गुरू घासीदास विश्वविद्यालय (मेदेर किरीवल अभिम 2008 ह 25 वे आंध साहिर नेदेर किरीवल) कोनी, बिलासपुर - 495009 (छ.ग.)



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List of New Course(s) Introduced

Depar	rtment	: Pure and applied physics
Progr	amme Name	: B.Sc. Electronics
		Academic Year : <mark>2018-19</mark>
List of	f New Course(s) I	Introduced
Sr. No.	Course Code	Name of the Course
01.	PS/ELEC/SEC-301L	Electronics Workshop Skills
02.	PS/ELEC/SEC-401L	Electrical Circuits and Network Skills
03.	PS/ELEC/C-102L	Mathematics Foundation for Electronics
04.	PS/ELEC/C-204L	Applied Physics
	PS/ELEC/C-101P	Basic Circuit Theory and Network Analysis Lab
	PS/ELEC/C-102P	Mathematics Foundation for Electronics Lab
	PS/ELEC/C-203P	Semi-Conductor Devices Lab
	PS/ELEC/C-204P	Applied Physics Lab

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Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Art 2009 No. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : School of Physical Sciences

Department : **Pure and Applied Physics**

Date and Time : July 13, 2018 - 11:30 AM; July 18, 2018 - 5:00 PM

Venue : *Smart Class Room*

The scheduled meetings of member of Board of Studies (BoS) of Department of Pure and Applied Physics, School of Studies of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, were held to design and discuss the B. Sc (Physics) Second year (III and IV Semesters), scheme and syllabi.

The following members were present in the meeting:

- 1. Prof. P K. Bajpai
- 2. Dr. H. S. Tewari
- 3. Prof. S. B. Kondawar (External Member)
- 4. Dr. M. N. Tripathi
- 5. Dr. P. Thakur
- 6. Dr. R. K. Pandey
- 7. Dr. T. G. Reddy
- 8. Dr. R. P. Prajapati
- 9. Dr. A. K. Gupta
- 10. Dr. M. P. Sharma
- 11. Dr. P. Das
- 12. Dr. T. Trivedi
- 13. Dr. S. P. Patel
- 14. Prof. R. Dhar (External member)

The committee discussed and approved the scheme and syllabi. The following Skill Enhancement courses were addec in the B. Sc. (Physics) Second year (III and IV Semesters):

Electronics Workshop Skills

Electrical Circuits and Network Skills

Mathematics Foundation for Electronics

Applied Physics

Basic Circuit Theory and Network Analysis Lab

Mathematics Foundation for Electronics Lab

Semi-Conductor Devices Lab

Applied Physics Lab

Signature & Seal of HoD





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Course Structure & Syllabus of B.Sc. Electronics Session -2019

School of Physical Sciences: B.Sc. Hon's (Electronics)

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / weak
	Core-1	PS/ELEC/C-101L	Basic Circuit Theory and Network Analysis	- (4	4
	Core -1 Practical	PS/ ELEC./C-101P	Basic Circuit Theory and Network Analysis Lab	2	4
	Core -2	PS/ ELEC./C-102L	Mathematics Foundation for Electronics	4	4
	Core -2 Practical	PS/ELEC/C-P-102P	Mathematics Foundation for Electronics Lab	2	4
	Generic Elective -1 (GE-1A)	PS/ELEC/GE-101	To be opted from the pool*	4	4
	Generic Elective - Practical	PS/ELEC./GE-P-101	GE-101 practical as opted	2	4
	Ability Enhancement Compulsory Course (AECC)	PS/ELEC./AE- 101/EC	English Communication / MIL (Hindi Communication)	4^{\oplus}	4
-	ECA	Open elective (Optional)	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			TOTAL	24	28
ш	Core-3	PS/ELEC/C-203L	Semiconductor Devices	4	4
	Core -3 Practical	PS/ ELEC /CP-203P	Semiconductor Devices Lab	2	4
	Core -4	PS/ ELEC /C-204L	Applied Physics	- 4	4.
	Core -4 Practical	PS/ ELEC /CP-204P	Applied Physics Lab	2	4
	Generic Elective -2 (GE-IB)	PS/ ELEC /GE-202/	GE-102 (second course of the same subject as opted in GE-101	4	4
	Generic Elective - Practical	PS/ ELEC /GE-P-202/	GE-202 practical as opted	2	4
	Ability Enhancement Compulsory Course (AECC)	PS/ ELEC /AE- 201/ES	Environmental Science	42	4
	ECA	Optional elective	ECA-Extracarricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			Total	24	28





