



Integral University, Lucknow

Effective from Session: 2017 - 18							
Course Code	MT201	Title of the Course	ENGINEERING MATHEMATICS – III	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Complex Variables, Calculus, Ordinary Differential Equations.	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> To identify the functions in engineering problems as analytic function and their study as a function of a complex variables. To learn the analysis of a system in time domain and predict the transient performance parameters of a system for different standard inputs. To understand the basic concepts of different types of controllers. To specify some difficult integration that appear in applications can be solved by complex integration. To understand the method of finding the series solution of Bessel's and Legendre's differential equations. To specify probability is an area of study which involves predicting the relative likelihood of various outcomes. Able to expand the given periodic function defined in the given range in terms of sine and cosine multiple of terms as a Fourier series. 						

Course Outcomes	
CO1	To solve Engineering problems using complex variable techniques
CO2	To evaluate the line integrals of a complex valued function
CO3	To apply the analytical technique to express periodic function as a Fourier sine and cosine series. Determine Z transform of DT signal and specify ROC, Using Z-transform properties to solve such problems efficiently
CO4	To apply the concept of probability to find the physical significance of various distribution phenomena.
CO5	To apply series solution of Bessel's differential equations for BVP.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Complex Variable I	Analytic functions, C-R equations and harmonic functions, Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Liouville's theorem, Fundamental theorem of Algebra.	8	1
2	Complex Variable II	Representation of a function by power series, Taylor's and Laurent's series, singularities, zeros and poles, Residue theorem, evaluation of real integrals of type $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and bilinear transformations.	8	2
3	Integral Transforms	Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations. Z-transform and its application to solve difference equations.	8	3
4	Probability and Descriptive Statistics	Probability, Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.	8	4
5	Series Solution	Series solutions of ODE of 2 nd order with variable co-efficient with special emphasis to differential equations of Bessel, Bessel functions and their properties.	8	5

Reference Books:

1. Kreyszig E. (1993) : Advanced Engg. Mathematics John Willey & Sons inc.S. Hasan Saeed, Automatic Control System, Kataria and sons, New Delhi
2. Dennis G. Zill : Advanced Engineering Mathematics, CBS Pub.
3. B.S. Grewal : Higher Engineering Mathematics, Khanna Pub. Katsuhiko Ogata, Modern Control Engineering, PHI
4. H.K. Dass : Advanced Engineering Mathematics, (S. Chand & Company)

e-Learning Source:

- <https://nptel.ac.in/courses/111103070>
- <https://nptel.ac.in/courses/111102129>
- <https://www.youtube.com/watch?v=nkOjzzWmDmA>
- <https://nptel.ac.in/courses/111106112>

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	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	2	2	1				1		2	1	1		
CO2	3	2	1	2	2	1						2	1	1		
CO3	3	2	1	1	1	1						2	1	1		
CO4	3	2	1	2	3	1				1		2	1	1		
CO5	3	1	1	1	2	1						2	1	1		

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Effective from Session:							
Course Code	EC 201	Title of the Course	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
Year	SECOND	Semester	THIRD	3	1	0	4
Pre-Requisite		Co-requisite					
Course Objectives	<ul style="list-style-type: none"> To understand the basic concepts of semiconductor physics and analyze the characteristics of PN Junction Diode and analyze the transport phenomena of various current components in a Semiconductor device and also understand the behavior and characteristic features of special diodes like LED, Schottky, Laser, etc To understand the concepts of Bipolar Junction Transistor and analyze the terminal behavior of the devices such as Junction Diode, BJT & MOSFET, also infer the region of operation with its equivalent circuit model. To understand the concept of MOSFET and apply the same to understand the MOS characteristics and model various MOS based circuits. To understand and develop analytical capability to analyze feedback in amplifiers and apply it to check the stability of feedback amplifiers and analyze multistage and tuned amplifiers. To understand the concept of Oscillators and analyze the working of different oscillators. To study the concept of regulated power supply and study various circuits for generating regulated power supply. 						

