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

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Koni, Bilaspur – 495009 (C.G.)

List of Revised Courses

Department	**: *Mechanical Engineering***
Programme Name	**: *B.Tech.***

Academic Year : 2020-21

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.	MA201TBS01	Mathematics-I
02.	MA202TBS03	Mathematics-II
03.	EC201TES01	Basic Electrical And Electronics Engineering
04.	ME201PES01	Engineering Graphics
05.	EC201PES03	Basic Electrical And Electronics Engineering Lab

विभागाध्यक्ष/Head
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Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2020-21	
School	: *School of Studies of Engineering and Technology*
Department	: *Mechanical Engineering*
Date and Time	: *May 26, 2021 – 11:30 AM*
Venue	: *E-Class Room*

Minutes of Meeting

The scheduled meeting of member of Board of Studies (BOS) of Department of Chemical Engineering, School of Studies of Engineering and Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur was held today (December 29, 2020) in online mode (via Google Meet) to discuss the B.Tech. First year-(I and II semesters) scheme and syllabi for CBCS-New pattern. This scheme and syllabi will be applicable for the students of the batch admitted in session 2020-21. The meeting was conducted in online mode due to Covid-19 pandemic situation. The following members were present in the meeting:

1. Prof. (Mrs.) A. B. Soni (**External Expert Member** BoS, Dept. of Chemical Engg., NIT Raipur)
2. Mr. Suprangya Mohanty (**External Industry Expert Member** BoS, Deputy Manager, HINDALCO, Mahan Unit, Bargawan, Singrauli)
3. Prof. S. N. Saha (**Member** BoS, Dept. of Chemical Engg.)
4. Dr. Anil Kumar Chandrakar (**HOD (I/c)**, Associate Prof., Dept. of Chemical Engg.-cum-**Chairman**, BOS)
5. Mrs. A. N. Joshi (**Member** BoS, Assistant Professor, Dept. of Chemical Engg.)
6. Mr. Amit Jain (Invited Member, Assistant Professor, Dept. of Chemical Engg.)
7. Mr. G. P. Dewangan (Invited Member, Assistant Professor, Dept. of Chemical Engg.)
8. Dr. Raghwendra Singh Thakur (Invited Member, Assistant Professor, Dept. of Chemical Engg.)
9. Mr. Vishnu Prasad Yadav (Invited Member, Assistant Professor, Dept. of Chemical Engg.)
10. Dr. Sandeep Dharmadhikari (Invited Member, Assistant Professor, Dept. of Chemical Engg.)

The committee discussed and approved the scheme and syllabi of B.Tech. First year (I and II Semesters). As per decision between members present in the meeting, this scheme and syllabus is being sent to external BOS members for their review and formal consent.

Prof. (Mrs.) A. B. Soni
External Expert Member, BoS
Professor, Chemical Engg.
NIT, Raipur

Mr. Suprangya Mohanty
External Industry Expert Member, BoS
Deputy Manager, HINDALCO
Mahan Unit, Bargawan, Singarauli

Prof. S. N. Saha
Member, BoS
Professor, Chemical Engg.

Dr. Anil Kumar Chandrakar
Chairman, BOS
HOD (I/c), Chemical Engg.

Mrs. A. N. Joshi
Member, BOS
Assistant Prof., Chemical Engg.

Mr. Amit Jain
Invited Member
Assistant Prof., Chemical Engg.

Dr. Raghwendra Singh Thakur
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Mr. G. P. Dewangan
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Invited Member
Assistant Prof., Chemical Engg.

Dr. Sandeep Dharmadhikari
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The following courses were revised in the of B. Tech. First year (I and II semester):

- ❖ Mathematics-I (MA201TBS01)
- ❖ Mathematics-II (MA202TBS03)
- ❖ Basic Electrical And Electronics Engineering (EC201TES01)
- ❖ Engineering Graphics (ME201PES01)
- ❖ Basic Electrical And Electronics Engineering Lab (EC201PES03)

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Signature & Seal of HoD

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Scheme and Syllabus

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A CENTRAL UNIVERSITY)
CBCS-NEW, EVALUATION SCHEME
PROPOSED (W.E.F. SESSION 2020-21)
B. TECH. FIRST YEAR (SEMESTER- I)
(Common for CH, CE, IPE, ME)