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IER Internship: 15 days	Optional elective	Swayam Swachhta / NSS / Industrial/ others	2	100
Core-5	PS/ ELEC /C-301L	Electronic Circuits	4	4
Core -5 Practical	PS/ ELEC /C-301P	Electronic Circuits Lab	2	4
Core -6	PS/ELEC /C-302L	Digital Electronics and VHDL	- 4	4
Core -6 Practical	PS/ELEC /C-302P	Digital Electronics and VHDL Lab	2	4
Core - 7	PS/ELEC/C-303L	C Programming and Data Structures	4	4
Core - 7 Practical	PS/ELEC/C-303P	C Programming and Data Structures Lab	2	4
Generic Elective -3 (GEII-A)		To be opted from the pool of GE	4	-4
Generic Elective - Practical		I SCOOL STRUCTURE AND	2	4
Skill Enhancement Course (SEC + 1)		To be opted from the pool of SE courses**	4*	2 (4)
No. of the second se		Total	28	34
Carel	DSUELEC /C.4011	Ourselford Amplifiers and Applieding		4
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	P. OT BERIEFE THE TREAT		14	4
		rook open nom me poer or Generie courses		4
Skill Enhancement Course		To be opted from the pool of SE courses	4*	2 (4)
A1970-01-000		TOTAL	28	34
ER Internship: 15 days	Optional elective	Swayam Swachhta / NSS / Industrial/ others	2	100
Consti	Descert for an abit	Missource and Missourcellure	14	4
the second se				i i
Core -12	PS/ ELEC /C-502L	Electromagnetics	4	4
Core -12 Practical	PS/ ELEC /C-502P	Electromagnetics Lab	-	1
	Core-5 Core -5 Practical Core -6 Core -6 Practical Core -7 Core - 7 Practical Generic Elective -3 (GEII-A) Generic Elective -3 (GEII-A) Core-8 Core-8 Core -8 Core -8 Core -8 Core -9 Core -9 Core -9 Core -9 Core -9 Core -10 Core -11 Core -1 Core -1 Core -1 Core -1 Core -1 Core -1 Co	Core-5 PS/ ELEC /C-301L Core -5 Practical PS/ ELEC /C-301L Core -6 PS/ ELEC /C-302L Core -7 PS/ ELEC /C-303L Generic Elective - Practical PS/ ELEC /C-303P Skill Enhancement Course (SEC + 1) PS/ ELEC /C-401L Core -8 PS/ ELEC /C-401L Core -9 PS/ ELEC /C-402L Core -10 PS/ ELEC /C-403L Core -10 Practical PS/ ELEC /C-403L Core -10 Practical PS/ ELEC /C-403L Core -10 Practical PS/ ELEC /C-403L Generic Elective - Practical PS/ ELEC /C-403L Generic Elective - Practical Skill Enhancement Course (SEC -2) ER Internship: 15 days Optional elective Core -11 PS/ ELEC /C-501L PS/ ELEC /C-501L PS/ ELEC /C-501L	Core-5 PS/ ELEC /C-301L Electronic Circuits Electronic Circuits Core -5 PS/ ELEC /C-301P Electronic Circuits Electronic Circuits Lab Core -6 PS/ ELEC /C-302L Digital Electronics and VHDL Lab Core -7 PS/ ELEC /C-303L C Programming and Data Structures PS/ ELEC /C-303H Generic Elective - 7 Ps/ ELEC /C-303P C Programming and Data Structures Lab To be opted from the pool of GE Generic Elective - Practical PS/ ELEC /C-403H To be opted from the pool of SE courses** Total Core -8 PS/ ELEC /C-401H Operational Amplifiers and Applications Core -8 Core -8 PS/ ELEC /C-401H Operational Amplifiers and Applications Lab Core -8 PS/ ELEC /C-401H Operational Amplifiers and Applications Lab Core -9 PS/ ELEC /C-401H Operational Amplifiers and Applications Lab Core -9 PS/ ELEC /C-401H Operational Amplifiers and Applications Lab Core -10 PS/ ELEC /C-403H Electronic Instrumentation Lab Core -10 PS/ ELEC /C-403H Electronic Instrumentation<	Core-5 PS/ ELEC /C-301L Electronic Circuits 4 Core -5 Practical PS/ ELEC /C-301P Electronic Circuits Lab 2 Core -6 PS ELEC /C-302L Digital Electronics and VHDL 4 Core -6 PS ELEC /C-302P Digital Electronics and VHDL 4 Core -7 PS ELEC /C-303L C Programming and Data Structures 4 Core -7 PS/ ELEC /C-303P C Programming and Data Structures Lab 2 Generic Elective -3 (GEII-A) To be opted from the pool of GE 4 Generic Elective - Practical PS/ ELEC /C-401L Operational Amplifiers and Applications Lah 2 Skill Enhancement Course Signals and Systems 4 2 Core -8 PS/ ELEC /C-401L Operational Amplifiers and Applications Lah 2 Core -9 PS/ ELEC /C-401P Operational Amplifiers and Applications Lah 2 Core -9 PS/ ELEC /C-401P Operational Amplifiers and Applications Lah 2 Core -9 PS/ ELEC /C-401P Operational Amplifiers and Applications Lah 2 Core -10 PS/ ELEC /C-403L Electronic Instrume