Course Outcomes	
CO1	The learners shall recall the basic concepts of semiconductor physics and analyze the characteristics of PN Junction Diode and analyze the transport phenomena of various current components in a Semiconductor device and also understand the behavior and characteristic features of special diodes like LED, Schottky, Laser, etc.
CO2	The learners shall understand the concepts of Bipolar Junction Transistor and analyze the terminal behavior of the devices such as Junction Diode, BJT & MOSFET, also infer the region of operation with its equivalent circuit model.
CO3	The learners shall understand the concept of MOSFET and apply the same to understand the MOS characteristics and model various MOS based circuits.
CO4	The learners shall understand and develop analytical capability to analyze feedback in amplifiers and apply it to check the stability of feedback amplifiers and analyze multistage and tuned amplifiers.
CO5	The learners shall understand the concept of Oscillators and analyze the working of different oscillators. The learners shall understand the concept of regulated power supply and analyze various circuits for generating regulated power supply.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Diode	PN Junction Diode-application oriented diode characteristics, simple dc circuit applications, space charge and the diode capacitances, switching characteristics. Special purpose diodes Tunnel diode, Varactor Diode, Schottkey Diode, Light Emitting Diode, photo voltaic cell, Laser Diode with their working principle and characteristics.	8	1
2	Bipolar Junction Transistor	Review of Configuration and characteristics of BJT, Early effect, Ebers-Moll Model, charge control model, biasing the BJT for discrete circuit design, Bias compensation, Small signal and low frequency analysis of BJT	8	2

		amplifier, Darlington pair, cascode amplifier, bootstrapping circuits. Parasitic capacitances & high frequency analysis of BJT amplifiers-CE configuration. Classification of Amplifiers: Class A,B,C amplifiers, Coupling methods, Audio Amplifiers, Wide band amplifier. Power amplifier.		
3	MOSFET	Review of device structure, operation & V I characteristic. Ohmic and saturation region equations. Classification of MOS (NMOS, PMOS, CMOS, principle of working and comparison, MOSFET as an amplifier and switch, biasing of MOS amplifier circuit, CS, CG, CD configuration using NMOS, frequency response of a single stage CS amplifier. MOS internal capacitance and high frequency model (CS configuration only).	8	3
4	Feedback Amplifiers	Basic concept of feedback, General Characteristics of negative feedback amplifiers, Classification of feedback, Voltage/Current shunt and series feedback, stability of feedback amplifiers, Multistage Amplifiers, Tuned Amplifier.	8	4
5	Oscillators & Voltage Regulator	Oscillators; Condition for oscillation, generalized form of oscillator circuit, The phase shift oscillator, Hartley & Colpitt's oscillator. The Wein Bridge oscillator, Crystal oscillator, frequency stability. Regulated Power Supplies: Series/Shunt voltage regulator, Monolithic regulators, SMPS, UPS(block diagram).	8	5

Reference Books:

1. Shilling & Belove, Electronic Circuit, McGraw-Hill Education India.
2. Streetman, B.G. Banerjee Sanjay, Solid State Electronic Devices, PHI.
3. Salivahanan, Kumar, Suresh & Vallavraj, Electronic Devices & Circuits, McGraw-Hill Education India.
4. Millman & Halkias, Integrated Electronics, McGraw-Hill Education India.

e-Learning Source:

You tube link: <https://www.youtube.com/watch?v=9FJJre>

2. Swayam Prabha - DTH Channel, https://www.swayamprabha.gov.in/index.php/program/current_he/8

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	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	1	1	2				1		1	3	3	2	2
CO2	3	2	2	1	1	2				1		1	3	3	2	2
CO3	2	1	2			2				1		1	3	3	2	2
CO4	2	1	2			2				1		1	3	3	2	2
CO5	2	1	2			2				1		1	3	3	2	2

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Effective from Session:							
Course Code	EC202	Title of the Course	Electromagnetic Field Theory	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Physics	Co-requisite	NA				
Course Objectives	<p>To understand the basic concepts of vector algebra with its use in the electromagnetic field theory and study of electrostatic fields with its application.</p> <p>To understand the concepts of magneto static fields with the associated laws and analyse the magneto static field applications in the electric instruments.</p> <p>To understand the concept of EM wave with its propagation in different medium. Also understand the power, losses (attenuation and phase constant), intrinsic impedance and associated constants for the EM wave.</p> <p>To understand the concept of transmission lines and to analyse its various types like lossless and distortion less. To learn the graphical method for the calculation of associated parameters of transmission line.</p> <p>To understand the concept of microwave frequency based waveguides. Also, design, implementation and analyse the various mode of waveguides</p>						

