>Course Outcomes</b>													
<b>CO1</b>	Students able to provide the knowledge about Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation												
<b>CO2</b>	Able to know about provide the knowledge about about Differential equations of higher orders, methods of finding complementary functions and particular integrals, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients, series solution techniques, Bessel's and Legendre's differential equations.												
<b>CO3</b>	Students able to provide the knowledge about Functions of a Complex variable: Limit, continuity and analytic function, Cauchy-Riemann equations, Harmonic functions. Infinite series and its convergence, periodic functions, Fourier series, Euler's formulae, Dirichlet's conditions, functions having arbitrary period, even and odd functions, half range series, Harmonic analysis												
<b>CO4</b>	Able to know about about the the Fourier Sine and Cosine Series, Fourier series for function having period 2L, Elimination of one and two arbitrary function.												
<b>CO5</b>	Students able to understand the basic Knowledge regarding partial differential equations: Formation of partial differential equations Higher order linear partial differential equations with constant coefficients, solution of non-linear partial differential equations, Charpit's method, and application of partial differential equations (one dimensional wave and heat flow equations, Laplace Equation												
Unit No.	Title of the Unit	Content of Unit									Contact Hrs.	Mapped CO	
1	<b>Unit-I</b>	Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation									5	CO 1	
2	<b>Unit-II</b>	Differential equations of higher orders, methods of finding complementary functions and particular integrals, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients, series solution techniques, Bessel's and Legendre's differential equations.									6	CO 2,3	
3	<b>Unit-III</b>	Functions of a Complex variable: Limit, continuity and analytic function, Cauchy-Riemann equations, Harmonic functions. Infinite series and its convergence, periodic functions, Fourier series, Euler's formulae, Dirichlet's conditions, functions having arbitrary period, even and odd functions, half range series, Harmonic analysis									7	CO 3	
4	<b>Unit-IV</b>	Fourier Sine and Cosine Series, Fourier series for function having period 2L, Elimination of one and two arbitrary function. Partial differential equations: Formation of partial differential equations Higher order linear partial differential equations with constant coefficients, solution of non-linear partial differential equations, Charpit's method, and application of partial differential equations (one dimensional wave and heat flow equations), Laplace Equation									7	CO 4,5	
5	<b>Unit-V</b>	Tutorials on solution of ordinary differential equations of first and higher orders. Series solutions of differential equations. Bessel's and Legendre's differential equations, Convergence of infinite series. Fourier series, harmonic analysis, analytical functions, Cauchy-Riemann equations, harmonic functions, Solution of partial differential equations, Application of partial differential equations.									7	CO 5	
<b>Practical:</b>													
Tutorials on solution of ordinary differential equations of first and higher orders. Series solutions of differential equations. Bessel's and Legendre's differential equations, Convergence of infinite series. Fourier series, harmonic analysis, analytical functions, Cauchy-Riemann equations, harmonic functions, Solution of partial differential equations, Application of partial differential equations.													
<b>Reference Books:</b>													
1. Ramana B V. 2008. Engineering Mathematics. Tata McGraw-Hill. New Delhi.													
2. Narayan Shanti. 2004. Differential Calculus. S. Chand and Co. Ltd. New Delhi.													
3. Narayan Shanti. 2004. Integral Calculus. S. Chand and Co. Ltd. New Delhi.													
4. Grewal B S. 2004. Higher Engineering Mathematics. Khanna Publishers Delhi.													
<b>e-Learning Source:</b>													
<a href="https://ilizone.in">https://ilizone.in</a>													
<a href="https://youtu.be/Bol_ej-T0V4">https://youtu.be/Bol_ej-T0V4</a>													
<a href="http://ecoursesonline.iasri.res.in/">http://ecoursesonline.iasri.res.in/</a>													

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
<b>CO1</b>	3	3	3	1	1	1	3	1	1	1	3	2	1	3	1	2	2	3	3	3	3
<b>CO2</b>	3	3	3	1	1	1	2	1	1	1	2	3	1	3	1	2	3	3	3	2	2
<b>CO3</b>	3	3	2	1	1	1	3	1	1	1	2	3	1	3	1	2	2	3	3	2	2
<b>CO4</b>	3	3	3	1	2	1	2	1	1	1	2	3	1	3	1	2	3	2	3	3	2
<b>CO5</b>	3	3	2	1	2	1	3	1	1	1	2	3	1	3	1	2	2	3	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

Effective from Session: 2018-19						
Course Code	ES124	Title of the Course	Environmental Science and Disaster Management	L	T	P
Year	1	Semester	II	2	0	1
<b>Course Objectives</b>	<p>1. To provide the knowledge about Environmental Studies: Scope and importance. Natural Resources: Renewable and nonrenewable resources Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.</p> <p>b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.</p> <p>c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p>e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.</p> <p>f) Land resources: Land as a resource, land degradation, man induced landslides</p> <p>2. To provide the knowledge about Soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Ecosystems: Concept, Structure, function, Producers, consumers, decomposers, Energy flow, ecological succession, food chains, food webs, ecological pyramids. Introduction, types, characteristic features, structure and function of the forest, grassland, desert and aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</p> <p>3. To educate the students about Biodiversity and its conservation: - Introduction, definition, genetic, species &amp; ecosystem diversity and bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity</p> <p>4. To provide Knowledge regarding Environmental Pollution: definition, cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Social Issues and the Environment from Unsustainable development, Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.</p> <p>5. To provide the knowledge about Disaster Management: Natural Disasters and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters-Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations</p>					