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	Discipline Specific Elective (DSE-1)	PS/ELEC/DSE-5011.	DSE-I	4	4
	DSE-1 - Practical	PS/ELEC/DSE-501P	DSE-I Lab	2	4
	Discipline Specific Elective - (DSE-2)	PS/ELEC/DSE-502L	DSE-2 .	4	4
	DSE-2 - Practical	PS/ELEC/DSE-502P	DSE-2 Lab	2	4
_			TOTAL	24	32
	Core-13	PS/'ELEC /C-601L	Communication Electronics	4	4
	Core -13 Practical	PS/ ELEC /C-601P	Communication Electronics Lab	2	4
	Core -14	PS/ ELEC /C-602L	Photonics	4	4
	Core -14 Practical	PS/ ELEC /C-602P	Photonics Lab	2	4
	Discipline Specific Elective (DSE-3)	PS/ELEC/DSE-503L	DSE-3	4	4
VI	DSE-3 - Practical	PS/ELEC/DSE-503P	DSE-3 Lab	2	4
	Discipline Specific Elective (DSE-4) + DSE-4 - Practical Or Dissertation/ Project work followed by seminar	PS/ELEC/PD		4+2=6 Or 5+1=6	8
			TOTAL	24	32
			TOTAL CREDITS	152 +	4 (SI)
departm two GE	nents. The No. of GE course is four. On courses (from one subject) in first two	e GE course is compulsory semesters after which stu	er GE and SEC courses offered by any departmen in first 4 semesters each. In present scheme it is dent shall change two GE for another subject in I approval by the competent authority).	proposed to have m	inimum , so that





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General electives to be offered by Electronics (for Physics/Maths /Electronics/ Comp. Sc. students) GE/101/ELEC Basic Circuit Theory and Network Analysis GE/102/ ELSC: Mathematics Foundation for Electronics '> GE/201/ ELEC: Semiconductor Devices 🛠 GE/202/ ELEC: Applied Physics List of General elective for Electronics Honors: (Ist SEM) GE/201/Maths GE/202/Maths GE/201/PHY GE/202/PHY GE/201/COMP. Sc. GE/202/COMP. Sc. Skill Enhancement Courses (02 to 04 papers) (Credit: 02 each)- SEC1 to SEC4 1. Design and Fabrication of Printed Circuit Boards (4) 2. Electronics Workshop Skills 3. Electrical circuit network Skills Basic Instrumentation Skills
 Renewable Energy and Energy harvesting abont tours by the 6. Radiation Safety

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Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Ant 2009 No. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

MathematicsFoundationforElectronics

(Credits:Theory-04,Practicals-02)

Objective-

- To build the strong foundation inMathematics of students needed for the field of electronics and Telecommunication Engineering
- Solve higher order linear differential equation using appropriate techniques for modelling and analysing electrical circuits.

Unit-1

Ordinary Differential Equations: First Order Ordinary Differential Equations, Basic Concepts, Separable Ordinary Differential Equations, Exact Ordinary Differential Equations, Linear Ordinary Differential Equations. Second Order homogeneous and non-homogeneous Differential Equations.