Course Outcomes	
CO1	Define and recognize different co-ordinate systems and techniques of vector calculus to understand different concepts of electrostatic field theory.
CO2	Understand the concept of static magnetic field with associated parameters and use of these parameters in different electric devices.
CO3	Examine the phenomena of wave propagation in different media and its interfaces and in applications of microwave engineering.
CO4	Able to derive and apply the steady state transmission line equations to the design of simple distributed circuit components.
CO5	Analyze the nature of electromagnetic wave propagation in guided medium which are used in microwave applications.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Electromagnetic Fields	Vector Calculus, Co-Ordinate systems, Gradient, Divergence and curl, Gauss Theorem, Stoke's Theorem, Electric Field due to Point Charges, electrostatic Potential, Solution of Laplace and Poisson's equation in one dimension, methods of Images applied to plain boundaries, Electric flux Density, Boundary conditions, Electrostatic Energy.	8	CO-1
2	Magneto-static Fields	Ampere law of force, Magnetic flux density, Ampere's circuital law, Boundary conditions, Faraday's Law, Energy stored in magnetic fields.	8	CO-2
3	Time-Varying Fields	Continuity equation, Displacement current, Maxwell's equation, boundary conditions, plane wave equation and its solution in conducting and non conducting media. Phasor notation, phase velocity, group velocity, Depth of penetration, conductors and dielectrics, impedance of conducting medium, Polarization, Reflection and refraction of plane waves at plane boundaries, Poynting vectors, and Poynting theorem.	8	CO-3
4	Transmission Lines	Transmission line equations, Characteristic impedance, Distortion-less lines, Input impedance, lossless lines, Open and short circuited lines, Standing wave and reflection losses, Impedance matching, Application of smith chart, Introduction to guided waves.	8	CO-4
5	Waveguides	Rectangular Waveguide, Circular Waveguide Transverse Electric (TE) and Transverse Magnetic (TM) Modes, Wave Propagation in the Guide, Power Transmission & Attenuation, Waveguide Resonators.	8	CO-5

Reference Books:

M. N. O. Sadiku, "Elements of Electromagnetics", 4th Edition, Oxford University Press, India.

Nathan Ida, "Engineering Electromagnetism", Second Edition, Springer India Private Limited.

Rakesh Singh Kshetrimayum, "Electromagnetic Field Theory", Cengage Learning India Publication, First Edition, 2012

W. H. Hayt and J. A. Buck, "Electromagnetic field theory", Seventh Edition, McGraw Hill Education.

e-Learning Source:

<https://nptel.ac.in/courses/108104087>

<https://nptel.ac.in/courses/108106073>

<https://nptel.ac.in/courses/115101005>

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	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	2	2	2	2	1	-	-	-	-	3	3	-	-
CO2	3	3	2	2	2	2	2	2	-	-	-	-	2	3	-	-
CO3	3	3	3	2	2	3	3	3	-	-	-	-	3	3	-	-
CO4	3	3	3	2	2	3	3	3	-	-	-	-	3	3	-	-
CO5	3	3	3	3	2	2	3	3	-	-	-	-	3	3	-	-

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

Name & Sign of Program Coordinator

Sign & Seal of HoD



Integral University, Lucknow

Effective from Session:							
Course Code	EC203	Title of the Course	Circuit Theory	L	T	P	C
Year	II	Semester	III/IV	3	1	0	4
Pre-Requisite	Physics, Mathematics, Basic Electrical Engineering	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> ❖ To understand the concepts of signals and their applications. To provide a systematic approach for analysis of circuits and solution of electric circuits by differential equations and Laplace Transform. ❖ To learn the analysis of electrical circuits by basic law's, AC theorems and Kirchhoff's law. ❖ To understand the Transient and Frequency response of different combinations of basic elements like resistance, capacitance and inductance. ❖ To understand the concept of Poles and Zeros, stability. To learn the synthesis of circuits. ❖ To understand the analysis of two Port network by network parameters and their interconnections for two port network. To provide the basic information about Filters. 						

Course Outcomes	
CO1	Given a circuit, students shall be able to represent signals in mathematical form, identify type of system, apply Kirchhoff's laws, and formulate differential equation for LTI system and solve using Laplace transform.
CO2	Given a circuit of passive elements with sources, student shall be able to analyze and evaluate the circuits using Kirchhoff's laws and AC-DC theorems
CO3	For a given circuit of R, L, C, student shall be able to generate its transient/ frequency response and examine , analyze and evaluate the circuit characteristics
CO4	For a given transfer function, students shall be able to identify its pole zeros and for stable circuits, select suitable design of implementation, develop series / parallel combination to synthesize the circuit.
CO5	Given a two port network, student shall be able to define its parameters, solve , analyze , and modify its form.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction	Introduction to continuous time signals and system, Basic continuous time signals: unit step, unit ramp, unit impulse and gate function and associated wave forms. Review of Laplace transforms poles and zeros, initial and final value theorems. Solution of differential equations using Laplace transforms.	8	1
2	Laws & Theorem	Kirchhoff's Law, Source transformation, Loop variable analysis, node variable analysis and duality. AC Network theorems: Superposition, Thevenin's Norton's, Millman, Tellegen's and Maximum Power transform theorems.	8	2
3	Sinusoidal analysis	Steady state sinusoidal analysis using phasors. Frequency domain analysis of RLC circuits, Transient Analysis for R-L, R-C and R-L-C Circuits.	8	3
4	Synthesis	Concept of Pole and Zeros and stability, Hurwitz Polynomials, positive real functions. Properties of real immittance functions, synthesis of LC driving point immittances, properties of RC driving point impedances, synthesis of RC impedances and RL admittances, properties of RL impedances and RC admittances. Foster Forms and Cauer Forms.	8	4
5	Two Port Network	Two port network, two port parameter, Inter-Conversion of two port Parameters. Network Functions: Driving point and transfer function, Interconnection for two port networks, Reciprocity and Symmetry, Ladder Networks, Image Impedance and Characteristic Impedance, T and Pi	8	5