Course Outcomes	
<b>CO1</b>	Students able to know about Environmental Studies: Scope and importance. Natural Resources: Renewable and nonrenewable resources Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides
<b>CO2</b>	Able to know about the Soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Ecosystems: Concept, Structure, function, Producers, consumers, decomposers, Energy flow, ecological succession, food chains, food webs, ecological pyramids. Introduction, types, characteristic features, structure and function of the forest, grassland, desert and aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
<b>CO3</b>	Students able to Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity
<b>CO4</b>	Able to know about about Environmental Pollution: definition, cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Social Issues and the Environment from Unsustainable development, Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.
<b>CO5</b>	Students able to understand the basic Knowledge regarding Disaster Management: Natural Disasters and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters-Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	Environmental Studies: Scope and importance. Natural Resources: Renewable and nonrenewable resources Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides.	7	CO 1,2
2	<b>Unit-II,</b>	Soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Ecosystems: Concept, Structure, function, Producers, consumers, decomposers, Energy flow, ecological succession, food chains, food webs, ecological pyramids. Introduction, types, characteristic features, structure and function of the forest, grassland, desert and aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).	6	CO 2

3	<b>Unit-III</b>	Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	7	CO 2,3
4	<b>Unit-IV</b>	Environmental Pollution: definition, cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Social Issues and the Environment from Unsustainable to Sustainable development, Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. des. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health	9	CO 4,5
5	<b>Unit-V.</b>	Disaster Management: Natural Disasters and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations	8	CO 5

**Practical:** To Case Studies and Field work. Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc. Expected impact of climate change on agricultural production and water resources, Mitigation Strategies, Economics of climate change. Disaster Management introduction, Natural and Manmade Disaster Studies, Informatics for Disaster Management, Quantitative Techniques for Disaster Management Environmental Impact Assessment (EIA) and Disaster Management Disaster Management Policy Environmental Modelling.

**Reference Books:**

1. Bharucha Erach. 2005. Text Book of Environmental Studies for Undergraduate Courses.
2. Sharma J P. 2003. Introduction to Environment Science. Lakshmi Publications.
3. Chary Manohar and Jaya Ram Reddy. 2004. Principles of Environmental Studies. BSPublishers, Hyderabad.
4. Kaul S N, Ashuthosh Gautam. 2002. Water and Waste Water Analysis. Days PublishingHouse, Delhi.

**e-Learning Source:**

<https://ilizone.in>

<https://youtu.be/z8VDdZxEG2M>

<http://ecoursesonline.iasri.res.in/>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	1	1	1	1	1	2	3	3	2	1	2	1	2	2	3	3	3	3
CO2	3	3	3	1	1	1	1	1	2	3	2	3	1	3	1	2	3	3	2	3	3
CO3	3	2	2	1	1	1	1	1	2	3	2	3	1	3	1	2	2	3	3	3	3
CO4	3	3	3	1	1	1	1	1	2	3	2	3	1	3	1	2	3	3	3	4	3
CO5	3	3	2	1	1	1	1	1	2	3	2	3	1	3	1	2	2	3	3	3	3

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

Effective from Session: 2018-19							
Course Code	BMI26	Title of the Course	Entrepreneurship Development and Business Management	L	2	T	0
Year	I	Semester	II	P	1	C	
Pre-Requisite		Co-requisite					
<b>Course Objectives</b>	<p>1. To provide the knowledge about Entrepreneurship, management – Management functions – planning- Organizing –Directing motivation – ordering – leading –supervision-Communication and control – Capital – Financial management –importance of financial statements – balance sheet – profit and loss statement</p> <p>2. To provide the knowledge about Analysis of financial statements – liquidity ratios– leverage ratios, Coverage ratios – turnover ratios – profitability ratios, Agro-based industries – Project – project cycle – Project appraisal and evaluation techniques – undiscounted measures – payback period – proceeds per rupee of outlay, Discounted measures – Net Present Value (NPV) – Benefit-Cost Ratio (BCR) – Internal Rate of Return (IRR) Net benefit investment ratio (N / K ratio) – sensitivity analysis-Importance of agribusiness in Indian economy international trade-WTO agreements – Provisions related to agreements in agricultural and food commodities. Agreements on agriculture (AOA).</p> <p>3. To educate the students about Domestic supply, market access, export subsidies agreements on sanitary and phyto-sanitary (SPS) measures, Trade related intellectual property rights (TRIPS). Development (ED): Concept of entrepreneur and entrepreneurship Assessing overall business environment in Indian economy Entrepreneurial and managerial characteristics</p> <p>4. To provide Knowledge regarding Entrepreneurship development Programmes (EDP) Generation incubation and commercialization of ideas and innovations- Motivation and entrepreneurship development- Globalization and the emerging business entrepreneurial environment- Managing an enterprise: Importance of planning, budgeting, monitoring evaluation and follow-up managing competition. Role of ED in economic development of a country- Overview of Indian social, political systems and their implications for decision making by individual entrepreneurs- Economic system and its implications for decision making by individual entrepreneurs- Social responsibility of business. Morals and ethics in enterprise management- SWOT analysis.</p> <p>5. To provide the knowledge about Government schemes and incentives for promotion of entrepreneurship. Government policy on small and medium enterprises (SMEs)/SSIs/MSME sectors- Venture capital (VC), contract farming (CF) and joint ventures (JV), public-private partnerships (PPP) - Overview of agricultural engineering industry, characteristics of Indian farm machinery industry</p>						