Series solution of differential equations and special functions: Power series method, Legendre Polynomials, Frobenius Method, Bessel's equations and Bessel's functions of first and second kind. Error functions and gamma function.

Unit-2

Matrices: IntroductiontoMatrices, System of Linear Algebraic Equations, Gaussian Elimination Method, EigenValues and EigenVectors, Linear Transformation, Properties of EigenValues and EigenVectors, Cayley-Hamilton

Theorem, Diagonalization, Powersofa Matrix. Real and Complex Matrices, Symmetric, Skew Symmetric, Orthogonal Quadratic Form, Hermitian, Skew Hermitian, Unitary Matrices.

Unit-3

Sequencesandseries: Sequences,Limitofasequence,Convergence,DivergenceandOscillationofa sequence,Infiniteseries, conditionforConvergence,Cauchy'sIntegralTest,D'Alembert'sRatio Test, Cauchy's nth Root Test, Alternating Series,Leibnitz's Theorem, Absolute Convergence and Conditional Convergence, Power Series.

Unit-4

Complex Variables and Functions:Complex Variable, Complex Function, Continuity, Differentiability, Analyticity. Cauchy-Riemann (C- R) Equations, Harmonic and ConjugateHarmonic Functions, Exponential Function, Line Integral in Complex Plane, Cauchy's Integral Theorem,Cauchy'sIntegralFormula,

DerivativeofAnalyticFunctions.Sequences,SeriesandPowerSeries,Taylor's Series, Laurent Series, Zeroes and Poles.Residue integration method, Residue integration of real Integrals.

Outcomes

- Demonstrate basic knowledge of solving differential equations, introduction to special functions like Bessel and Legendre.
- Demonstrate basic knowledge of Matrix Theory, convergence and divergence of a series and Complex Integration..

References: 1. E. Kreyszig, advanced engineering mathematics, Wiley India (2008) 2.MurraySpiegel,SeymourLipschutz,JohnSchiller,OutlineofComplexVariables, SchaumOutlineS eries, Tata McGraw Hill (2007) and the astrony astrony





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MathematicsFoundationforElectronicsLab(MATLAB/anyotherMathem aticalSimulation software) 60 Lectures

Objective- To impart adequate knowledge on the need of programming languages and problem solving techniques.

- 1. Solution of First Order Differential Equations
- 2. Solution of Second Order homogeneous Differential Equations
- 3. Solution of Second Order non-homogeneous Differential Equations
- 4. Convergence of a given series.
- 5. Divergence of a given series.
- 6. Solution of linear systemof equations using Gauss Elimination method.
- 7. Solution of linear systemof equations using Gauss Seidel method.
- 8. Solution of linear systemof equations using L-U decomposition method.

Outcomes-

- systems this will be very useful forbitwise operations.
- Develop programs using the basic elements like control statements, Arrays and Strings
- Students will understand basics of numerical analysis.

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Semiconductor Devices Lab (Hardware and Circuit Simulation Software) 60 Lectures

Objective-

- To make the students understand coherence between theory and practical.
- Develop the skills needed to set up the circuits required to test models or theory developed in the lecture course
- To study voltage current characteristics for various active components and also of solar cell.
 - 1. Study of the I-V Characteristics of Diode Ordinary and Zener Diode.
 - 2. Study of the I-V Characteristics of the CE configuration of BJT and obtain r_i , r_o , β .
 - 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i , r_o , α .
 - 4. StudyoftheI-VCharacteristicsoftheCommonCollectorConfigurationofBJTandobtainvoltage gain, ri, r_o .
 - 5. Study of the I-V Characteristics of the UJT.
 - 6. Study of the I-V Characteristics of the SCR.
 - 7. Study of the I-V Characteristics of JFET.
 - 8. Study of the I-V Characteristics of MOSFET.
 - 9. Study of Characteristics of Solar Cell
 - 10. Study of Hall Effect.