S.No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
THEORY									
1.	MA201TBS01	MATHEMATICS-I	3	1	-	30	70	100	4
2.	CY201TBS02	CHEMISTRY	3	1	-	30	70	100	4
3.	CE201TES01	ENGINEERING MECHANICS New Course	3	1	-	30	70	100	4
4.	CS201TES02	COMPUTER PROGRAMMING	3	0	-	30	70	100	3
5.	CM201TES03	BASIC CIVIL & MECHANICAL ENGINEERING New Course	3	0	-	30	70	100	3
6.	LW201TMC01	INDIAN CONSTITUTION New Course	2	0	-	-	-	-	-
		TOTAL	17	3	-	150	350	500	18
PRACTICALS									
1.	CY201PBS01	CHEMISTRY LAB	-	-	2	30	20	50	1
2.	CE201PES01	ENGINEERING MECHANICS LAB New Course	-	-	2	30	20	50	1
3.	CS201PES02	COMPUTER PROGRAMMING LAB	-	-	2	30	20	50	1
		TOTAL	-	-	6	90	60	150	3
		GRAND TOTAL	17	3	6	240	410	650	21

Total Credits:21   Total Contact Hours:26   Total Marks:650

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L:LECTURE, T:TUTORIAL, P:PRACTICAL, IA : INTERNAL ASSESSMENT, ESE:END SEMESTER EXAMINATION
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.

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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject Code:	MA201TBS01									
Subject:	MATHEMATICS-I	3	1	-	15	15	30			

90% Change

Course Content

Calculus (Single Variable)

UNIT 1: Calculus: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Asymptotes: definition, properties and problems.
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L' Hospital's rule; Maxima and minima.

UNIT 2: Sequences and series: Convergence of sequence and series, tests for convergence, power series, and Taylor's series. Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

UNIT-3: (A): Multi variable Calculus (Differentiation): Limit, continuity and partial derivatives, directional Derivatives, total Derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

(B): *Multivariable Calculus (Integration):* Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

UNIT – 4 (A): Matrices (in case vector spaces is not to be taught): Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms.

(B) Matrices (in case vector spaces is to be taught): Matrices, vectors: addition and scalar multiplication, matrix multiplication; linear systems of Equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

UNIT-5 (A): Vector spaces: Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps, Matrix associated with a linear map.

(B) Vector spaces: Eigenvalues, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, eigenbasis. Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Textbooks/References:
1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 Reprint, 2010.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

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B. TECH. FIRST YEAR SYLLABUS (W.E.F SESSION 2020-21)

SYLLABUS	Periods/	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	TOTAL	70	100	4
Subject Code:	MA202TBS03									
Subject:	MATHEMATICS-II	3	1	-	15	15	30			

90% Change

Course Content:

UNIT 1: First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT 2: Ordinary differential equations of higher orders (Prerequisite 2c, 4a) second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

UNIT 3: Partial Differential Equations – First order (Prerequisite 5a-b): First order partial differential equations, solutions of first order linear and non-linear PDEs.

UNIT 4: Partial Differential Equations– Higher order (Prerequisite 5b-c) Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems).

UNIT 5: D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary- value problems for various linear PDEs in various geometries.

Textbooks/References:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons, 2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
7. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993.
8. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall, 1998.
9. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1964.
10. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition, 2010
11. Denian murry,defferential equations ,oxford publications

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SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
		L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject Code:	EC201TES01 / EC202TES04	3	1	-	15	15	30			
Subject:	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING									

Course Learning Objectives:
- To impart a basic knowledge of electrical quantities such as current, voltage, power, energy and. To provide working knowledge for the analysis of basic DC circuits used in electrical and electronic devices.
- To provide working knowledge for the analysis of basic AC circuits used in electrical and electronic devices and measuring instruments.
- To explain the working principle, construction, applications of Transformer, DC machines and AC machines.
- To make students understand basics of Diodes and Transistors.
- To impart knowledge about basics of Digital Electronics

80% Change

Course Content:

UNIT-1: DC circuits (8 hours)
Electrical circuit elements (R, L and C), voltage and current sources, Ohm's Law, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits. Mesh & nodal analysis, Star-Delta transformation and circuits.

UNIT-2: AC circuits (8 hours)
Representation of sinusoidal waveforms, average and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. Three-phase power measurement- Two-Wattmeter method.
Construction and working principle of single-phase wattmeter and energy meter. Introduction to Sensors and Transducers.