Course Outcomes	
<b>CO1</b>	Students able to know Entrepreneurship, management – Management functions – planning- Organizing –Directing motivation – ordering – leading – supervision-Communication and control – Capital – Financial management – importance of financial statements – balance sheet – profit and loss statement
<b>CO2</b>	Able to know about the Analysis of financial statements – liquidity ratios – leverage ratios, Coverage ratios – turnover ratios – profitability ratios, Agro-based industries – Project – project cycle – Project appraisal and evaluation techniques – undiscounted measures – payback period – proceeds per rupee of outlay, Discounted measures – Net Present Value (NPV) – Benefit-Cost Ratio (BCR) – Internal Rate of Return (IRR) Net benefit investment ratio (N / K ratio) – sensitivity analysis-Importance of agribusiness in Indian economy International trade-WTO agreements – Provisions related to agreements in agricultural and food commodities. Agreements on agriculture (AOA).
<b>CO3</b>	Students able to know the Domestic supply, market access, export subsidies agreements on sanitary and phyto-sanitary (SPS) measures, Trade related intellectual property rights (TRIPS). Development (ED): Concept of entrepreneur and entrepreneurship Assessing overall business environment in Indian economy Entrepreneurial and managerial characteristics
<b>CO4</b>	Able to know about Entrepreneurship development Programmes (EDP) Generation incubation and commercialization of ideas and innovations- Motivation and entrepreneurship development- Globalization and the emerging business entrepreneurial environment- Managing an enterprise: Importance of planning, budgeting, monitoring evaluation and follow-up managing competition. Role of ED in economic development of a country- Overview of Indian social, political systems and their implications for decision making by individual entrepreneurs- Economic system and its implications for decision making by individual entrepreneurs- Social responsibility of business. Morals and ethics in enterprise management- SWOT analysis.
<b>CO5</b>	Students able to understand the basic Knowledge regarding Government schemes and incentives for promotion of entrepreneurship. Government policy on small and medium enterprises (SMEs)/SSIs/MSME sectors- Venture capital (VC), contract farming (CF) and joint ventures (JV), public-private partnerships (PPP) - Overview of agricultural engineering industry, characteristics of Indian farm machinery industry

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	To provide the knowledge about Entrepreneurship, management – Management functions – planning- Organizing – Directing motivation – ordering – leading – supervision-Communication and control – Capital – Financial management – importance of financial statements – balance sheet – profit and loss statement	5	CO 1
2	<b>Unit-II,</b>	To provide the knowledge about Analysis of financial statements – liquidity ratios – leverage ratios, Coverage ratios – turnover ratios – profitability ratios, Agro-based industries – Project – project cycle – Project appraisal and evaluation techniques – undiscounted measures – payback period – proceeds per rupee of outlay, Discounted measures – Net Present Value (NPV) – Benefit-Cost Ratio (BCR) – Internal Rate of Return (IRR) Net benefit investment ratio (N / K ratio) – sensitivity analysis-Importance of agribusiness in Indian economy International trade-WTO agreements – Provisions related to agreements in agricultural and food commodities. Agreements on agriculture (AOA).	8	CO 2,3
3	<b>Unit-III</b>	To educate the students about Domestic supply, market access, export subsidies agreements on sanitary and phyto-sanitary (SPS) measures, Trade related intellectual property rights (TRIPS). Development (ED): Concept of entrepreneur and entrepreneurship Assessing overall business environment in Indian economy Entrepreneurial and managerial characteristics	5	CO 3
4	<b>Unit-IV</b>	To provide Knowledge regarding Entrepreneurship development Programmes (EDP) Generation incubation and commercialization of ideas and innovations- Motivation and entrepreneurship development- Globalization and the emerging business entrepreneurial environment- Managing an enterprise: Importance of planning, budgeting, monitoring evaluation and follow-up managing competition. Role of ED in economic development of a country- Overview of Indian social, political systems and their implications for decision making by individual entrepreneurs- Economic system and its implications for decision making by individual entrepreneurs- Social responsibility of business. Morals and ethics in enterprise management- SWOT analysis.	9	CO 4
5	<b>Unit-V.</b>	To provide the knowledge about Government schemes and incentives for promotion of entrepreneurship. Government policy on small and medium enterprises (SMEs)/SSIs/MSME sectors- Venture capital (VC), contract farming (CF) and joint ventures (JV), public-private partnerships (PPP) - Overview of agricultural engineering industry, characteristics of Indian farm machinery industry	6	CO 5

**Practical:** Determination Preparation of business – Strengths Weaknesses Opportunities and Threats (SWOT) analysis, Analysis of financial statements (Balance Sheet, Profit loss statement). Compounding and discounting, Break-even analysis Visit to agro-based industries-I, Visit to agro-based industries-II Study of Agro-industries Development Corporation , Ratio analysis-I, Ratio analysis-II, Application of project appraisal technique-I (Undiscounted measures), Application of project appraisal technique-II(Discounted Measures), Formulation of project feasibility reports. Farm Machinery Project proposals as entrepreneur – individual and group - Presentation of project proposals in the class.