Outcomes - Understanding the connection between theory and practicalas well as to make familiar with Experiments

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Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Art 2009 No. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

AppliedPhysics

(Credits:Theory-04,Practicals-02)

Objective - Develop the skills needed to set up the equipment required to test models ortheory developed in the lecture course

Unit-1

QuantumPhysics: InadequaciesofClassicalphysics, Compton'seffect,Photo-electricEffect,Wave-particle duality,deBroglie waves, Basicpostulatesandformalism ofquantum mechanics:probabilisticinterpretation ofwaves,conditionsforphysicalacceptabilityofwavefunctions.Schrodingerwaveequationforafree particleand inaforce-field(1dimension),Boundaryandcontinuityconditions.Operators inQuantum Mechanics,Conservationof probability, Time-dependentform,Linearity andsuperposition, Operators,Time- independent one dimensional Schrodinger wave equation, Stationary states, Eigen-values and Eigen functions.

Unit-2

Mechanical Properties of Materials:Elastic and Plastic Deformations, Hooke's Law, ElasticModuli, BrittleandDuctileMaterials,TensileStrength,TheoreticalandCriticalShearStressofCrystals.StrengtheningMechanisms, Hardness, Creep, Fatigue, Fracture.Crystals.Strengthening

Unit-3

ThermalProperties:Brief Introductionto Laws of Thermodynamics,ConceptofEntropy,Conceptof Phonons, Heat Capacity, Debye's Law, Lattice Specific Heat, Electronic Specific Heat, Specific Heat Capacityfor Si and GaAs, Thermal Conductivity, Thermoelectricity,Seebeck Effect, Thomson Effect, Peltier Effect.

Unit-4

ElectricandMagneticProperties: Conductivityofmetals,Ohm'sLaw,relaxationtime,collisiontimeand meanfreepath,electronscatteringandresistivityofmetals,heatdevelopedincurrent carrying conductor, Superconductivity.

Classification of Magnetic Materials, Origin of Magnetic moment, Originof dia, para, ferroand antiferrom agnetism and their comparison, Ferrimagnetic materials, Saturation Magnetisation and Curie temperature, Magnetic domains, Concepts of Giant Magnetic Resistance (GMR), Magnetic recording.

Outocmes- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.

References:

- 1. S. Vijaya and G. Rangarajan, Material Science, Tata McGraw Hill (2003)
- 2. W. E. Callister, Material Science and Engineering: An Introduction, Wiley India (2006)
- 3. A. Beiser, Concepts of Modern Physics, McGraw-Hill Book Company (1987)
- 4. A. Ghatak& S. Lokanathan, QuantumMechanics: Theory and Applications, Macmillan India (2004)
- 5. M.C. Jain , Quantum Mechanics



गुरू घासीदास विश्वविद्यालय (हेन्द्रेर विवरेवकर अधिम 2008 ह. 25 हे आंध साथिर हेन्द्रेर विवरेवकर) कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya (A Central University Established by the Central Universities Ant 2009 Mo. 25 of 2009) Koni, Bilaspur – 495009 (C.G.)

Applied Physics Lab 60 Lectures

Objective- To learn the usage of electrical and optical systems for measurement of Young modulus and Planck's constant

- 1. To determine Young's modulus of a wire by optical lever method.
- 2. To determine the modulus of rigidity of a wire by Maxwell's needle.
- 3. To determine the elastic constants of a wire by Searle's method.
- 4. To measure the resistivity of a Ge crystal with temperature y four –probe method from room temperature to 200 0 C).
- 5. To determine the value of Boltzmann Constantby studying forward characteristics of diode.
- 6. To determine the value of Planck's constant by using LEDs of at least4 different wavelengths.
- 7. To determine e/m ratio of electron by Bar Magnet or by Magnetic Focusing.

Outcomes- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.

एवं अनुप्रयुक्त of Pure & Applied Physics रू घासीदास विश्वविद्यालय Guru Ghasidas 128





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Electronics Circuits

Semester -III(Credits: Theory-04, Practicals-02)

Objective-

- To teach students how to analyzeelectrical filters and amplifiers using op- amps, transistors & diodes.
- To learn basic function of single stage amplifier, multistage amplifier and power Amplifier and their working principle.

Theory Lectures 60

Unit-1(14 Lectures): **Diode Circuits**: Ideal diode, dc load line analysis, Quiescent (Q) point. Clipping and clamping circuits. Rectifiers: HWR, FWR (center tapped and bridge). Circuit diagrams, working and waveforms, ripple factor 8 efficiency, comparison. Filters: types, circuit diagram and explanation of shunt capacitor filter withwaveforms.