UNIT-3: Electrical machines (8 hours)
Construction, classification, ideal and practical transformer, equivalent circuit, losses in transformers, tests, voltage regulation and efficiency.
Construction, Working Principle, losses and efficiency of DC Machines and three phase Induction Machine, DC motor.

UNIT-4: Semiconductor devices And application (8 hours)
Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics.

UNIT 5: Digital Electronics (8 hours)
Binary Number System, Logic Gates, Combinational circuits, Boolean Algebra, De Morgan's Theorem, Half and Full Adders, Flip- Flops. Sequential circuits-Registers and Counters, A/D a D/A Conversion.

Suggested Text / Reference Books:

(i) D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
(ii) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
(iii)B L Theraja and AK Theraja," A Textbook of Electrical Technology- Vol-I & II, S. CHAND & 2013.
(iv) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
(v) Jacob Millman, Christos Halkias,, Chetan Parikh, "Millman's Integrated Electronics – Anal Digital Circuit and Systems", 2nd Edition 2017
(vi) Robert L Boylestad, Louis Nashlsky," Electronics devices and circuit theory", Pearson 11th 2013
(vii) M. Morris Mano ," Digital Logic and Computer Design", Pearson, 2004.

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SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
Subject Code:	ME201PES01/ ME202PES03							20	50	3
Subject:	ENGINEERING GRAPHICS	1	0	3	30	--	30			

Course Learning Objectives: 30% Change
- To learn the basic of Engineering Drawing and Orthographic Projections
- To learn the Sections and Sectional Views of Right Angular Solids
- To learn the Isometric Projections covering and overview of Computer Graphics

UNIT 1: Introduction Engineering Graphics and Engineering Curves: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction. Engineering Curves - Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids, Involutes and trochoid.

UNIT 2: Projection of Points, Straight lines and Planes: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes. Projections of regular planes, inclined to both planes

UNIT 3: Projections Solids: Introduction, Type of solid, Projections of solids in simple position, Projection of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both H.P. and the V.P.

UNIT 4: Section of Solids and Development of Surfaces: Sectioning of regular solids - Section planes perpendicular to one plane and parallel or inclined to other plane - Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.

UNIT 5: Isometric Projections and Orthographic Views: Principles of Isometric Projections-Isometric Scale- Isometric Views Conventions-Plane Figures, Simple and Compound Solids. Conversion of isometric views to orthographic views. Conversion of orthographic views to isometric projections, vice-versa. Introduction to perspective projection.

Computer Aided Drafting: Introduction to computer aided drafting package to make 2-D drawings. Demonstration purpose only - not to be included in examinations.

Textbooks/References:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, PearsonEducation
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. CAD Software Theory and User Manuals

Course Outcomes:
1. At the end of the course, the student shall be able to
2. Draw engineering curves, orthographic projections of lines, planes and solids.
3. Draw sections of solids including cylinders, cones, prisms and pyramids.
4. Make development of surfaces, Orthographic and Isometric projections
5. Overview of Computer Graphics.

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SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
		L	T	P	IA	MSE	TOTAL			
Subject Code:	EC201PES03/ EC202PES05									
Subject:	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB	-	-	2	30	--	30	20	50	1

Course Learning Objectives:
- To understand basic electrical wiring, measurements, errors and method.
- To practically provide the concept of different theorems.
- To have actually hands-on on machines like transformers, DC and AC machines to get better understanding.
- To get experimental knowledge of Diodes and Transistors
- To make students learn Digital logic design.

40% Change

Course Content:
List of experiments/demonstrations:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
3. Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and Verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
4. Transformers: Polarity test, OC & SC tests. Loading of a transformer: measurement of primary and secondary voltages and currents and power.
5. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), and single-phase induction machine.
6. Study of Diodes and transistors characteristics.
7. Study of full-wave and half-wave rectifier.
8. Verification of De Morgan's theorems.
9. Study of Logic gates.
10. Study of half and full adder.

Course Outcomes: At the end of the course students will be able to:

- Acquire knowledge about different types of meters and take readings and Construct circuits and measure different electrical quantities.
- Analyze Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Work on machines like transformers
- Acquire knowledge about different types of diodes and transistors
- Design and understand digital logic circuits

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