**Reference Books:**

1. Harsh, S.B., Conner, U.J. and Schwab, G.D. 1981. Management of the Farm Business. Prentice Hall Inc., New Jersey.
2. Joseph, L. Massie. 1995. Essentials of Management. Prentice Hall of India Pvt. Ltd., NewDelhi.
3. Gittenger Price, J. 1989. Economic Analysis of Agricultural Projects. John HopkinsUniversity, Press, London.
4. Thomas W Zimmer and Norman M Scarborough. 1996. Entrepreneurship. Prentice-Hall, New Jersey.

**e-Learning Source:**

<https://ilzone.in>



[https://youtu.be/\\_C2LlvX9s5w](https://youtu.be/_C2LlvX9s5w)

<http://ecoursesonline.iasri.res.in/>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	1	1	1	1	1	1	1	1	3	2	3	2	1	2	2	3	3	3	1
CO2	3	3	1	1	1	1	1	1	2	1	2	3	3	3	1	2	3	3	2	3	1
CO3	3	3	1	1	1	1	1	1	1	1	2	3	3	3	1	2	2	3	3	3	1
CO4	3	3	1	1	1	1	1	1	2	1	2	3	3	3	1	2	3	3	3	4	1
CO5	3	3	1	1	1	1	1	1	1	1	2	3	3	3	1	2	2	3	5	6	1

3- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



## Integral University, Lucknow

Effective from Session: 2018-19							
Course Code	AE106	Title of the Course	Fluid Mechanics and Open Channel Hydraulics	L	T	P	C
Year	I	Semester	II	2	0	1	
<b>Course Objectives</b>	1. To provide the knowledge about Properties of fluids: Ideal and real fluid. Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces, centre of pressure, buoyancy, Meta centre and Meta centric height, condition of floatation and stability of submerged and floating bodies 2. To provide the knowledge about Kinematics of fluid flow: Lagrangian and Eulerian description of fluid motion, continuity equation, path lines, streak lines and stream lines, stream function, velocity potential and flow net. Types of fluid flow, translation, rotation, circulation and vorticity, Vortex motion 3. To educate the students about Dynamics of fluid flow, Bernoulli's theorem, Venturi meter, orifice meter and nozzle, siphon; Laminar flow: Stress strain relationships, flow between infinite parallel plates both plates fixed, one plate moving, discharge, average velocity 4. To provide Knowledge regarding Laminar and turbulent flow in pipes, general equation for head loss Darcy, Equation, Moody's diagram, Minor and major hydraulic losses through pipes and fittings, flow through network of pipes, hydraulic gradient and energy gradient; Flow through orifices (Measurement of Discharge, Measurement of Time), Flow through Mouthpieces, Flow over Notches, Flow over weirs, Chezy's formula for loss of head in pipes 5. To provide the knowledge about Flow through simple and compound pipes, Open channel design and hydraulics: Chezy's formula, Bazin's formula, Katter's Manning's formula, Velocity and Pressure profiles in open channels, Hydraulic jump; Dimensional analysis and similitude: Rayleigh's method and Buckingham's Pi- theorem, types of similarities, dimensional analysis, dimensionless numbers. Introduction to fluid machinery						

Course Outcomes	
<b>CO1</b>	Students able to know about Properties of fluids: Ideal and real fluid. Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces, centre of pressure, buoyancy, Meta centre and Meta centric height, condition of floatation and stability of submerged and floating bodies
<b>CO2</b>	Able to know about the Kinematics of fluid flow: Lagrangian and Eulerian description of fluid motion, continuity equation, path lines, streak lines and stream lines, stream function, velocity potential and flow net. Types of fluid flow, translation, rotation, circulation and vorticity, Vortex motion
<b>CO3</b>	Students able to know the dynamics of fluid flow, Bernoulli's theorem, venturimeter, orifice meter and nozzle, siphon; Laminar flow: Stress strain relationships, flow between infinite parallel plates both plates fixed, one plate moving, discharge, average velocity
<b>CO4</b>	Able to know about Laminar and turbulent flow in pipes, general equation for head loss Darcy, Equation, Moody's diagram, Minor and major hydraulic losses through pipes and fittings, flow through network of pipes, hydraulic gradient and energy gradient; Flow through orifices (Measurement of Discharge, Measurement of Time), Flow through Mouthpieces, Flow over Notches, Flow over weirs, Chezy's formula for loss of head in pipes
<b>CO5</b>	Students able to understand the basic Knowledge regarding Flow through simple and compound pipes, Open channel design and hydraulics: Chezy's formula, Bazin's formula, Katter's Manning's formula, Velocity and Pressure profiles in open channels, Hydraulic jump; Dimensional analysis and similitude: Rayleigh's method and Buckingham's Pi-theorem, types of similarities, dimensional analysis, dimensionless numbers. Introduction to fluid machinery