Zener diode, regulator circuit diagram and explanation for load and line regulation, disadvantages of Zener diode regulator.

Unit-2 (15 Lectures): **Bipolar Junction Transistor**: Review of CE, CB Characteristics and regions of operation. Hybric parameters, Transistor biasing, DC load line, operating point, thermal runaway, stability and stability factor, Fixed bias without and with RE, collector to base bias, voltage divider bias and emitter bias ($+V_{CC}$ and $-V_{EE}$ bias), circuit diagrams and theirworking Transistor as a switch, circuit and working,BJT amplifier (CE), dc and ac load line analysis, hybrid mode of CE configuration.

Unit-3 (13 Lectures): **Feedback Amplifiers:** Concept of feedback, negative and positive feedback, advantages and disadvantages of negative feedback, voltage (series and shunt), current (series and shunt) feedback amplifiers, gain, input and output impedances. Barkhausen criteria for oscillations, Study of phase shift oscillator, Colpitts oscillator and Hartley oscillator.

Unit-4 (18 Lectures): **MOSFET Circuits**: Review of Depletion and Enhancement MOSFET, Biasing of MOSFETs, Smal Signal Parameters, Common Source amplifier circuit analysis, CMOS circuits. **Power Amplifiers:** Classification of power amplifiers, Class A, Class B, Class C and their comparisons. Operation of a Class A single ended power amplifier Operation of Transformer coupled Class A power amplifier, overall efficiency. Circuit operation of complementary symmetry Class B push pull poweramplifier, crossover distortion, heatsinks.

Outcomes - To understand basic construction of feedback circuits and their application in Oscillators. To understand basic amplifier and oscillator circuits and their application

References:

- 1. Electronic Devices and circuit theory, Robert Boylstead and Louis Nashelsky, 9th Edition, 2013, PHI
- 2. Electronic devices, David A Bell, Reston PublishingCompany

Dept. of Pure & Applied Physics गुरु घासीदास विश्वविद्यालय Guru Ghasidas Yişhi धेलासपुर (छ.ग.) Wavidva

गुरू घासीदास विश्वविद्यालय (हेरेर विकायक अधिम 2009 व. 25 हे कांग्र लागिर हेन्द्रेर विवीचक) कोनी, बिलासपुर - 495009 (छ.ग.)



ELECTRICAL CIRCUITS AND NETWORK SKILLS (with Electrical Engineering) (Credits:02)

Theory:30Lectures

Objective -The aim of this course is to enable the students to design and trouble shoots the electrical circuits, networks and appliances through hands-on mode.

Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law.Series, parallel, and series- parallel combinations.AC and DC Electricity.Familiarization with multimeter, voltmeter and ammeter.(**3 Lectures**)

Understanding Electrical Circuits: Basic electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source.Power factor.Saving energy and money.(4 Lectures)

Electrical Drawing and Symbols: Drawing symbols. Blueprints.Reading Schematics. Ladder diagrams. ElectricalSchematics.Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of
elements and identify current flow and voltage drop.

(4 Lectures)

Generators and Transformers: DC Power sources. AC/DC generators.Inductance, capacitance, and impedance.Operation of transformers.(**3 Lectures**)

ElectricMotors:Single-phase,three-phase&DCmotors.Basicdesign.InterfacingDCor AC sources to control heaters & motors. Speed & power of ac motor. (**4 Lectures**)

Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers.Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources(**3 Lectures**)

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection.Grounding and isolating. Phase reversal. Surge protection. Relay protection device.(4 Lectures)

Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection.Voltage drop and losses across cables and conductors.Instruments to measure current, voltage, power in DC and AC circuits.Insulation.Solid and stranded cable.Conduit.Cable trays.Splices: wirenuts,crimps, terminal blocks andsolder. Preparation of extension board.(**5 Lectures**)

Outcomes – 1 apply the knowledge of basic circuital law and simplify the network using reduction techniques

2 Analyze the circuit using Kirchhoff's law and Network simplification theorems

References:

- 1. Electrical Circuits, K.A. Smith and R.E. Alley, 2014, Cambridge University Press
- 2. A text book in Electrical Technology B L Theraja S Chand & Co.
- 3. A text book of Electrical Technology A K Theraja
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