गुरु घासीदास विश्वविद्यालय
(केंद्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केंद्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

List of Revised Courses

Department	: *Pure and Applied Physics*
Program Name	: *B.Sc. (Electronics)*

Academic Year : 2019-20

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.		Microprocessor and Microcontrollers
02.		Electromagnetics

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

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

Academic Year : 2019-20	
School	: *School of Physical Sciences*
Department	: *Pure and Applied Physics*
Date and Time :	*July 13, 2018 – 11:30 AM*
Venue	: *Smart Class Room*

The scheduled meeting of member of Board of Studies (BoS) of Department of Pure and Applied Physics, School of Studies of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, was held to design and discuss the B. Sc. (Electronics) First year (V and VI 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 courses were revised in the B. Sc. (Electronics) Third year (V and VI Semesters):

- ❖ Microprocessor and Microcontrollers
- ❖ Electromagnetics

Signature & Seal of HoD

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

Scheme and Syllabus

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

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
I	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- IA)	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*	4
	ECA	Open elective (Optional)	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			TOTAL	24	28
II	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	4*	4
	ECA	Optional elective *	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			Total	24	28

गुरु घासीदास विश्वविद्यालय
(केंद्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केंद्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

SUMMER 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
III	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			2	4
	Skill Enhancement Course (SEC - 1)		To be opted from the pool of SE courses**	4*	2 (4)
			Total	28	34
	Core-8	PS/ ELEC/C-401L	Operational Amplifiers and Applications	4	4
	Core -8 Practical	PS/ ELEC /C-401P	Operational Amplifiers and Applications Lab	2	4
	Core -9	PS/ ELEC /C-402L	Signals and Systems	4	4
	Core -9 Practical	PS/ ELEC /C-402P	Signals and Systems Lab	2	4
IV	Core - 10	PS/ ELEC /C-403L	Electronic Instrumentation	4	4
	Core -10 Practical	PS/ ELEC /C-403P	Electronic Instrumentation Lab	2	4
	Generic Elective -4 (GEII-B)		To be opted from the pool of Generic courses	4	4
	Generic Elective - Practical			4	4
	Skill Enhancement Course (SEC -2)		To be opted from the pool of SE courses	4*	2 (4)
			TOTAL	28	34
SUMMER Internship: 15 days		Optional elective	Swayam Swachhta / NSS / Industrial/ others	2	100
	Core-11	PS/ ELEC /C-501L	Microprocessors and Microcontrollers	4	4
V	Core -11 Practical	PS/ ELEC /C-501P	Microprocessors and Microcontrollers Lab	2	4
	Core -12	PS/ ELEC /C-502L	Electromagnetics	4	4
	Core -12 Practical	PS/ ELEC /C-502P	Electromagnetics Lab	2	4

गुरु घासीदास विश्वविद्यालय
(केंद्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केंद्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

	Discipline Specific Elective (DSE-1)	PS/ELEC./DSE-501L	DSE-1	4	4
	DSE-1 - Practical	PS/ELEC/DSE-501P	DSE-1 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
	DSE-3 - Practical	PS/ELEC/DSE-503P	DSE-3 Lab	2	4
VI	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)	

As per UGC CBCS guidelines, University / departments have liberty to offer GE and SEC courses offered by any department to students of other departments. The No. of GE course is four. One GE course is compulsory in first 4 semesters each. In present scheme it is proposed to have minimum two GE courses (from one subject) in first two semesters after which student shall change two GE for another subject in IIIrd and IVth semester, so that all the student can have exposure of one additional subject. **(Subject to approval by the competent authority).**

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

Microprocessor and Microcontrollers
(Credits: Theory-04, Practicals-02)

Theory Lectures 60

Objective-This subject deals about the basic 16-bit (8086) processor and an 8-bit (8051) controllers, their architecture , internal organization and their functions, interfacing an external device with the processors/ controllers.

Unit-1

(18 Lectures)

Introduction to Microprocessor: Introduction, Applications, Basic block diagram, Speed, Word size, Memory capacity, Classification of microprocessors (mention of different microprocessors being used)

Microprocessor 8085: Features, Architecture -block diagram, General purpose registers, register pairs, flags, stack pointer, program counter, types of buses. Multiplexed address and data bus, generation of control signals, pin description of microprocessor 8085. Basic interfacing concepts, Memory mapped I/O and I/O mapped I/O.

8085 Instructions: Operation code, Operand & Mnemonics. Instruction set of 8085, instruction classification, addressing modes, instruction format. Data transfer instructions, arithmetic instructions, increment & decrement instructions, logical instructions, branch instructions and machine control instructions. Assembly language programming examples.

Unit-2

(10 Lectures)

Stack operations, subroutine, call and return instructions. Delay loops, use of counters, timing diagrams-instruction cycle, machine cycle, T- states, time delay. Interrupt structure of 8085A microprocessor

Microcontrollers: Introduction, different types of microcontrollers, embedded microcontrollers, processor architectures. Harvard vs. Princeton, CISC vs. RISC architectures, microcontroller memory

types, microcontroller features, clocking, I/O pins, interrupts, timers, peripherals.

Unit-3

(18 Lectures)

PIC16F887 Microcontroller: Core features, Architecture, pin diagram, memory organization- Program and data memory organization, I/O Ports, oscillator module, Timer modules (Timer 0, Timer 1 and Timer 2), comparator module, analog-to-digital converter (ADC) module, data EEPROM, Enhanced capture/compare/PWM module , EUSART, master synchronous serial port (MSSP) module, special features of the CPU, interrupts, addressing modes, instruction set.

Unit-4

(14 Lectures)

Interfacing to PIC16F887: LED, Switches, Solid State Relay, Seven Segment Display, 16x2 LCD display, 4x4 Matrix Keyboard, Digital to Analog Converter, Stepper Motor and DC Motor. Interfacing program examples using C language.

Suggested Books:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh S.Gaonkar - Wiley Eastern Limited- IV Edition.
2. Fundamentals of Microprocessor & Microcomputer: B. Ram— Danpat Rai Publications.
3. Microchip PIC16F87X datasheet

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

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

Electromagnetics
(Credits: Theory-04, Practicals-02)

Unit-1

Vector Analysis: Scalars and Vectors, Vector Algebra, Vector Components and Unit Vector, Rectangular (Cartesian) Coordinate System, Cylindrical Coordinates, Spherical Coordinates, Line, Surface and Volume integrals, Del Operator, Gradient of a Scalar, Divergence and Curl of a Vector, the Laplacian.

Electrostatic Fields: Coulomb's Law and Electric Field, Field due to Discrete and Continuous Charge Distributions, Electric Flux Density, Gauss's Law and Applications, Divergence Theorem and Maxwell's First Equation. Electric Potential, Potential due to a Charge and Charge distribution, Electric dipole. Electric Fields in Conductors, Current and Current Density, Dielectric materials, Dielectric Constant, Capacitance and Capacitors, Electrostatic Energy.

Unit- 2

Poisson's Equation and Laplace's Equation: Derivation of Poisson's and Laplace's equation, Examples of Solution of Laplace's Equation.

Magnetostatics: Biot Savert's law and Applications, Magnetic dipole, Ampere's Circuital Law, Curl and Stoke's Theorem, Maxwell's Equation, Magnetic Flux and Magnetic Flux Density, Scaler and vector magnetic potential, Magnetization in Materials and Permeability, Inductors and Inductances, Magnetic Energy.

Unit-3

Time-Varying Fields and Maxwell's Equations: Faraday's Law of Electromagnetic Induction, Stationary Circuit in Time-Varying Magnetic Field, Transformer and Motional EMF, Displacement Current, Maxwell's Equations in differential and integral form and Constitutive Relations. Electromagnetic Boundary Conditions.

Unit-4

Electromagnetic Wave Propagation: Time-Harmonic Electromagnetic Fields and use of Phasors, Electromagnetic Spectrum, Wave Equation in a source free isotropic homogeneous media, Uniform Plane Waves in Lossless and Lossy unbounded homogeneous media, Wave Polarization, Phase and Group velocity, Flow of Electromagnetic Power and Poynting Vector. Uniform Plane wave incident on a Plane conductor boundary, concept of reflection and standing wave.

Suggested Books:

1. Murray. R. Spiegel, Vector Analysis, Schaum series, Tata McGraw Hill (2006)

2. M. N. O. Sadiku, Elements of Electromagnetics, Oxford University Press (2001)

4. D. C. Cheng, Field and Wave Electromagnetics, Pearson Education (2001)