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	To provide the knowledge about Properties of fluids: Ideal and real fluid. Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces, centre of pressure, buoyancy, Meta centre and Meta centric height, condition of floatation and stability of submerged and floating bodies	7	CO 1,2
2	<b>Unit-II,</b>	To provide the knowledge about Kinematics of fluid flow: Lagrangian and Eulerian description of fluid motion, continuity equation, path lines, streak lines and stream lines, stream function, velocity potential and flow net. Types of fluid flow, translation, rotation, circulation and vorticity, Vortex motion	6	CO 2
3	<b>Unit-III</b>	To educate the students about Dynamics of fluid flow, Bernoulli's theorem, venturimeter, orifice meter and nozzle, siphon; Laminar flow: Stress strain relationships, flow between infinite parallel plates both plates fixed, one plate moving, discharge, average velocity	7	CO 3,4
4	<b>Unit-IV</b>	To provide Knowledge regarding Laminar and turbulent flow in pipes, general equation for head loss Darcy, Equation, Moody's diagram, Minor and major hydraulic losses through pipes and fittings, flow through network of pipes, hydraulic gradient and energy gradient; Flow through orifices (Measurement of Discharge, Measurement of Time), Flow through Mouthpieces, Flow over Notches, Flow over weirs, Chezy's formula for loss of head in pipes	9	CO 4
5	<b>Unit-V.</b>	To provide the knowledge about Flow through simple and compound pipes, Open channel design and hydraulics: Chezy's formula, Bazin's formula, Katter's Manning's formula, Velocity and Pressure profiles in open channels, Hydraulic jump; Dimensional analysis and similitude: Rayleigh's method and Buckingham's Pi-theorem, types of similarities, dimensional analysis, dimensionless numbers. Introduction to fluid machinery	8	CO 5

**Practical:** Study of manometers and pressure gauges; Verification of Bernoulli's theorem; Determination of coefficient of discharge of venturi-meter and orifice meter; Determination of coefficient of friction in the pipeline; Determination of coefficient of discharge for rectangular and triangular notch; Determination of coefficient of discharge, coefficient of velocity and coefficient of contraction for flow through orifice; Determination of coefficient of discharge for mouthpiece; Measurement of force exerted by water jets on flat and hemispherical vanes; Determination of meta-centric height; Determination of efficiency of hydraulic ram; Performance evaluation of Pelton and Francis turbine; Study of current meter; Velocity distribution in open channels and determination of Manning's coefficient of rugosity.

**Reference Books:**

1. Khurmi, R .S. 1970. A Text Book of Hydraulics, Fluid Mechanics and Hydraulic Machines S. Chand & Company Limited, New Delhi.
2. Modi P M and Seth S.M.1973. Hydraulics and Fluid Mechanics. Standard Book House, Delhi.
3. Chow V T 1983. Open Channel Hydraulics. McGraw Hill Book Co., New Delhi.
4. Lal Jagadish 1985. Fluid Mechanics and Hydraulics. Metropolitan Book Co. Pvt. Ltd., New Delhi.

**e-Learning Source:**

- <https://ilizone.in>
- <https://youtu.be/2Puu0Qp0nz0>
- <http://ecoursesonline.iasri.res.in/>

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Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	1	2	3	1	1	1	3	3	2	1	2	1	2	2	3	3	3	1
CO2	3	3	3	1	1	3	1	1	2	3	2	3	1	3	1	2	3	3	2	3	1
CO3	3	3	2	1	1	2	1	1	1	3	2	3	1	3	1	2	2	3	3	3	1
CO4	3	3	3	1	2	3	1	1	2	2	2	3	1	3	1	2	3	3	3	3	1
CO5	3	3	2	1	2	3	1	1	1	2	2	3	1	3	1	2	2	3	5	3	1

4- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
Course Code	AE107	Title of the Course	Strength of Materials	L	T	P	C
Year		Semester	II	1	0	1	
Course Objectives	<ol style="list-style-type: none"> <li>1. To educate the students such that they will be able to analyze the structure and calculate the slope and deflection at various points in the structure using different methods.</li> <li>2. Understanding the analysis and design of columns, riveted and welded connections, masonry dams and analysis of statically indeterminate beams.</li> <li>3. To educate the students in a manner such that they will be able to analyze the fixed and continuous beams using various methods.</li> </ol>						

Course Outcomes	
CO1	Learner will be able to analyze the structure and determine slope and deflections in the structure using various methods learned.
CO2	Utilizing the knowledge of this topic and the mathematical skills, learner will be able to classify, analyze and design the columns, riveted and welded connections, masonry dams and statically indeterminate beams.
CO3	Learner will be able to analyze the fixed and continuous beams using various methods
CO4	
CO5	