Reference Books:

1. Networks and Systems, Ashfaq Husain, Khanna Books Publishing Co. (P) Ltd. New Delhi
2. Network Analysis & Synthesis, C.L.Wadhwa, New Age International Publishers
3. Networks And Systems, D. Roy Chowdhury, New Age International Publishers.
4. Introductory Circuit Analysis, Robert Boylestad, Pearson Education, Pearson Education, Prentice Hall.
5. Circuit Analysis Principles and Applications, Allan H. Robbins and Wilhelm C. Miller, Cenage Learning India Private Limited.
6. Circuit theory, Dr. Abhijit Chakrabarty, Dhanpat Rai & Co. Pvt. Ltd.

e-Learning Source:

<https://archive.nptel.ac.in/courses/108/102/108102042/>

<https://nptel.ac.in/courses/117106108>

<https://www.electrical4u.com/electrical-engineering-articles/circuit-theory/>

<https://www.youtube.com/@s.h.tutorials>

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	PSO1	PSO2	PSO3	PSO4
CO1	3	3	1	1	2								3	2		1
CO2	3	3	1	1	2								3		1	
CO3	3	3	1	1	2								3		1	
CO4	3	3	1	1	2								3	2		
CO5	3	3	2	1	2								3		1	

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

Name & Sign of Program Coordinator

Sign & Seal of HoD



Integral University, Lucknow

B.Tech Civil Engineering

Attributes &SDGs Common for all branches/Disciplines

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
ES202	Environmental Studies					√			3,9,11,17

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45 % marks in the aggregate from a recognized Board/University		Co-requisite				
Course Objectives	<ul style="list-style-type: none"> To Study the types of Disasters and its profile in India. Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:

- https://www.youtube.com/watch?v=9WIwljva_s
- https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	-	-	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	1	1	-	-	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	1	-	-	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	2	-	-	-	-
CO5	3	1	3	2	2	2	2	2	3	2	1	2	1	1	-	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow B.Tech Mechanical Engineering

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45% marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> • To Study the types of Disasters and its profile in India. • Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. • To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. • Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. • To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

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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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	2	1	-	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	1	1	1	-	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	2	1	-	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	2	1	-	-	-
CO5	3	1	3	2	2	2	2	2	2	3	2	2	1	2	1	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow B.Tech Electrical Engineering

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45% marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> • To Study the types of Disasters and its profile in India. • Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. • To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. • Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. • To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

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https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	1	1	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	2	1	2	2	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	1	1	2	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	1	1	2	-	-
CO5	3	1	3	2	2	2	2	2	2	3	2	1	2	1	1	2	1	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

B.Tech Electric and Communication Engineering

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45% marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> • To Study the types of Disasters and its profile in India. • Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. • To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. • Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. • To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:

- https://www.youtube.com/watch?v=9WIwljva_s
- https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
	CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	1	1	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	2	1	2	2	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	1	1	2	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	1	1	2	-	-
CO5	3	1	3	2	2	2	2	2	3	2	1	2	1	1	2	1	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow B.Tech Biotech , Food Tech

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45% marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> • To Study the types of Disasters and its profile in India. • Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. • To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. • Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. • To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:

- https://www.youtube.com/watch?v=9Wlwljva_s
- https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	1	-	-	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	1	1	1	-	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	2	1	1	-	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	1	1	-	-	-
CO5	3	1	3	2	2	2	2	2	2	3	2	2	1	1	1	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow
B.Tech Computer Science and Engineering ,B.Tech –,CSE

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45 % marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> To Study the types of Disasters and its profile in India. Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:

- https://www.youtube.com/watch?v=9WIwljva_s
https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	1	-	-	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	1	1	1	-	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	1	1	-	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	1	1	-	-	-
CO5	3	1	3	2	2	2	2	2	3	2	1	2	1	1	1	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow
B.Tech Computer Science and Engineering ,B.Tech – ,CTIS

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	10+2 having a minimum of 45 % marks in the aggregate from a recognized Board/University	Co-requisite					
Course Objectives	<ul style="list-style-type: none"> To Study the types of Disasters and its profile in India. Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,	8	CO3

Reference Books:

- Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- Sethi, V.K., Disaster Management, New Delhi Maxford Books
- Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:
https://www.youtube.com/watch?v=9WIwljva_s
https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	1	1	1	3	2	1	1	2	1	1	1	1	-	-	-
CO2	2	2	2	1	2	3	3	2	2	2	2	2	1	1	1	-	-	-
CO3	3	2	2	1	2	2	3	2	2	2	1	2	1	1	2	-	-	-
CO4	3	2	2	1	2	2	3	2	2	1	1	2	1	2	1	-	-	-
CO5	3	1	3	2	2	2	2	2	3	2	1	2	1	1	1	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Bachelor of Computer Application

Effective from Session:							
Course Code	ES202	Title of the Course	Disasters, Management	L	T	P	C
Year	II	Semester	III	2	1	-	3
Pre-Requisite	Candidate should have passed '10+2' exam in any stream with at least 45% in aggregate.		Co-requisite				
Course Objectives	<ul style="list-style-type: none"> • To Study the types of Disasters and its profile in India. • Knowledge of causes and impacts of Disasters, and Case studies of National and Global Disasters. • To learn about risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters. • Basic concepts of Disaster Management Cycle and its Risk Reduction Measures. • To know the National Acts and policies for mitigating disasters. Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management. 						
Course Outcomes							
CO1	Students are able to learn types of disasters and its profile in India						
CO2	Students are able to understand the causes and impacts of disasters on environment						
CO3	Students are able to learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.						
CO4	To understand the concept of Disaster Management Cycle and its Risk Reduction						
CO5	To understand the concept of Disaster Management Cycle and its Risk Reduction						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to disaster	Introduction to Disasters, Concepts, Definition and types (Natural and Man-made), Disaster profile of India.	8	CO1
2	Impact of Disaster	Causes and Impacts of Disasters, Global and National Perspective, Case studies from Disasters, Large Hydro projects and its risks for Disasters	8	CO2
3	Disaster Risk Reduction	Approaches to Disaster risk Reduction, Safety issues in mitigating Industrial disasters, Case studies, EHS etc.	8	CO4
4	Disaster Management	Disaster Management Cycle, Risk Reduction Measures (Preparedness, Mitigation, Response	8	CO3
5	Disaster Act. and Policies	National Acts and policies for mitigating Disasters (Disaster Management Act 2005, NDRF,)	8	CO3

Reference Books:

- (1) Gupta Harsh K., Disaster Management, Hyderabad University Press. Publications-Meerut.
- (2) Sethi, V.K., Disaster Management, New Delhi Maxford Books
- (3) Bhattacharya, Tushar, Disaster Science and Management, New Delhi Tata Mc Graw Hill.
- (4) Nidhi Gauba, Dhawan/ Ambrina Sardar Khan, Disaster Management and Preparedness, CBS

e-Learning Source:

- https://www.youtube.com/watch?v=9WIwlljva_s
- https://www.youtube.com/watch?v=uA_OLKfQpYA

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	2	2	1	2	-	-	-	-	1	1	1	-	-	-
CO2	1	1	1	1	2	1	1	1	-	-	-	-	1	1	1	-	-	-
CO3	1	1	1	1	2	1	1	1	-	-	-	-	1	1	1	-	-	-
CO4	1	1	1	1	2	1	1	1	-	-	-	-	1	1	1	-	-	-
CO5	1	1	1	1	2	1	1	1	-	-	-	-	1	1	1	-	-	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Effective from Session: 2020-21							
Course Code	CS-203	Title of the Course	Cyber Law & Information Security	L	T	P	C
Year	II	Semester	III	2	1	0	3
Pre-Requisite	None	Co-requisite	None				
Course Objectives	<ul style="list-style-type: none"> Knowledge about cyber law, intellectual property and cybercrimes (internet security threats), trademarks and domain theft. Knowledge on the disciplines of technology, E-business and law to allow them to minimize the occurrence and severity of information security incidents. Knowledge about Information System and principles of Information Security (as confidentiality, integrity, and availability) Knowledge of cryptography and techniques used to detect and prevent network intrusions. 						

