Integral University
STUDY & EVALUATION SCHEME
B.Tech. (CC & AI) 1st Sem

Sl.No.	Course Category	Subject Code	Name of Subject	Periods				Evaluation Scheme				Subject Total
								Sessional (CA)			End Sem	
				L	T	P	C	CT	TA	Total	Exam (ESE)	
1	BS	PY-101	Physics	3	1	0	4	25	15	40	60	100
2	LN	LN-101	Professional Comm.-I	3	1	0	4	25	15	40	60	100
3	MT	MT-101	Mathematics – I	3	1	0	4	25	15	40	60	100
4	ESA	EE-103	Basic Electrical Engineering	3	1	0	4	25	15	40	60	100
5	ESA	EC-101	Basic Electronics	3	1	0	4	25	15	40	60	100
6	BS	PY-104	Phy Lab	0	0	2	1	30	30	60	40	100
7	ESA	EE-104	Elec Lab	0	0	2	1	30	30	60	40	100
8	ESA	ME-103	Engg. Graphics Lab	0	0	2	1	30	30	60	40	100
9	DC	CS-125	Digital Workforce Skills	0	0	2	1	30	30	60	40	100
				15	5	8	24	245	195	440	460	900

L – Lecture **T** – Tutorial **P** – Practical **C** – Credits   **CT** – Class Test **TA** – Teacher Assessment

Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

BS – Basic Sciences **DC** – Departmental Core

HM – Humanities **OE** – Open Elective

DE – Departmental Elective **ESA** – Engineering Sciences & Arts (Foundation Course & Engineering Courses)

PHYSICS (PY101)
(w.e.f. July 2017)

L T P
3 1 0

Unit I: Wave Optics   **8**
Methods of formation of coherent sources, Fresnel's Biprism, displacement of fringes, thin film interference, Newton's ring. Fraunhoffer's diffraction at single slit, grating, Rayleigh's criterion of resolution, resolving power of grating.

Unit II: Optical Activity and Modern Optics   **8**
Production of plane polarized light by reflection and Double refraction, Nicol prism, Optical activity, polarimeter (Laurentz and Biquartz).
Principle of fiber optics, numerical aperture, attenuation, dispersion in optical fibers, material dispersion, waveguide dispersion, intermodal and intramodal dispersion, Pulse dispersion in step index fiber.
Main components of laser, Einstein's coefficients, He-Ne laser, Nd-YAG laser and their applications.

Unit III: Properties of Matter and Relativistic Mechanics   **8**
Viscosity, Poiseulli's equation, Michelson-Morley experiment and its implications, Galilean transformation equations Lorentz transformation equations and their consequences, energy mass relation, relativistic kinetic energy.

Unit IV: Quantum Physics   **8**
Compton effect, basic postulates of quantum mechanics, Wave function and its physical admissibility, orthogonality of wavefunctions, normalization of wave functions, Heisenberg's uncertainty principle(no derivation) and its applications (non-existence of electron in nucleus, Bohr's radius), Schrodinger's equation and its application to free particle, particle in one dimensional box.

Unit V: Physics of Materials   **8**
Magnetic Properties: Magnetization, Origin of magnetic moment, dia, para and ferro magnetism, Langevin's theory for diamagnetic material, Phenomena of hysteresis and its applications.
Superconductors: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Super-conductors.
Nano-Materials: Basic principle of nanoscience and technology, structure, properties and uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.

Reference Books:
1. Fundamentals of Optics by Jenkins and White
2. Optical Fiber Communication by Gerd Keiser
3. Concepts of Modern Physics by Arthur Beiser
4. Introduction to Special Theory of Relativity by Robert Resnick
5. Quantum Physics by Eisberg
6. Introduction to Nanotechnology by Poole Owens, Wiley India
7. Solid State Physics by S.O. Pillai, New Age Publications

PROFESSIONAL COMMUNICATION –I (LN-101)

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UNIT I *Introduction to Communication* 04 HRS
Definition, Types of Communication, Channels of Communication, Language

UNIT II *Interpersonal Communication* 06 HRS
Culture- Definition and Types, Communication and Culture including Cross Cultural Communication

UNIT III *Written Communication* 08 HRS
Letter Writing- Informal and Formal - Letters of Enquiry, Letters of complaint, Response to complaints and enquiries, Self Exploration through description

UNIT IV *Grammar through Worksheets* 12 HRS
Situational activities and modules- Parts of Speech, Tenses, Articles, Modals, Active and Passive, Subject-Verb Agreement, Direct and Indirect Speech, Degrees of comparison

UNIT V *Grammar through Worksheets Continued* 10 HRS
Sentences: Simple, Compound, Complex, Declarative, Assertive, Negative, Interrogative, Exclamatory, Imperative

RECOMMENDED BOOKS:

1. Wren PC and Martin H, "High School Grammar and Composition", S. Chand and Co.

2. K. Floyd , "Interpersonal Communication: The Whole Story" (2009), McGraw Hill,

3. Greenbaum Sidney and Nelson Gerald, "An Introduction To English Grammar", Pearson

4. Swan Michael, "Practical English Usage" OUP, 2005

5. Raymond Murphy, " Intermediate English Grammar", (2007) Cambridge University Press

BASIC ELECTRICAL ENGINEERING (EN-101)

UNIT-1
D.C CIRCUIT ANALYSIS AND NETWORK THEOREMS
Circuit concepts: Concept of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, R L and C as linear elements, source transformation, Kirchoff's Law: loop and nodal methods of analysis, star delta transformation, network theorems: Thevenin's theorem, Norton's theorem, maximum power transfer theorem.   (8)

UNIT-2
STEADY STATE ANALYSIS OF SINGLE PHASE AC CIRCUITS
AC fundamentals: Sinusoidal, square and triangular waveforms-average and effective value, form the peak factors, concept of phasors, phasors representation of sinusoidally varying voltage and current, analysis of series-parallel RLC circuits. Apparent, active and reactive powers, power factor, causes and problems of low power factor, power factor improvement, resonance in series and parallel circuits, bandwidth and quality factors.   (8)

UNIT-3
THREE PHASE AC CIRCUITS
Three phase system: Its necessity and advantages, meaning of phase sequence, star and delta connections, balanced supply and balanced load, line and phase voltage/current relation, three phase power measurements.
MEASUREMENT INSTRUMENTS
Types of instruments: construction and working principle of PMMC and MI type voltmeter and ammeters, single phase dynamometer type wattmeter and induction type energy meter, use of shunts and multipliers.   (8)

UNIT-4
INTRODUCTION OF POWER SYSTEM: general layout of electrical power system and function of its elements, standard transmission and distribution voltages, concept of grid.
MAGNETC CIRCUIT
Magnetic circuit: Concepts, analogy between electric and magnetic circuit, magnetic circuits with DC and AC excitation, magnetic leakage, BH curve, hysteresis and eddy current losses, magnetic circuit calculation, mutual coupling.
Single Phase Transformer: Principle of operation, construction, emf equation, equivalent circuit, power losses, efficiency, Introduction to auto transformers.   (8)

UNIT-5
Principle of Electromechanical energy conversion
DC Machines: Types, emf equation of generator and torque equation of motor, characteristics and applications of DC motors.
Three Phase Induction Motor: Type, principle of operation, slip-torque Characteristics, applications.
Single Phase Induction Motor: Principle of operation and introduction to methods of starting, applications.
Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor, applications.   (8)

References:
2.V.Deltoro, "Principle of Electrical Engg." PHI.
3.M.A Mallick, Dr. I. Ashraf, "Fundamental of Electrical Engg," Word Press, Lucknow.
4.A. Hussain, "Basic Electrical Engg" Dhanpat Rai & sons.
5.I J Nagrath,"Basic Electrical Engg" ,TMH

BASIC ELECTRONICS (EC-101)

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UNIT-I
Semiconductor Diode
Mechanism of Conduction in Semiconductors: Mobility and Conductivity, Electrons and holes in an intrinsic semiconductors, Donor and acceptor impurities, Fermi level, Carrier densities in semiconductor, Hall effect, Diffusion, Recombination
Junction Diode
PN junction characteristic and its equation, Effect of Temperature, Depletion Layer, Piecewise linear diode model, Breakdown Mechanism, Zener and Avalanche Breakdown characteristics
Diode as circuit element
Half wave and full wave rectifiers, capacitive filters, Zener diode as a regulator, clamper, clipper and voltage doubler, **special diode**- LED, Schottkey diodes

(8)

UNIT-II
BJT characteristics and circuits
Transistor Operation, CE, CB, CC configuration and their characteristics, transistor biasing circuits, stability factor, h- parameter model (low frequency), computation of Ai, Av, Ri, Ro of single transistor CE amplifier configuration.

(8)

UNIT-III
Field Effect Transistors
JFET: Construction and principle of working,
Drain / Transfer characteristics, basic amplifier circuits, Biasing of JFET
MOSFET: Enhancement and depletion type N-channel, P-channel, Drain / Transfer Characteristics.

(8)

UNIT-IV
Switching theory & Logic gates
Number system, Conversion, Compliments, Addition and Subtraction, BCD numbers, Boolean algebra, Canonical form, Logic gates, Minimization of logical function using Karnaugh map

(8)

UNIT-V
Operational Amplifier
Concept of ideal operational amplifier (inverting and non-inverting) and its applications, Inverter, integrator, differentiator, voltage follower, summing and differential amplifier
Electronic Instruments: Digital Multimeter (block diagram approach), CRO (block diagram and its working),Measurement of voltage, phase, frequency. Double beam CRO (block diagram & its working).

(8)

Text Books
1. Bolyested& Nashekey / Electronic Devices and Circuit Theory, PHI
2. Milliman & Halkias: Integrated Electronics , Mc Graw Hill
3. J. S. Katre: Electronics Engineering, Tech-Max Publication

PHYSICS LAB (PY-104)

1. To determine the wave length of monochromatic light by Newton's ring.

2. To determine the wave length of monochromatic light with the help of Fresnel's Biprism.

3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.

4. To determine the specific rotation of cane sugar solution using Biquartz polarimeter.

5. To determine the wavelength of spectral lines using plane transmission grating.

6. To determine the Brewster's angle and refractive index of material with the help of a laser source.

7. To determine the variation of magnetic field along the axis of a current carrying coil and then to estimate the radius of the coil.

8. To verify Stefan's law by electrical method.

9. To determine the energy band gap of a given semiconductor material.

10. To determine the viscosity of a liquid.

ELECTRICAL ENGINEERING LAB (EN-102)

List of Experiments:

1.Verification of Thevenin's Theorem.

2.Verification of Superposition Theorem.

3.Verification of Maximum Power Transfer Theorem.

4.To study V-I characteristics of diode.

5.To study the input & outputcharacteristics of BJT in CE configuration.

6.To study the full wave rectifier circuit with &without filter and determine the ripple factor.

7.To study the phenomenon of resonance in series RLC circuit.

8.Determination of losses in single phase transformer by OCT and SCT.

9.To calibrate a single phase induction type energy meter.

10.To study the running and reversing of a three phase SCIM.

11.Study of OP Amp based inverting and non inverting amplifier.

ENGINEERING GRAPHICS (ME-103)

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1. **Introduction**

    Engineering graphics as a tool to communicate ideas, Lettering and dimensioning. Construction of geometrical figures like pentagon and hexagon.

2. **Orthographic Projection**

    Principles of orthographic projections Principal and auxiliary planes, First and Third angle projections.
    Projection of points. Pictorial view.
    Projection of lines parallel to both the planes. Parallel to one and inclined to other, Inclined to both the planes.
    Application to practical problems.
    Projection of solid in simple position, Axis or slant edge inclined to one and parallel to other plane, solids lying on a face or generator on a plane.
    Sectioning of solids lying in various positions, True shape of the section.
    Development of lateral surfaces, sheet metal drawing.

3. **Isometric Projection**

    Principles of isometric projection, Isometric projection using box and offset methods.

References:

1. Bhatt. N.D. : Elementary Engineering Drawing Charothar Publishing.
2. Laxmi Narayan V and Vaish W: A Text Book of Practical Geometry and Geometrical drawing.

Digital Workforce Skills
CS125

w.e.f. Session 2019-20

L T P C

0 0 2 1

Purpose :

- Technological advancement and its understanding
- The need of skills for future
- Understanding the workflow of organization and processes
- Appreciate basic digital literacy
- Understand the value of data and its importance in the new data driven business
- Understand where technology is going in the few years and be a part of the change
- Creating solution after discovering the challenges
- Understanding the applications and its uses
- Creating small bots to record the information
- Creating an insights by visualising the data

Unit 1 :Getting started and Technology and workplace

- What are the emerging technologies that we should know deeper: Cloud, Data, Analytics, AI, Machine Learning, Block Chain
- A Day in the Life of a Digital Worker
- How is the Digital Workplace different from the Workplace of today?
- Skills for the Future Workforce (Sensemaking, Social Intelligence, New Media Literacy, Design Mindset, Virtual Collaboration)
- Types of collaboration:
  Human to human, Human to Machine and machine to human, Machine to machine

  Key drivers for Collaboration:

- Real time
- Content Management, i.e. sharing of large content, without replication
- Best use of network bandwidth
- Security
  - Diving a level deeper – what are the technology building blocks for collaboration
  - Inform of the latest news updates.
  - Get material needed for work from communities
  - Understands colleagues and contributions
  - Investigates organization reporting line
  - Chats with colleague Instantly
  - Locate expertise in the organization with expert finder
  - Participate in discussions and contributes to communities
  - Contribute and share file with communities
  - Co-author and Co-edit documents
  - Participate in online meeting

• Interesting Use Cases in different domains • Host an online meeting Lab: Simulation Preparation Lab: Information collection from News, Communities and documents Lab: Preparation for a meeting, hosting a meeting and sending the notes	

Unit 2: Impact of technology and work flow

• Communicating and collaborating digitally
• Turn data into insight
• Go digital with forms and processes
• User friendly experience
• Real time case and discussion in depth
• Getting insight from the case
• Identifying the benefits of growth mindsets
• Growth mindsets vs fixed mindsets
• Embracing a Growth Mind set
• Cloud – the game changing layer
 	
    Lab1: Assemble Mobile Application
    Lab 2: Insights from the Real time case study
    Lab 3: Creating a solution through processes and forms
    Lab 4: Skills for the future class game	

Unit 3: Turning Data into sights

• What is data and its types
      • Usefulness of data and its impact
      • Types of Analytics
      • Analytics Driven organization benefits
      • What is Business Intelligence and its types
      • Data Insights, Discovery, exploration
      • Reporting and Dashboarding
      • Ad Hoc Analysis and advanced analysis
      • A story of two halves
      • Story telling and case studies
 	
Lab: Uploading and Understanding the data sets
Lab: Consolidating the data sets, Creating data sets and refining the module,
Lab: Exploring datasets with asking a question, data visualization, Building visualisation using data sets and data slots
Lab: Defining predictive models and hypothesis
Lab: Filtering, drilling and finding the root cause to the problems.	

UNIT 4: Build Online forms with solutions

- Build application on Cloud - Review application design - Gather design elements - Creating a new application and choosing a layout - Designing the forms, configuring the labels and inputs field - Define workflow and approval steps - Define roles and Control access - Deployment and launching an application - Use and Process Application - Review Application Data Analytics Lab: Getting started with cloud and creating an application theme and name Lab: Choosing a layout and design for the application Lab: Selecting the name and forming the fields for an application Lab: Distributing roles, creating relationship and forming values Lab: Working on securities - Setting administrative, user and staff rights. Lab: Review and testing an application.	
Unit 5 :Experience Artificial Intelligence with IBM Watson	
- Intelligent Chatbot and Virtual agents across variety of channels - Unlocking hidden values in unstructured data - Ability to tag content inside an image - Ability to convert speech to text and text to speech - Translating one language to another - Understanding the content tone, personality and emotional stage - Use cases and functionalities Lab 1: Watson Assistant Lab 2: Synthesizes natural sounding speech from text Lab 3: Natural Language classifier and translator Lab 4: Natural Language Understanding and knowledge studio Lab 5: Tone analyser and personality Insights	