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Unit-I	Slope and deflection of beams using integration techniques, moment area theorems, and conjugate beam method.	5	CO 1
2	Unit-II,	Columns and Struts. Riveted and welded connections. Stability of masonry dams.	5	CO 2
3	Unit-III	Analysis of statically intermediate beams. Propped beams. Fixed and continuous beam analysis using superposition three-moment equation and moment distribution methods.	7	CO 3

**Practical:** To perform the tension test on metal specimen (M.S., C.I.), to observe the behaviour of materials under load, to calculate the value of E, ultimate stress, permissible stress, percentage elongation etc. and to study its fracture; To perform the compression test on: Concrete cylinders & cubes, C.I., M.S. & Wood specimens and to determine various physical and mechanical properties; To perform the bending test on the specimens; M.S. Girder, Wooden beam, Plain concrete beams & R.C.C. beam, and to determine the various physical and mechanical properties; To determine Young's modulus of elasticity of beam with the help of deflection produced at centre due to loads placed at centre & quarter points; To study the behaviour of materials (G.I. pipes, M.S., C.I.) under torsion and to evaluate various elastic constants; To study load deflection and other physical properties of closely coiled helical spring in tension and compression; To perform the Rockwell, Vicker's and Brinell's Hardness tests on the given specimens; To perform the Drop Hammer Test, Izod Test and Charpy's impact tests on the given specimens; To determine compressive & tensile strength of cement after making cubes and briquettes; To measure workability of concrete (slump test, compaction factor test); To determine voids ratio & bulk density of cement, fine aggregates and coarse aggregates; To determine fatigue strength of a given specimen; To write detail report emphasizing engineering importance of performing tension, compression, bending, torsion, impact and hardness tests on the materials.

**Reference Books:**

1. Khurmi R.S. 2001. Strength of Materials S. Chand & Co., Ltd., New Delhi.
2. Junarkar S.B. 2001. Mechanics of Structures (Vo-I). Choratar Publishing House, Anand.
3. Ramamrutham S. 2003. Strengths of Materials. Dhanpat Rai and Sons, Nai Sarak, New Delhi.

**e-Learning Source:**

<https://ilizone.in>

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<http://ecoursesonline.iasri.res.in/>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																				
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO1	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3
CO2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	2	3	3	2	3
CO3	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3
CO4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
CO5	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2

5- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
<b>Course Code</b>	<b>ME 107</b>	<b>Title of the Course</b>	<b>Workshop Technology and Practice</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>I</b>	<b>Semester</b>	<b>II</b>	<b>1</b>	<b>0</b>	<b>2</b>	
<b>Pre-Requisite</b>		<b>Co-requisite</b>					
<b>Course Objectives</b>	1. To provide the knowledge about Introduction to various carpentry tools, materials, types of wood and their characteristics and Processes or operations in wood working; Introduction to Smithy tools and operations 2. To provide the knowledge about Introduction to welding, types of welding, oxyacetylene gas welding, types of flames, welding techniques and equipment. Principle of arc welding, equipment and tools. Casting processes; Classification, constructional details of center lathe, Main accessories and attachments. Main operations and tools used on center lathes. 3. To educate the students about Types of shapers, Constructional details of standard shaper. Work holding devices, shaper tools and main operations. Types of drilling machines. Constructional details of pillar types and radial drilling machines 4. To provide Knowledge regarding Work holding and tool holding devices. Main operations. Twist drills, drill angles and sizes. 5. To provide the knowledge about Types and classification. Constructional details and principles of operation of column and knee type universal milling machines. Plain milling cutter. Main operations on milling machine						

Course Outcomes	
<b>CO1</b>	Students able to know about Introduction to various carpentry tools, materials, types of wood and their characteristics and Processes or operations in wood working; Introduction to Smithy tools and operations
<b>CO2</b>	Able to know about the Introduction to welding, types of welding, oxyacetylene gas welding, types of flames, welding techniques and equipment. Principle of arc welding, equipment and tools. Casting processes; Classification, constructional details of center lathe, Main accessories and attachments. Main operations and tools used on center lathes
<b>CO3</b>	Students able to know the Types of shapers, Constructional details of standard shaper. Work holding devices, shaper tools and main operations. Types of drilling machines. Constructional details of pillar types and radial drilling machines
<b>CO4</b>	Able to know about Work holding and tool holding devices. Main operations. Twist drills, drill angles and sizes
<b>CO5</b>	Students able to understand the basic Knowledge regarding Types and classification. Constructional details and principles of operation of column and knee type universal milling machines. Plain milling cutter. Main operations on milling machine

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	Introduction to various carpentry tools, materials, types of wood and their characteristics and Processes or operations in wood working; Introduction to Smithy tools and operations.	4	CO 1
2	<b>Unit-II,</b>	Introduction to welding, types of welding, oxyacetylene gas welding, types of flames, welding techniques and equipment. Principle of arc welding, equipment and tools. Casting processes; Classification, constructional details of center lathe, Main accessories and attachments. Main operations and tools used on center lathes.	4	CO 2,3
3	<b>Unit-III</b>	Types of shapers, Constructional details of standard shaper. Work holding devices, shaper tools and main operations. Types of drilling machines. Constructional details of pillar types and radial drilling machines	4	CO 3
4	<b>Unit-IV</b>	Able to know about Work holding and tool holding device's Main operations. Twist drills, drill angles and sizes	3	CO 4
5	<b>Unit-V.</b>	Work holding and tool holding devices. Main operations. Twist drills, drill angles and sizes. Types and classification. Constructional details and principles of operation of column and knee type universal milling machines. Plain milling cutter. Main operations on milling machine.	3	CO 5