Course Outcomes	
CO1	Understand key terms and concepts in cyber law, intellectual property and cybercrimes(internet security threats), trademarks and domain theft.
CO2	Keep an appropriate level of awareness, knowledge and skill on the disciplines of technology, E-business and law to allow them to minimize the occurrence and severity of information security incidents.
CO3	Understand about Information System and principles of Information Security (as confidentiality, integrity, and availability)
CO4	Understand about cryptography and techniques used to detect and prevent network intrusions.
CO5	

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Fundamentals of Cyber Law	Jurisprudence of Cyber Law, Object and Scope of the IT Act 2000, Introduction to Indian Cyber Law, Uncitral Model Law, ISP Guideline. Intellectual property issues and cyber space, Indian perspective, Overview of Intellectual property related legislation in India, Patent, Copy Right, Trademark law, Law related to semiconductor layout & design.	8	1
2	E - Commerce	Security Threats to E - Commerce, Virtual Organization, Business Transactions on Web, E-Governance and EDI, Concepts in Electronics payment systems, E-Cash, Credit/Debit Cards, E- Agreement, Legal recognition of electronic and digital records, E- Commerce Issues of privacy, Wireless Computing- Security challenges in Mobile devices. Digital Signatures - Technical issues, legal issues, Electronic Records, Digital Contracts, and Requirements of Digital Signature System.	7	2
3	Investigation and Ethics	Cyber Crime, Cyber jurisdiction, Cyber crime and evidence act, Treatment of different countries of cyber crime, Ethical issues in data and software privacy, Plagiarism, Pornography, Tampering computer documents, Data privacy and protection, Domain Name System, Software piracy, Issues in ethical hacking. Internet security threats: Hacking, Cracking, Sneaking, Viruses, Trojan horse, Malicious Code & logic bombs. Introduction to biometric security and its challenges, Finger prints. Cyber crime forensic: CASE STUDY in Cyber Crime.	9	3
4	Information security	Information Systems and its Importance, Role of Security in Internet and Web Services, Principles of Information Security, Classification of Threats and attacks, Security Challenges, Security Implication for organizations, Security services - Authentication, Confidentiality, Integrity, Availability and other terms in Information Security, Information Classification and their Roles. Introduction to Cryptography, Issues in Documents Security, Keys: Public Key, Private Key, Firewalls, Basic Concepts of Network Security, Perimeters of Network protection & Network attack, Need of Intrusion Monitoring and Detection.	9	4

Reference Books:	
1.	Harish Chander "Cyber Law and IT Protection", PHI Publication, New Delhi
2.	Merkov, Breithaupt, "Information Security", Pearson Education
3.	"Cyber Law in India" - Farooq Ahmad-Pioneer books.
4.	K. K. Singh, Akansha Singh "Information Security and Cyber law", Umesh Publication, Delhi
e-Learning Source:	
https://nptel.ac.in/courses/106106129	

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	PSO1	PSO2	PSO3	PSO5	PSO6	PSO7
CO1	1	2	2	3	1	2	1	3	1	2	1	2	1	2	2			
CO2	3	2	1	1	1	2	3	2	2	2	3	1	3	2	2			
CO3	2	2	2	2	1	1	3	2	3	1	1	2	2	1	2			
CO4	3	2	1	2	3	1	1	3	2	2	3	3	2	3	1			
CO5	1	2	2	3	1	2	1	3	1	2	1	2	1	2	2			

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



Integral University, Lucknow

Effective from Session:							
Course Code	EC204	Title of the Course	Electronic Circuit and simulation Lab	L	T	P	C
Year	II	Semester	III			2	
Pre-Requisite		Co-requisite					
Course Objectives	<ul style="list-style-type: none"> Basics of Electronic Circuit and simulation Lab. The students will gain overview about the available techniques and possibilities of this field. Students will be able to perform the basic techniques and apply them in practice. Learning about image conversion into mathematical form and application of algorithms to major findings. 						

Course Outcomes	
CO1	Understand & Implement Transient Analysis of Low & High Pass RC Filter Circuit for Step input & Pulse input.
CO2	Understand & Implement AC Analysis of AC for Low & High Pass RC Filter Circuit
CO3	Understand & Implement Transient & AC Analysis of Series RLC Circuit.
CO4	Understand & Implement Transient Analysis of Diode Clipper & BJT Inverter Circuit.
CO5	Acquire knowledge with the Transient Analysis of Enhancement type NMOS & CMOS Inverter Circuit.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Low Pass RC Filter Circuit.	Transient Analysis of Low Pass RC Filter Circuit. a. Step Input b. Pulse Input	2	CO1
2	High Pass RC Filter Circuit.	Transient Analysis of High Pass RC Filter Circuit. a. Step Input b. Pulse Input	2	CO1
3	AC Analysis of Low Pass	AC Analysis of Low Pass RC Filter Circuit.	2	CO2
4	AC Analysis High Pass	AC Analysis of High Pass RC Filter Circuit.	2	CO2
5	Image Conversion	To write a program to convert image into bit plane and extract next bit plane.	2	
6	Transient Analysis of RLC	Transient Analysis of Series RLC Circuit. a. Step Input.	2	CO3
7	Transient Analysis of diode	Transient Analysis of Diode Clipper Circuit	2	CO4
8	Transient Analysis of BJT	Transient Analysis of BJT Inverter Circuit. a. Step Input b. Pulse Input c. DC Analysis Without Parameter	2	CO4
9	Transient Analysis of NMOS	Transient Analysis of Enhancement type NMOS Inverter Circuit. a. Step Input b. Pulse INPUT c. DC Analysis Without Parameter	2	CO5
10	Transient Analysis of CMOS	Transient Analysis of CMOS Inverter Circuit. a. Step Input b. Pulse Input c. DC Analysis Without Parameter	2	CO5

Reference Books:

e-Learning Source:

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Effective from Session: 2017-18							
Course Code	EC205	Title of the Course	Electronics Workshop	L	0	T	0
Year	II	Semester	III	P	2	C	
Pre-Requisite		Co-requisite					
Course Objectives	<p>To understand the concepts of basic components of including resistance, capacitor, inductor and transistor.</p> <p>To provide a comprehensive idea about Transformer, Chokes, Potentiometer, Switches and Rectifiers.</p> <p>To learn the basics of Semiconductor devices and integrated circuits: different rating and packages. Power Semiconductor devices and Heat Sinks.</p> <p>To perform winding of Transformer, assembly of core and complete the transformer and also explain the various materials involved in it.</p> <p>To learn and perform about the preparation of Printed Circuit Board (PCB) and perform drilling on the PCB.</p> <p>To understand the concept of soldering of components on the PCB and assembled circuit.</p> <p>To perform Assembly of Electronic Circuits and Systems- Soldering and Communication Cable jointing. Bread Board assembly of a regulated d.c. power supply.</p> <p>Assembling of an unregulated DC power supply in a steel cabinet along with complete wiring.</p>						

Course Outcomes	
CO1	After study, student shall be able to identify and measure the values and various operation related to resistance, capacitor, inductor and transistor. With the help of various components student shall understand and design the Transformer, Chokes, Potentiometer, Switches and Rectifiers.
CO2	Student shall be able to understand to learn the basics of Semiconductor devices and integrated circuits: different rating and packages. Power Semiconductor devices and Heat Sinks. Student shall be able to perform winding of Transformer, assembly of core and complete the transformer and also explain the various materials involved in it.
CO3	Student shall be able to understand and able to prepare Printed Circuit Board (PCB) and perform drilling on the PCB and able to understand the concept of soldering of components on the PCB and assembled Circuit.
CO4	Able to perform Assembly of Electronic Circuits and Systems- Soldering and Communication Cable jointing. Bread Board assembly of a regulated DC power supply.
CO5	Student shall be able to Assemble an unregulated DC power supply in a steel cabinet along with complete wiring.

Experiment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1	Passive components	To study the components of Electronic Circuits and systems. Types according to construction, rating and tolerance of Resistors, Capacitors, Inductors.	2	CO1
2	Passive components	Study of Transformer, Chokes, Potentiometer, Switches and Rectifiers.	2	CO1
3	Active component	To study Semiconductor devices and integrated circuits: different rating and packages. Power Semiconductor devices and Heat sinks.	2	CO2
4	Transformer assembly	To perform winding of Transformer, assembly of core and complete the transformer and also explain the various materials involved in it.	2	CO2
5	PCB Layout	To learn and perform about the preparation of Printed Circuit Board (PCB) and perform drilling on the PCB.	2	CO3
6	Soldering	To perform soldering of components on the PCB and assembled circuit.	2	CO3
7	Assembly of components	To perform Assembly of Electronic Circuits and Systems Soldering and Communication Cable jointing. Bread Board Assembly of a regulated DC power supply.	2	CO4
8	Wiring in cabinet	Assembling of an unregulated DC power supply in a steel cabinet along with complete wiring.	2	CO5

e-Learning Source:

<https://www.vlab.co.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	PSO1	PSO2	PSO4
	CO1	3	1	3	0	0	0	0	0	3	0	0	1	3	2
CO2	3	2	3						3			1	3		
CO3	3	3	3	1	1				3			1	3	2	1

CO4	3	3	2						3			1	3		
CO5	3	2	2	1	1				2			1	3	2	1

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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Integral University, Lucknow

Effective from Session:							
Course Code	EC206	Title of the Course	EDC Lab	L	T	P	C
Year	II	Semester	III	0	0	2	2
Pre-Requisite	Mathematics, Basic Electrical Engineering	Co-requisite					
Course Objectives	1. Ability to verify the working of diode, LED, transistor and oscillator. 2. Plot and study of frequency 3. Response Bridge and amplifier. 4. To study the application of OP-AMP as inverting and non-inverting unit gain amplifier. 5. Ability to verify the working of MOSFET. 6. Ability to understand the working of Zener diode.						

Course Outcomes	
CO1	For given component, student shall be able to understand the characteristics of transistor.
CO2	Given a system, students shall be able to understand the working of bridge.
CO3	Given a system, students shall be able to understand the working of LED and clipping and clamping circuit.
CO4	For MOSFET, student shall be able to understand the characteristics of MOSFET.
CO5	For DIODE, student shall be able to understand the characteristics of diode.

Unit No.	Experiment No.	Content of Unit	Contact Hrs.	Mapped CO
1	1	V-I characteristics of diode.	2	1
2	2	BJT-CB input characteristics	2	2
3	3	Inverting Opamp	2	3
4	4	CE amplifier	2	4
5	5	Zener diode	2	1
6	6	Study of clipping and clamping circuit.	2	3
7	7	Study of LED (Red, Green, Yellow)	2	3
8	8	Study of MOSFET as a amplifier (common source)	2	5
9	9	Application of operational amplifier as differentiator and integrator plot frequency response	2	5

e-Learning Source:	
https://www.vlab.co.in/broad-area-electronics-and-communications	

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	PSO1	PSO2	PSO3	PSO4
	CO1	3	2	2	3									1	2	3
CO2	3	2	2	3									1	2	3	4
CO3	3	2	2	3									1	2	3	4
CO4	3	2	2	3									1	2	3	4
CO5	3	2	2	3									1	2	3	4

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

<p>Name & Sign of Program Coordinator</p>	<p>Sign & Seal of HoD</p>
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Integral University, Lucknow

Effective from Session:							
Course Code	EC207	Title of the Course	Circuit Theory Lab	L	T	P	C
Year	II	Semester	IV	0	0	2	2
Pre-Requisite	Mathematics, Basic Electrical Engineering	Co-requisite					
Course Objectives	<ol style="list-style-type: none"> 1. The ability to conduct experimental procedures for verification of different theorems. 2. The ability to conduct testing and experimental procedures on Transient response of R-L circuits. 3. The ability to conduct testing and experimental procedures on Transient response of R-C circuits. 4. The ability to conduct testing and experimental procedures on Transient response of R-L-C circuits. 5. To give a chance to students to solve two port networks analysis. 6. To determine the two port parameter of a two port resistive network. 						

Course Outcomes	
CO1	Given a circuit, students shall be able to understand and analyze the circuits by using the AC-DC different Theorems.
CO2	Given a circuit of passive elements with sources, student shall be able to conduct experiments to analyze and evaluate the circuits using Kirchoff's laws.
CO3	For a given circuit of R, L, C, student shall be able to generate experimentally and investigates, examine, analyze and evaluate the transient response characteristics.
CO4	For a given series RLC circuit student shall examine the variation in current and voltage and find the resonant frequency of the circuit.
CO5	Given a two port network, student shall be able to understand its parameters, solve, analyze, and modify its form as per requirement

Unit No.	Experiment No.	Content of Unit	Contact Hrs.	Mapped CO
1	1	To Verify Thevenin's Theorem.	2	1
2	2	To Verify Norton's Theorem.	2	1
3	3	To Verify the Maximum Transfer Theorem.	2	1
4	4	Obtain the transient response of RC circuit.	2	3
5	5	Obtain the frequency response of series RLC circuit.	2	4
6	6	To determine the z-parameters of two port resistive network.	2	5
7	7	Obtain the transient response of RL circuit.	2	2

Reference Books:

1. Networks and Systems, Ashfaq Husain, Khanna Books Publishing Co. (P) Ltd. New Delhi
2. Network Analysis & Synthesis, C.L.Wadhwa, New Age International Publishers
3. Networks And Systems, D. Roy Chowdhury, New Age International Publishers.
4. Introductory Circuit Analysis, Robert Boylestad, Pearson Education, Pearson Education, Prentice Hall.
5. Circuit Analysis Principles and Applications, Allan H. Robbins and Wilhelm C. Miller, Cenage Learning India Private Limited.
6. Circuit theory, Dr. Abhijit Chakrabarty, Dhanpat Rai & Co. Pvt. Ltd.

e-Learning Source:

- <https://www.vlab.co.in/broad-area-electronics-and-communications>
- <http://vlabs.iitb.ac.in/vlab/>
- <https://vlab.amrita.edu/>

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	PSO1	PSO2	PSO3	PSO4
CO1	3	3	1	1	2				1				3	3	2	1
CO2	3	3	1	1	2				2				3	3	3	1
CO3	3	3	1	1	2				2				3	3	2	1
CO4	3	3	1	1	2				2				3	3	3	1
CO5	3	3	2	1	2				2				3	3	2	1

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

Name & Sign of Program Coordinator	Sign & Seal of HoD
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