**Practical:** Preparation of simple joints: Cross half Lap joint and T-Halving joint; Preparation of Dovetail joint, Mortise and tenon joint; Jobs on Bending, shaping etc.; Jobs on Drawing, Punching, Riveting. Introduction to tools and measuring instruments for fitting; Jobs on sawing, filing and right angle fitting of MS Flat; Practical in more complex fitting job; Operations of drilling, reaming, and threading with tap and dies; Introduction to tools and operations in sheet metal work; Making different types of sheet metal joints using G.I. sheets. Introduction to welding equipment, processes tools, their use and precautions; Jobs on ARC welding – Lap joint, butt joint; T-Joint and corner joint in Arc welding; Gas welding Practice – Lab, butt and T-Joints; Introduction to metal casting equipment, tools and their use; Mould making using one-piece pattern and two pieces pattern; Demonstration of mould making using sweep pattern, and match plate patterns; Introduction to machine shop machines and tools; Demonstration on Processes in machining and use of measuring instruments; Practical jobs on simple turning, step turning; Practical job on taper turning, drilling and threading; Operations on shaper and planer, changing a round MS rod into square section on a shaper; Demonstration of important operations on a milling machine, making a plot, gear tooth forming and indexing; Any additional job.

**Reference Books:**

- Hazra, Choudari S K and Bose S K. 1982. Elements of Workshop technology (Vol. I and II). Media Promoters and Publishers Pvt. Ltd., Mumbai.
- Raghuwamsi B S. 1996. A Course in Workshop Technology (Vol. I and II). Dhanpat Rai and Sons, 1682 Nai Darak, New Delhi.
- Chapman W A J. 1989. Workshop Technology (Part I and II). Arnold Publishers (India) Pvt. Ltd., AB/9 Safdarjung Enclave, New Delhi.

**e-Learning Source:**

<https://ilizone.in>

<https://youtu.be/lyRtPFJj8vI>

<http://ecoursesonline.iasri.res.in/>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																				
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
<b>CO1</b>	3	3	3	1	2	3	3	1	1	3	3	2	1	2	1	2	2	3	3	3
<b>CO2</b>	3	3	3	1	1	3	2	1	2	3	2	3	1	3	1	2	3	3	2	3
<b>CO3</b>	3	3	2	1	1	2	3	1	1	3	2	3	1	3	1	2	2	3	3	3
<b>CO4</b>	3	3	1	1	2	3	2	1	2	3	3	3	1	3	1	2	3	3	3	3
<b>CO5</b>	3	3	1	1	2	3	3	1	1	3	3	3	1	3	1	2	2	3	5	3

6- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



## Integral University, Lucknow

<b>Effective from Session: 2022-23</b>							
<b>Course Code</b>	ME108	<b>Title of the Course</b>	Theory of Machines in Agriculture	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	2018-19	<b>Semester</b>	II	2		0	
<b>Course Objectives</b>	1. To impart understanding of different types of Mechanisms and its inversion. 2. To analyze the velocity and acceleration of planar mechanisms. 3. To synthesize planar mechanisms based on motion requirements. 4. Understanding of gear drives and analysis of gear trains. 5. Understanding of governors and static and dynamic balancing						

Course Outcomes	
<b>CO1</b>	Ability to identify and analyze the mechanisms required for a particular motion requirement.
<b>CO2</b>	Capability to analyze and synthesize the velocity and acceleration of planar mechanisms.
<b>CO3</b>	Know about gears like helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains. Ability to understand the suitability of different gear drives for motion/power transmission and to analyze different types of gear trains.
<b>CO4</b>	Identify different types of governors and their applications
<b>CO5</b>	Ability to understand the static and dynamic balancing, Balancing of rotating masses in one and different planes, Partial primary balancing of reciprocating masses

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	Basic Elements, links, pairs, kinematics chain, and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chain, slider crank chain and their inversions. Determination of velocity and acceleration using graphical (relative velocity and acceleration) method. Instantaneous centers.	5	CO 1,2
2	<b>Unit-II</b>	Types of gears. Law of gearing, velocity of sliding between two teeth in mesh. Involute and cycloidal profile for gear teeth. Spur gear, nomenclature, interference and undercutting. Introduction to helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains.	6	CO 2
3	<b>Unit-III</b>	Determining velocity ratio by tabular method. Turning moment diagrams, coefficient of fluctuation of speed and energy, weight of flywheel, flywheel applications. Belt drives, types of drives, belt materials. Length of belt, power transmitted, velocity ratio, belt size for flat and V belts. Effect of centrifugal tension, creep and slip on power transmission.	7	CO 3
4	<b>Unit-IV</b>	Chain drives. Types of friction, laws of dry friction. Friction of pivots and collars. Single disc, multiple disc, and cone clutches. Rolling friction, anti-friction bearings. Types of governors. Constructional details and analysis of Watt, Porter, Proell governors.	7	CO 4
5	<b>Unit-V</b>	Effect of friction, controlling force curves. Sensitiveness, stability, hunting, isochronism, power and effort of a governor. Static and dynamic balancing. Balancing of rotating masses in one and different planes.	7	CO 5

**Reference Books:**

4. Bevan Thomas. 1984. Theory of Machines. CBS Publishers and Distributors, Delhi.
5. Ballaney P L. 1985. Theory of Machines. Khanna Publishers, 2-B Nath Market, Nai Sarak, New Delhi.
6. Rao J S and Dukkippatti R V. 1990. Mechanisms and Machine Theory. Wiley astern Ltd., New Delhi.
7. Lal Jagdish. 1991. Theory of Mechanisms and Machines. Metropolitan Book Co. Pvt.Ltd., 1Netaji Subash Marg, New Delhi

**e-Learning Source:**

<a href="https://ilizone.in">https://ilizone.in</a>
<a href="https://youtu.be/-rZyt1Quyuk">https://youtu.be/-rZyt1Quyuk</a>
<a href="http://ecoursesonline.iasri.res.in/">http://ecoursesonline.iasri.res.in/</a>

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	1	1	1	3	1	1	3	1	1	1	3	1	2	2	3	3	5
CO2	3	3	2	1	1	1	1	1	1	3	1	1	1	3	1	2	3	3	2	5
CO3	3	3	2	1	1	1	2	1	1	3	1	1	1	3	1	2	2	3	4	3
CO4	3	3	2	1	1	1	2	1	1	3	1	1	1	3	1	2	3	3	3	4
CO5	3	3	1	1	1	1	1	1	1	3	1	1	1	3	1	2	2	3	5	3

7- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



# Integral University, Lucknow

<b>Effective from Session: 2018-19</b>							
Course Code	CA171	Title of the Course	Web Designing and Internet Applications	L	T	P	C
Year	I	Semester	II	1	0	1	
Course Objectives	<ol style="list-style-type: none"> <li>1. To learn principles of web designing.</li> <li>2. To learn basic web design and know about history of Internet.</li> <li>3. To learn fundamental language of Internet i.e. HTML, DHTML and JavaScript.</li> <li>4. Learn to use FLASH, DREAM WEAVER, GIF ANIMATION and FTP.</li> </ol>						

Course Outcomes	
CO1	Able to manage web designing project successfully.
CO2	Ability to design and create of a web site using Web Standards after understanding Audience requirements..
CO3	Hands on practice on HTML and learn the concepts of Client-Side JavaScript.
CO4	Upgrading skill set according to latest market needs and use web testing tools.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Unit-I</b>	Basic principles in developing a web designing, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout.	5	CO 1
2	<b>Unit-II</b>	Design Concept. Basics in Web Design, Brief History of Internet, World Wide Web, creation of a web site, Web Standards, Audience requirement.	5	CO 2,3
3	<b>Unit-III</b>	Introduction to Java Script, variables & functions, Working with alert, confirm and prompt, Connectivity of Web pages with databases; Project.	5	CO 3, 4

**Practical:** FLASH: Animation concept FPS, Understanding animation for web, Flash interface, Working with tools, DREAM WEAVER :Exploring Dreamweaver Interface, Planning & Setting Web Site Structure, Working with panels, Understanding and switching views, Using property inspector, Formatting text, JAVA SCRIPT: Working with alert, confirm and prompt, Understanding loop, arrays, Creating rollover image, Working with operator, GIF ANIMATION: Learning to use FTP, Setting FTP, Uploading of site, Using Control panel, FTP UPLOADING SITE: Understanding gif animation interface, Knowing GIF file format, Creating basic web banners, Creating web banners with effects, Creating animated web buttons.

**Reference Books:**

1. Jennifer Niederst Robbins. Developing web design latest edition.
2. Frain and Ben. Responsive Web Design with HTML5.
3. Nicholas c.Zakas. Java Script for Web Developers.
4. George Q. Huang, K. L. Mak. Internet Applications in Product Design and Manufacturing. ISBN:3540434658.

**e-Learning Source:**

<https://ilizone.in>

[https://youtu.be/ZDw5aw\\_actw](https://youtu.be/ZDw5aw_actw)

<http://ecoursesonline.iasri.res.in/>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																				
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
	CO1	2	2	3	1	1	1	1	1	1	1	2	1	1	1	1	2	2	3	3
CO2	2	3	3	2	1	1	1	1	1	1	2	2	2	1	1	2	3	3	2	5
CO3	2	3	3	1	1	1	1	1	1	1	1	2	1	2	1	2	2	3	3	3
CO4	2	3	3	1	1	1	1	1	1	1	2	2	2	2	1	2	3	3	3	3
CO5	2	2	3	1	1	1	1	1	1	1	2	1	1	1	1	2	2	3	5	2

8- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation