Revised Syllabus
(According to CBCS)
w.e.f. from 2015 – 2016

B.TECH.
IN
ELECTRICAL ENGINEERING

FACULTY OF ENGINEERING & TECHNOLOGY
GURUKULA KANGRI
VISHWAVIDYALAYA
HARIDWAR

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

B. Tech. First Year

SEMESTER-I

S.No.	DSC/SEC/ DSE.	SUBJECT	PERIODS			EVALUATION SCHEME				SUBJECT TOTAL	
						SESSIONAL EVALUATION			EXAM ESE		
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1.	BAP-C101	Engineering Physics	3	1	0	4	20	10	30	70	100
2.	BAM-C 101	Engineering Mathematics-I	3	1	0	4	20	10	30	70	100
3.	BEE -C 101	Basic Electrical Engineering	3	1	0	4	20	10	30	70	100
4.	BEC-C 101	Basic Electronics Engineering	3	1	0	4	20	10	30	70	100
5.	BME-C 102	Basic Manufacturing Process	3	1	0	4	20	10	30	70	100
PRACTICAL											
6.	BAP-C 151	Engineering Physics Lab	0	0	2	2	20	10	30	70	100
7.	BEE -C 151	Basic Electrical Engineering Lab	0	0	2	2	20	10	30	70	100
8.	BEC-C 151	Basic Electronics Engineering Lab	0	0	2	2	20	10	30	70	100
9.	BEG-A151	Technical Communication	0	0	2	2	20	10	30	70	100
10.	BME-C 152	Workshop Practice	0	0	2	2	20	10	30	70	100
	TOTAL		15	5	10	30	200	100	300	700	1000

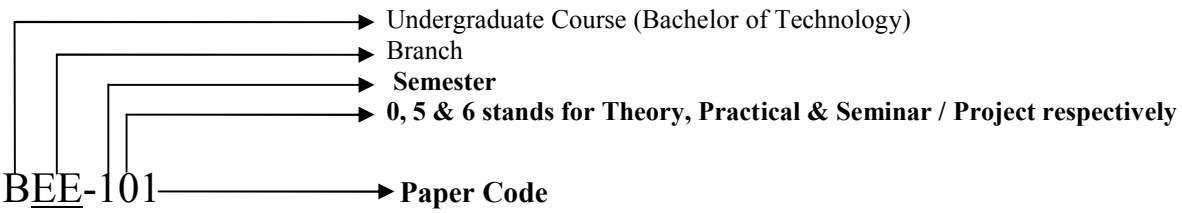
L-LECTURE; T-TUTORIAL; P-PRACTICAL; CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT;

ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course

Coding:

BEC : Electronics BAM : Mathematics
BEG : Humanities BME : Mechanical
BAP : Physics BEE : Electricals



Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

B. Tech. First Year

SEMESTER-II

S.No.	DSC/SEC/ DSE	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BAC-C 201	Engineering Chemistry	3	1	0	4	20	10	30	70	100
2	BAM -C 201	Engineering Mathematics-II	3	1	0	4	20	10	30	70	100
3	BME-C 201	Fundamental of Mechanical Engineering	3	1	0	4	20	10	30	70	100
4	BCE -C 201	Problem solving through 'C'	3	1	0	4	20	10	30	70	100
5	BHU-S 201	Vedic Science & Engineering	2	0	0	2	20	10	30	70	100
6	BEN -A201	Environmental Studies	2	0	0	2	20	10	30	70	100
PRACTICAL											
7.	BAC-C 251	Engineering Chemistry Lab	0	0	2	2	20	10	30	70	100
8	BME-C 251	Basic Mechanical Engineering Lab	0	0	2	2	20	10	30	70	100
9	BCE-C 251	Computer Programming Lab	0	0	2	2	20	10	30	70	100
10	BSP -S251	Physical Training and yoga	0	0	2	0	0	0	100	0	100
11	BME-C 253	Engineering Graphics	0	0	2	2	20	10	30	70	100
TOTAL			16	4	10	28	200	100	300	700	1000

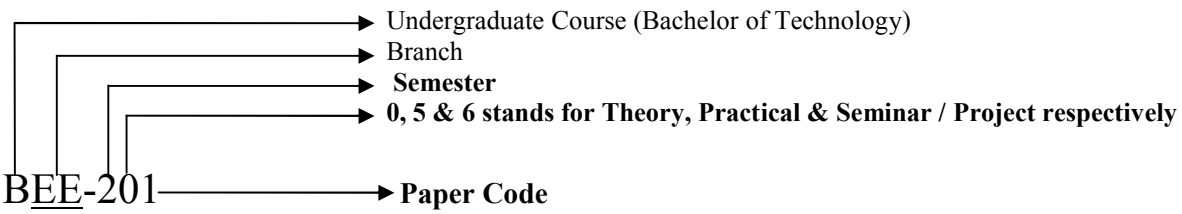
L-LECTURE; T-TUTORIAL; P-PRACTICAL;

CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

BAC: Chemistry B: Mathematics BME: Mechanical

BCE: Computers BHU: Humanities BEN: Environmental

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

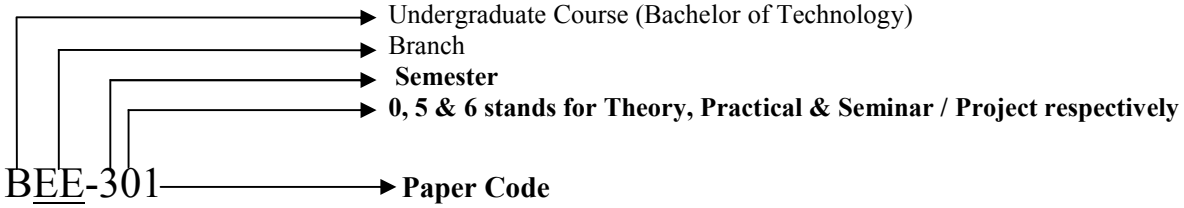
B. Tech. Second Year

SEMESTER-III

S.No.	DSC/SEC/DSE	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BAM-C 301	Engineering Mathematics-III	3	1	0	4	20	10	30	70	100
2	BEE-C 301	Electrical Machines-I	3	1	0	4	20	10	30	70	100
3	BEE-C 302	Network Analysis and Synthesis	3	1	0	4	20	10	30	70	100
4	BEE-C 303	Electrical Measurement and Measuring Instruments	3	1	0	4	20	10	30	70	100
5	BEC-C 301	Electronic Devices and Circuits	3	1	0	4	20	10	30	70	100
6	BCE-C 302	Computer Organization	3	1	0	4	20	10	30	70	100
PRACTICAL											
7	BEE-C 351	Electrical Machine-I Lab	0	0	2	2	20	10	30	70	100
8	BEE -C352	Measurement Lab	0	0	2	2	20	10	30	70	100
9	BEE-C 353	Seminar	0	0	2	2	20	10	30	70	100
10	BEC-C 351	Electronic Devices and Circuits Lab	0	0	2	2	20	10	30	70	100
TOTAL			18	6	8	32	200	100	300	700	1000

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

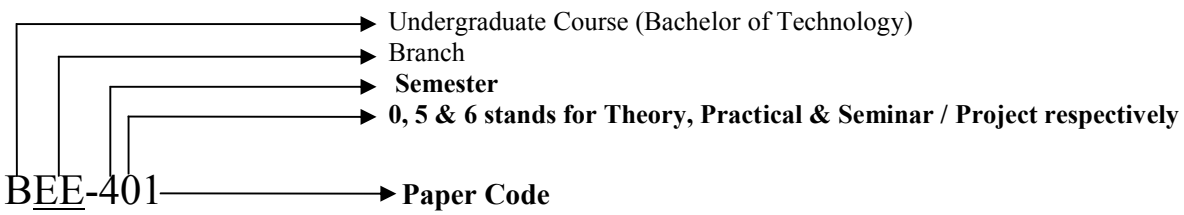
B. Tech. Second Year

SEMESTER-IV

S.No.	DSC/SEC/DSE.	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BEE -C 401	Electrical Machines-II	3	1	0	4	20	10	30	70	100
2	BEE-C 402	Electrical Engineering Materials	3	1	0	4	20	10	30	70	100
3	BEC-C 403	Electromagnetic Field Theory	3	1	0	4	20	10	30	70	100
4	BEC -C 405	Signals and Systems	3	1	0	4	20	10	30	70	100
5	BCE -C 405	C & Data Structure	3	1	0	4	20	10	30	70	100
6	BAM -C 402	Numerical Analysis	3	1	0	4	20	10	30	70	100
PRACTICAL											
7	BEE-C 451	Electrical Machine-II Lab	0	0	2	2	20	10	30	70	100
8	BEE-C 452	Circuit Lab	0	0	2	2	20	10	30	70	100
9	BAM-C 452	Numerical Analysis Lab	0	0	2	2	20	10	30	70	100
10	BCE -C 454	Data Structure Lab	0	0	2	2	20	10	30	70	100
TOTAL			18	6	8	32	200	100	300	700	1000

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

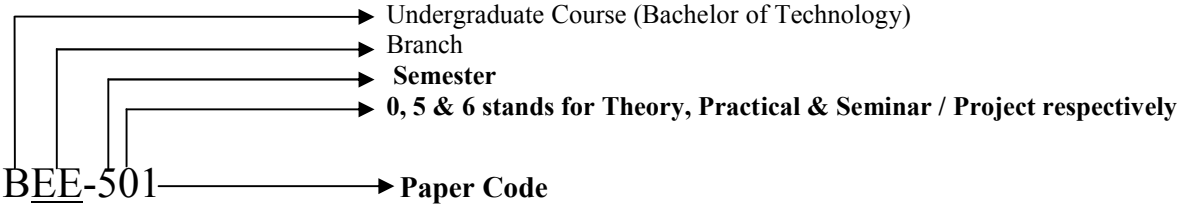
B. Tech. Third Year

SEMESTER-V

S.No.	DSC/SEC/DSE.	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BEE-C 501	Power System-I	3	1	0	4	20	10	30	70	100
2	BEE-C 502	Power Electronics	3	1	0	4	20	10	30	70	100
3	BEE-C 503	Automatic Control System	3	1	0	4	20	10	30	70	100
4	BCE-C 506	Object Oriented Programming using C++	3	1	0	4	20	10	30	70	100
5	BEC-C 506	Digital Electronics	3	1	0	4	20	10	30	70	100
6	BAM-C501	Optimization Techniques	3	1	0	4	20	10	30	70	100
PRACTICAL											
7	BEE-C 551	Power System Lab	0	0	2	2	20	10	30	70	100
8	BEE-C 552	Power Electronics Lab	0	0	2	2	20	10	30	70	100
9	BEE-C 553	Control and Instrumentation Lab	0	0	2	2	20	10	30	70	100
10	BCE-C 554	Object Oriented Programming Lab	0	0	2	2	20	10	30	70	100
TOTAL			18	6	8	32	200	100	300	700	1000

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

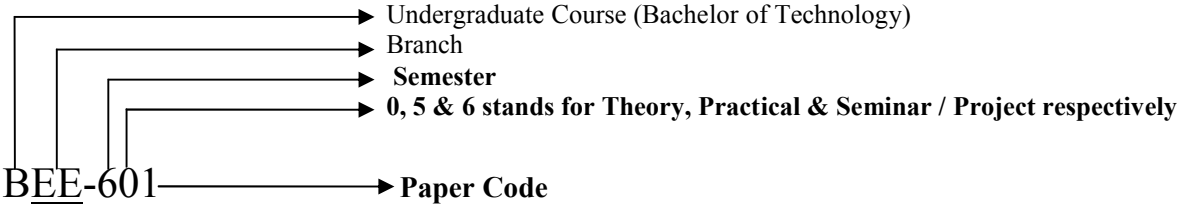
B. Tech. Third Year

SEMESTER-VI

S.No.	DSC/SEC/DSE.	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BEE-C 601	Power System-II	3	1	0	4	20	10	30	70	100
2	BEE-C 602	Computer Aided Design of Electrical Machines	3	1	0	4	20	10	30	70	100
3	BEE-C 603	Instrumentation and Process Control	3	1	0	4	20	10	30	70	100
4	BEC-C 601	Analog Integrated Circuits	3	1	0	4	20	10	30	70	100
5	BEC-C 605	Microprocessor and Microcontroller	3	1	0	4	20	10	30	70	100
6	BHU -C 601	Industrial Economics and Business Administration	3	1	0	4	20	10	30	70	100
PRACTICAL											
7	BEE-C 651	CAD of Electrical Machines Lab	0	0	2	2	20	10	30	70	100
8	BEG -A 651	Technical Communication Lab	0	0	2	2	20	10	30	70	100
9	BEC-C 651	Analog Integrated Circuits Lab	0	0	2	2	20	10	30	70	100
10	BEC-C 654	Microprocessor and Microcontroller Lab	0	0	2	2	20	10	30	70	100
TOTAL			18	6	8	32	200	100	300	700	1000

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

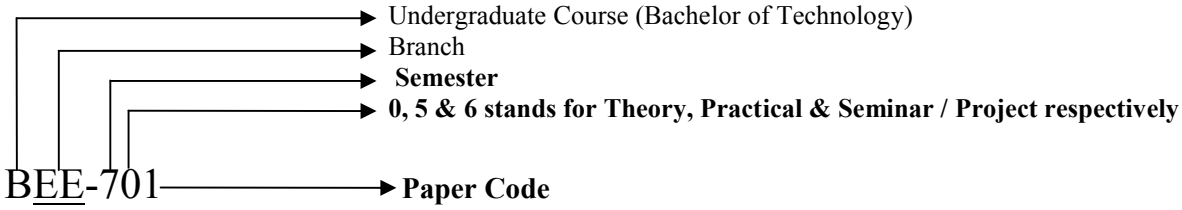
B. Tech. Fourth Year

SEMESTER-VII

S.No.	DSC/SEC/DSE	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	BEE-C 701	Switchgear and Protection	3	1	0	4	20	10	30	70	100
2	BEE-C 702	Electric Drives and Their Control	3	1	0	4	20	10	30	70	100
3	BEE-C 703	Power System Operation and Control	3	1	0	4	20	10	30	70	100
4	BEE-G	Elective-I	3	1	0	4	20	10	30	70	100
5	BEC-C 701	Digital Signal Processing	3	1	0	4	20	10	30	70	100
PRACTICAL											
6	BEE-C 751	Switchgear and Protection Lab	0	0	2	2	20	10	30	70	100
7	BEE-C 752	CAD of Power System Lab	0	0	2	2	20	10	30	70	100
8	BEE-C 760	Minor Project	0	0	4	2	20	10	30	70	100
TOTAL			15	5	8	28	160	80	240	560	800

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATIO

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

B. Tech. Fourth Year

SEMESTER-VII

List of Electives

S. No	CODE	SUBJECT
Elective-I		
1.	BEE-G 704	High Voltage Engineering
2.	BEE-G 711	Bio-Medical Instrumentation
3.	BEE -G 710	EHV AC and DC Transmission
4.	BEE -G 709	Electrical Power Utilization

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty Students should opt for a particular elective.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

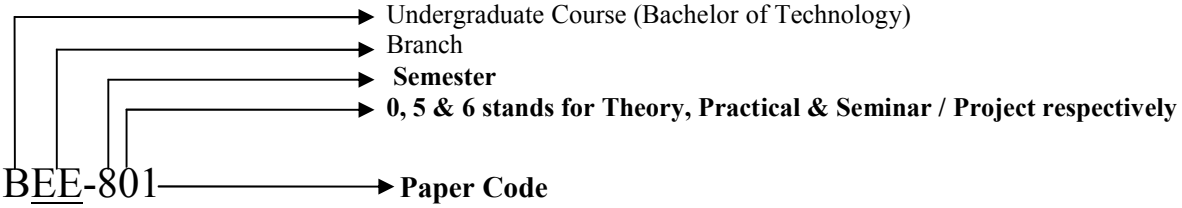
B. Tech. Fourth Year

SEMESTER-VIII

S.No.	DSC/SEC/DSE.	SUBJECT	PERIODS				EVALUATION SCHEME				SUBJECT TOTAL
							SESSIONAL EVALUATION			EXAM ESE	
			L	T	P	Credit	CT	TA	TOTAL		
THEORY											
1	DSE-II	Elective-II	3	1	0	4	20	10	30	70	100
2	DSE-III	Elective-III	3	1	0	4	20	10	30	70	100
3	DSE-IV	Elective-IV	3	1	0	4	20	10	30	70	100
4	DSE-V.	Elective-V	3	1	0	4	20	10	30	70	100
PRACTICAL											
5	BEE-C 860	Major Project	0	0	8	8	0	100	100	300	400
TOTAL			12	4	8	24	80	140	220	580	800

L-LECTURE; T-TUTORIAL; P-PRACTICAL;
CT-CUMULATIVE TEST; TA- TEACHER ASSESSMENT; ESE–END SEMESTER EXAMINATION

C-Discipline Specific Course [DSC]
E- Discipline Specific Elective [DSE]
G-Generic Elective
S-Skill Enhancement Course [SEC]
A-Ability Enhancement Compulsory Course



Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

B. Tech. Fourth Year

SEMESTER-VIII

List of Electives **List of Electives**

S. No	CODE	SUBJECT
1.	BEE-G 803	Renewable Energy Systems
2.	BEE -G 804	Modern Control Systems
3.	BEE -G 805	Static Relays
4.	BEE -G 806	AC Commutator Machines
5.	BEE-G 807	Computer Methods in Power System Analysis
6.	BEE-G 808	Virtual Instrumentation
7.	BEE-G 802	POWER GENERATION SYSTEMS
8.	BHU-G 801	Entrepreneurship Development
9.	BEE-G 801	DIGITAL CONTROL SYSTEM

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.

BAP-C 101
ENGINEERING PHYSICS

MM: 100 **Sessional: 30**
Time: 3 hrs **ESE: 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B & Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Optics: Interference of light, Coherence, Fresnel's Biprism, Interference in thin films & wedge shaped film, Newton's rings. Diffraction of light, Diffraction at a single slit, Double slits, Plane transmission grating. Polarization of light,Brewester's Law, Mauls law, Double refraction, Nicol Prism, Production and analysis of polarized light.

UNIT II

Electromagnetics: Gauss' law and its applications.Maxwell's equations, Poynting theorem, Electromagnetic wave equation (elementary idea of each, no derivation). Magnetic induction, Magnetic field intensity, Magnetic permeability and susceptibility (definitions only), Dia, Para,& ferromagnetic materials (Qualitative idea only). Motion of charged particle in uniform electric and magnetic field, Magnetic and electrostatic focusing, Function and block diagram of CRO.

UNIT III

Special Theory of Relativity & Quantum Theory: Inertial & non-inertial frames of reference, Galilean transformation, Lorentz transformation equation of space and time, Michelson-Morlay experiment, Postulates of special theory of relativity, Length contraction, Time dilation, Addition of velocities, Mass energy equivalence& variation of mass with velocities.
Quantum theory of radiations, Planck's law, Photoelectric effect, de-Broglie concept of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle and its applications, Schrodinger wave equation and its solution for a particle in a box.

UNIT IV

Atomic & Nuclear Physics: Bohr's atomic model and energy level diagram, Sommerfeld relativistic atomic model, Vector atom model, Franck-Hertz experiment, Quantum numbers, general properties of nucleus, Mass defect and packing fraction, Nuclear binding energy, Semi-empirical mass formula.

UNIT V

Solid State Physics: Crystal structure, Miller indices, Separation between lattice planes, Different kinds of crystal bonding, Formation of energy bands in solids (energy level approach), classification of solids, Basic idea of conduction mechanism in semiconductors, Hall effect, X-ray diffraction & Bragg's Law.

References

1. Vasudeva AS, Modern Engineering Physics, S Chand, New Delhi, 1998.
2. Ghatak Ajoy, Optics, TMH, New Delhi, 1999.
3. K.K. Tiwari, Text book of Electricity and Magnetism, S.Chand, New Delhi, 2001
4. Rajam JB.,Atomic Physics, SChand, New Delhi;2000.
5. Beiser Arthur,Concepts of Modern Physics, TMH, New Delhi,1999
6. Mani HS, Modern Physics, New Delhi,1999
7. Kittel Charles(7/e), Introduction to Solid State Physics, John Wiley, Singapore, 1996
8. Murugeshan R (8/e), Modern Physics, S.Chand,New Delhi,2001
9. Kaplan lrving , Nuclear Physics, Narosa ,New Delhi,1998
10. Schiff (3/e), Quantum Mechanics, McGraw, Auckland
11. S.R.Verma, Engg. Physics Vol-I & Vol-II, 2009.

BAP-C 151
ENGINEERING PHYSICS LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To determine the value of Stefan's constant by electrical method.
2. To determine the focal points, principal points and focal length of a combination of lenses by Newton's method and its verification.
3. To determine the focal length of a combination of two lenses by Nodal Slide method and to locate the position of cardinal points.
4. To determine the dispersive power of the material of the given prism.
5. To determine the wavelength of spectral lines by plane transmission grating.
6. To determine the wavelength of monochromatic light with the help of Newton's ring method.
7. To determine the wavelength of monochromatic light with the help of Fresnel's Biprism.
8. To study the variation of magnetic field along the axis of the current carrying coil and then to estimate the radius of the coil.
9. To determine the e/m of electron by magnetron method.
10. To study the characteristics of a photocell.
11. To determine the value of Plank's constant by photoelectric effect.
12. To study the Energy band gap of a semi conducting sample by Four Probe method.
13. To study the Hall effect using Hall effect set up.
14. To determine the susceptibility by Quink's method.
15. To determine the specific resistance of the material of the given wire using C.F. bridge.
16. To study the nature of polarization of Laser light& to verify malus Law.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BAM-C 101
ENGINEERING MATHEMATICS- I

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Calculus I : Successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's Expansion, Indeterminate forms, Radius of curvature, Asymptotes, Double points and their classification, Tracing of curves.

UNIT II

Differential Calculus II : Partial Differentiation of functions, Normal to surfaces and tangent plane, Change of variables, Jacobian, Taylor's series of two variables, Truncation errors, Extrema of function of two and more variables, Method of Lagrange's multipliers.

UNIT III

Multiple Integrals : Fundamental Theorem of integral calculus, Differentiation under the integral sign, Double and triple integrals, Change of order of integration, change of variables. Application to arc length, area , volume, centroid and moment of inertia. Gamma and Beta functions, Dirichlet's integral.

UNIT IV

Vector Calculus : Differentiation of a vector, Scalar and vector fields, Gradient, Divergence, Curl and their physical meanings, Differential operator and identities, Line, Surface and Volume integrals, Green's theorem in plane. Gauss and Stoke's theorems (without proof). Simple applications.

UNIT V

Matrices : Elementary row/ column operations, Rank of a matrix and its applications, Eigen-values and Eign vectors, Cayley-Hamilton theorem, Diagonalisation of Matrices, Linear dependence and independence, Normal matrices, Complex matrices and unitary matrices.

References

1. Prasad C., A first course in mathematics for Engineers, Prasad Mudranalaya
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Srivastava R.S.L., Engineering Mathematics Vol.I

BEE-C 101
BASIC ELECTRICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three sections (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

D.C. Network Theory: Concept of elements**,** Circuit theory concepts- Mesh and node analysis, Star-Delta transformation. Network Theorems- Super-position theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, DC Transients- RL, RC circuits.

UNIT II

Steady State Analysis of A.C. Circuits: Sinusoidal and Phasor representation of voltage and current, average and rms value, form and peak factor of sinusoidal and different waveforms, single -phase A.C. circuit- behavior of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor.
Three Phase A.C. Circuits: Star-Delta connections, line and phase voltage/current relations, three -phase power and its measurement.

UNIT III

Magnetic Circuits: Ampere turns, magnetomotive force, permeability, reluctance, composite magnetic circuits, comparison between magnetic and electric circuits.
Transformer: Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single-phase transformer, O.C. and S.C. tests.

UNIT IV

D. C. Machines : Principle of electromechanical energy conversion, types of D.C. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, speed control of D.C. motors and applications.
Measuring Instruments: Principle of working and constructional features of Permanent Magnet Moving Coil and Moving Iron ammeters and voltmeters, Electrodynamic Wattmeter, Induction type single-phase Energy meter.

UNIT V

Three-phase Induction Motor: Principle of operation, types and methods of starting, slip-torque characteristics and applications.
Single-phase Induction Motor: Principle of operation, methods of starting.
Three-phase Synchronous Machines: Principle of operation and application of synchronous motor.

Text Books

1. V. Del Toro, Principles of Electrical Engineering, Prentice Hall International.
2. H. Cotton, Advanced Electrical Technology, Wheeler Publishing.
3. E. Huges, Electrical Technology.

References

1. B. L., Theraja, Electrical Technology, Vol-1, S. Chand Publisher, New Delhi.
2. W.H. Hayt & J.E. Kennedy, Engineering circuit Analysis, Mc Graw Hill.
3. I.J. Nagrath, Basic Electrical Engineering, Tata Mc Graw Hill.
4. A.E. Fitgerald, D.E., Higginbotham and A Grabel, Basic Electrical Engineering, Mc Graw Hill.
5. Ashfaq Hussain, Fundamentals of Electrical Engineering, Dhanpat Rai Publish.

BEE-C 151
BASIC ELECTRICAL ENGINEERING LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Verification of Kirchoff's laws.
2. Verification of Thevenin's theorems.
3. Verification of Norton's theorem
4. Verification of Superposition theorem.
5. Verification of maximum power transfer theorem.
6. Measurement of power in three-phase circuit by two wattmeter method.
7. Determination of efficiency of a single-phase transformer by load test.
8. To perform open circuit test on single-phase transformer & find equivalent circuit parameters.
9. To perform short circuit test on single-phase transformer & find equivalent circuit parameters.
10. D.C. generator characteristics
    (a) Shunt generator
    (b) Series generator
    (c) Compound generator
11. Speed control of D.C. shunt generator.
12. To study running and reversing of a three-phase Induction Motor.
13. To study & calibration of a single-phase Energy Meter.
14. Calibration of voltmeter and ammeter.
15. To study of resonance in RLC circuit.

NOTE

1.In practical examination the student shall be required to perform one experiment.
2.A teacher shall be assigned 20 students for daily practical work in laboratory.
3.No batch for practical class shall consist of more than 20 students.
4.The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEC-C 101
BASIC ELECTRONICS ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Semiconductors, energy band description of semiconductors, effect of temperature on semiconductors, intrinsic and extrinsic semiconductors, donor and acceptor impurities, electron and hole concentration, conductivity of a semiconductor, mobility, Hall effect, Fermi level, mass action law, charge densities in a semiconductor, diffusion and continuity equation.

UNIT II

P-N junction and its properties, V-I characteristics of P-N junction, semiconductor-diode, depletion layer, equivalent circuits of junction diode, diode equation, diode resistance and capacitance, application of junction diode as clippers, clampers and rectifiers (Half-wave, Full-wave and bridge), efficiency of rectifiers, ripple factor, filter circuits, Zener and avalanche breakdown mechanism, Zener diode and its characteristics, equivalent circuit of Zener diode, Zener diode as a voltage regulator.

UNIT III

Bipolar junction transistor(BJT) and its action, Transistor configurations (CB, CE and CC) and their characteristics, cut-off, active and saturation regions. Transistor as a switch, operating point, dc load line, Transistor biasing and its necessity, thermal runaway, types of biasing and their analysis, stability factors, Transistor as a regulator.

UNIT IV

Concept of Transistor amplifier, graphical analysis of CE amplifier, dc and ac equivalent circuits, Emitter follower and its ac model. Basic idea of operational amplifier and OP-AMP parameters, inverting, non-inverting and unity gain configurations. Application of OP-AMP as adder, subtractor, differentiator and integrator.

UNIT V

Number system, conversion of bases (decimal ,binary, octal and hexadecimal), addition and subtraction, BCD numbers, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map, don't care conditions.

Text Book

1. Integrated Electronics: Jacob Millman & C.C. Halkias

References

1. Malvino and leach “Digital principle and applications.
2. Streetman Ben.G, “Solid state electronic devices” (3/e), PHI
3. Millman and grabel, “Microelectronics” PHI
4. Robert Bolyestad “Electronic devices and circuit”, PHI

BEC-C 151
BASIC ELECTRONICS ENGINEERING LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To draw the V-I characteristics of PN junction diode.
2. To draw the V-I characteristics of Zener diode.
3. To study junction diode as half wave and full wave rectifier.
4. To study junction diode as clipper and clamper.
5. To study the Zener diode as voltage regulator.
6. To draw the input and output characteristics of a transistor in CE configuration.
7. To draw the input and output characteristics of a transistor in CB configuration.
8. To find the small signal h-parameters of a transistor.
9. To study various logic gates.
10. To study Op-Amp as inverting and non- inverting amplifier.
11. To study Op-Amp as adder and subtractor.
12. To study Op-Amp as differentiator and integrator.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEG-A 151
TECHNICAL COMMUNICATION

MM : 100 **Sessional : 30**
Time : 2 hrs **ESE : 70**
L T P
2 0 0
Credits 2

OBJECTIVES:

--To sensitize the learners to non-verbal communication.
--To expose the learners to English sound system and acquire phonetic skill and speech Rhythm.
--To help the learners use grammar correctly.
--To train the learners to speak and write English clearly, intelligibly and effectively;
Objectives:

1. To expose the learners to English sound system and acquire phonetic skill and speech rhythm.
2. To help the learners use grammar correctly.
3. To train the learners to speak English, clearly, intelligibility and effectively.
4. To equip the learners to compete for a career, and enable them to function effectively in careers which demand good communication skills.

Contents:

i) Non - verbal communication

- Use of hands
- Posture of shoulders
- Eye contact
- Weight of the body
- Movement of the body

ii) Applied Phonetics

- Sound of English-consonants and Vowels
- Phonemic Transcription
- Stress, Rhythm and Intonation

Remedial Grammar

- Some useful expression (introduction, greetings etc.) that are used frequently.
- Common mistakes in the use of nouns, pronouns, adjectives, adverb, prepositions and conjunctions.
- Use of who and whome, much and many, still and yet, so as and so that, make and do.
- Tense and their use.
- Confusion of participles.
- Tag Questions

Reading and Speaking skills, Listening and Writing skills

- Presentation and addresses
- Group discussion

- Interviews
- Role playing

Reading and Writing skills, Listening and Writing skills
- Letter writing-formal and informal
- Real life social situations
- Curriculum vitae
- Agenda, notice and minutes

List of recommended Books (Latest editions unless specified)

1). T. Balsubramaniam. “Phonetics for Indian students”, Macmillan India Ltd.
2). Jones, Daniel. “English Pronouncing Dictionary”, Cambridge Univ. Press.
3). Oxford Advanced Learners Dictionary.
4). Taylor, Grant. “Conversation Practice”, TMH, New Delhi.
5). F.T.A. Wood. “Remedial English Grammar”, Macmillan India Ltd.
6). Berry, Thomas Elliot. “The most common errors in English usage”, TMH, New Delhi.
7). N. Krishnaswamy. “Modern English”, Macmillan India Ltd.
8). Desmond. “People Watching”.

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BME-C 102
BASIC MANUFACTURING PROCESS

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction : Classification of Manufacturing Process, Composition , Properties and uses of wrought iron, cast iron, Malleable iron ,Carbon and alloy steels, Copper, Aluminum, lead, brass, bronze, duralumin, bearing metals, high temperature metals , Properties of metals: Strength , Elasticity, Stiffness , Plasticity, Malleability , Ductility, Brittleness, Toughness, Hardness, Impact Strength, Fatigue.

UNIT II

Metal Casting: Scope of moulding, moulding sands, Principles of metal casting, pattern materials, types and allowances: classification of moulds, roles of gate, runner and riser, core, core box, and core print. Introduction of dicasting, permanent mould casting, investment casting, casting defects.

UNIT III

Metal Joining: Welding Principles, Classification of welding techniques, oxy-acetylene gas welding, Electric Arc welding, Electric resistance welding, Spot, Seam, Butt welding, Flux: composition, properties and function, Brazing and soldering, types of joints

UNIT IV

Machine Shop and Metal Cutting : Brief description of Lathe, drilling, shaping, planning, milling machines, Cutting tools used and their materials and geometry. Introduction & Profile Programming to CNC machines.

UNIT V

Carpentry: Characteristics of Soft Wood & Hard Wood, object & Methods Seasoning. Cutting, Drilling, Boring, Striking, Miscellaneous & Shaving tools. Types of Saw, Chisels & Planes.
Fitting: Operation of the Fitting Shop. Type of Vices & Clamps. Marking , Cutting, Drilling & Boring tools. Classification of Files, Hacksaw, Scrapers, Hammer, Taps, Dies, Drill, Surface Plate.

References

1 Hazra and Chowdhary (11/e), Workshop Technology (Vol 1 and 2), Media, Mumbai, 2000
2 B.S.Raghuvanshi (9/e),Workshop Technology (Vol 1 and 2), Dhanapat Rai, Delhi, 2001
3 Lindeberg Ray A, (4/e), Process & Materials of Manufacturing, PHI, New Delhi, 1995
4 Degarmo, Materials and Processes in Manufacturing, PHI, New Delhi, 2000
5 Begmen , Manufacturing Processes

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BME-C 152
WORKSHOP PRACTICE

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

Carpentry Shop
1. To prepare a half T joint of given dimensions.
2. To prepare a wooden pattern of given dimensions.

Moulding Shop
3. To prepare a mould of half bearing.
4. To prepare a mould using core.

Metal Joining.
5. To prepare a butt joint of MS strips using Arc welding.
6. To prepare a T joint of MS strips using Oxy Acetylene gas welding.

Fitting Shop
7. To prepare a rectangular piece with slant edge of given size from M.S. flat.

Machine Shop
8. To prepare a job on Lathe machine of given shape and size.
9. To prepare a job on Shaper machine of given shape and size.
10. To prepare a job on Milling machine of given shape and size.
11. To prepare a job on CNC train master of given shape and size.
12. To prepare a job on drilling machine of given shape and size.

NOTE

1.In practical examination the student shall be required to perform one experiment.
2.A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4.The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5.Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BAC-C 201
ENGINEERING CHEMISTRY

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Periodicity & Chemical Bonding: Atomic radii, Ionization potential, Electro negativity, Electro positivity, Electron affinity and their periodicity. Hybridization involving s, p and d orbital, partial ionic character, dipole moment and its applications, hydrogen bond and Vander Waal's forces, elementary treatment of M.O. theory and its application to homo nuclear diatomic molecules of I and II period elements.
Phase Rule: Gibbs phase rule (without derivation). Applications of Phase rule to one component system (H_2O and S) and two component system (KI- H_2O system).

UNIT II

Chemical kinetics: Arrhenius equation, determination of activation energy, theories of reaction rates (collision and absolute reaction rate theory).
Photochemistry: Laws of Photochemistry, Quantum yield, Fluorescence, Phosphorescence, Chemiluminescence, Jabolinski diagram.

UNIT III

Water Analysis: Hard & soft water, Specification of water, Analysis of water-alkalinity, hardness (EDTA Method only) of water for domestic use, Water softening-soda-lime process, anion exchangers, Boiler-feed water, Boiler problems-scale and sludge, priming & forming, Caustic embittlement & corrosion, their cause and prevention (Removal of dissolved gases, carbonate treatment, Phosphate conditioning, Colloidal conditioning), numerical problems based on hardness. Solid impurities (filterable, non-filterable), pH, D.O, B.O.D., C.O.D.
Polymers: Polymers, thermoplastics, thermosetting plastic, linear, branched & cross linked polymers etc., industrial application of polymers, addition, condensation polymerizations.
(I)Plastics: Structure, properties and uses of thermoplastic (Polyvinyl chloride, Teflon, Nylons and Polymethyl methacrylate) and thermosetting (Bakelite) materials.

(II)Rubber: natural Rubber and it's preparations, vulcanization, mechanism of vulcanization, synthetic rubber (General).

UNIT IV

Fuels: Definition and classification, Calorific value; Gross & Net calorific value and their determination by Bomb calorimeter.
(I)Solid fuels: Coke-it's manufacture by Otto Hoffman oven and uses.
(II) Liquid fuels: Conversion of coal into liquid fuels (Bergius process & Fischer Tropsch process and mechanism), Petroleum- its chemical composition and fractional distillation. Cracking of Heavy oil residues (Thermal cracking and catalytic cracking), Knocking & Anti knocking agents, octane and cetane numbers and their significance.
(III)Gaseous fuels: Natural Gas, Producer gas, Water gas, Carburetted water gas, Coal gas and Oil gas.
(IV)Nuclear fuels: Nuclear fission and nuclear fusion. Nuclear reactor.
Corrosion: Definition and types of corrosion, Electrochemical Theory of corrosion, laws of oxide film, different theories of corrosion, Atmospheric corrosion, stress corrosion water line, pitting and soil corrosion. Protective measures against corrosion

UNIT V

Lubricants: Principle of Lubrication, types of Lubrication, Lubricating oil, fraction from crude oil, de-waxing of oil fraction, acid and solvent, refining of lubricating oils, properties of refined oils (viscosity, viscosity index, acid value, saponification value & iodine value, pour point and cloud point, flash point and fire point, aniline point, and their determination, Lubricant greases (Semi solid) and their Penetration and drop point tests, solid lubricants.
Name Reactions: Reimer Tieman reaction, Aldol Condensation, Diel's Alder Reaction, Wurt'z Reaction and Claisen Reaction.

References

1. Principales of Physical chemistry : B.R. Puri, L.R. Sharma, M. Pathania
2. Advanced inorganic chemistry : Cotton
3. A text book of organic chemistry : S.K. Jain
4. Principals of Physical Chemistry : Samuel Glastone
5. A text book of Engineering chemistry : S.S. Dara
6. A text book of Engineering chemistry : Jain

BAC-C 251
ENGINEERING CHEMISTRY LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Find out the surface tension of given liquid by stalagnometer.
2. Find out the viscosity of given liquid by Ostwald's viscometer.
3. Find out pH of given acid/base solution by using pH meter.
5. Determine Na^+ and K^+ concentration using flame photometer.
6. Determine the turbidity of given solution/water sample by turibidimeter.
7. Determination of D.O. of water sample.
8. Find out distribution constant for the distribution of I_2 between CCl_4 and water.
9. Separate the given mixture indicator by using TLC.
10. Separate the given mixture by using paper chromatography
11. Determine the angle of rotation of given solution by using polarimeter.
12. Determination of strength of oxalic acid/Mohr salt by $KMnO_4$.
13. Determination of strength of oxalic acid/Mohr salt by $K_2Cr_2O_7$.
14. Determine the refractive index of given liquid by using Abbe's refractrometer.
15. Determine conductivity of given compound.
16. Determine absorption maxima and concentration of given $KMnO_4$ solution.
17 To observe fluorescence of fluorescent materials.
18. Determine acid value of given oil sample.
19. Determine iodine value of given oil sample.
20. Determine saponification value of given oil sample.

REFERENCES

1. Advanced practical physical chemistry : J.B. Yadav
2. Analytical chemistry Vol. I, II, III : Subhash, Satish
3. Applied chemistry : Virmani and Narula

NOTE

1.In practical examination the student shall be required to perform two experiments.
2.A teacher shall be assigned 20 students for daily practical work in laboratory.
3.No batch for practical class shall consist of more than 20 students.
4.The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5.Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BAM-C 201
ENGINEERING MATHEMATICS II

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Equation : Ordinary differential equations of first order, orthogonal trajectories, linear differential equations with constant coefficients, Euler- Cauchy equations, Equations of the form $y'' = f(y)$. Solution of second order differential equations by change of dependent and independent variables, Method of variation of parameters for second order differential equations. Simple applications.

UNIT II

Partial Differential Equations and its Applications : Introduction of partial differential equations, Linear partial differential equations of II order with constant coefficients and their classifications - parabolic, elliptic and hyperbolic with illustrative examples, Method of separation of variables. Wave and Heat equation up to two-dimensions.

UNIT III

Solution in Series : solution in series of second order linear differential equations, Bessel's and Legendre's equations and their solutions, Properties of Bessel function and Legendre's polynomials, Recurrence relations, Generating functions, Jacobi series, Integral representation of Bessel's functions.

UNIT IV

Fourier Series : Fourier series, Dirichlet's condition and convergence. Half range series, Harmonic analysis.

UNIT V

Statistics : Moments, Moment generating functions. Binomial, Poisson and Normal distributions. Correlation and Regression. Method of least squares and curve fitting - straight line and parabola.

References

1. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Prasad C.,Advanced Mathematics for Engineers, Prasad Mudranalaya
4. Kapur J. N. & Saxena H.C., Mathematical Statistics

BME-C 201
FUNDAMENTAL OF MECHANICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Thermodynamics I: Introduction to SI units, Definition of thermodynamic system, Surrounding and Universe, Quasi static process, Energy interaction Zeroth law, Concept of temperature First law of thermodynamics, Application to closed and open system, Concept of Enthalpy, steady flow energy equation, Throttling process.

UNIT II

Thermodynamics II: Second law, reversible and irreversible process, Thermal reservoir, heat engines and thermal efficiency, COP of heat pump and refrigerator, Carnot cycle, Clausius inequality, Concept of entropy, Entropy change for ideal gases.

UNIT III

Thermodynamics III: Generation of steam at constant pressure, Properties of steam, Use of property diagram, Process of vapor in closed and open system, Rankine cycle. Stroke clearance ratio, Compression ratio, Definition and calculation of mean effective pressure (no proof) for air standard cycles (Otto and diesel cycles)

UNIT IV

Mechanics: Trusses: Plane structure, (Method of Joints and Sections only) Beams: Bending moment and shear force diagram for statically determinate beams.

UNIT V

Strength of Materials: Simple stresses and strain, strain energy, stress- strain diagram, elastic constants. Compound stress and strain: state of stress at a point, Simple tension, pure shear,general two dimensional stress system, principal planes, principal stresses and strains, Mohr's stress circle, Poisson's ratio, maximum shear stress

References

1 Kumar DS (2/e), Thermal Science and Engineering, S.K.Kataria, New Delhi,2001
2 P.K.Nag (2/e), Engineering Thermodynamics, TMH, New Delhi,2001
3 R.Yadav(7/e), Thermal Engineering, Central Publishing House, Allahabad, 2000
4 Shames Irving H.(4/e), Engineering Mechanics, PHI, New Delhi, 1994
5 Hibler (1/e), Statics and Dynamics, Pearson Education, Singapore, 2000
6 Pytel & Singer (1/e), Strength of Materials, Addison Wesley, 1999

BME-C 251
BASIC MECHANICAL ENGINEERING LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To conduct the tensile test on a UTM and determine ultimate tensile strength, percentage elongation for a steel specimen.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine the hardness of the given specimen using Brinell / Rockwell / Vicker testing machine.
4. To study the 2-stroke I.C. Engine models.
5. To study the 4-stroke I.C. Engine model.
6. To study close loop system example (Turbine)
7. To study model of Locomotive boiler.
8. To study model of Bibcock boiler.
9. Study of Fire Tube boiler
10. Study of water Tube boiler

NOTE

1.In practical examination the student shall be required to perform one experiment.
2.A teacher shall be assigned 20 students for daily practical work in laboratory.
3.No batch for practical class shall consist of more than 20 students.
4.The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5.Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2015-16)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BCE-C 201
PROBLEM SOLVING THOUGH 'C'

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Computers: Block diagram of computers, functions of its important components, Memory and I/O devices. Concept of assembler, interpreter, compiler & generation of languages.

Number System: Decimal, Binary, Octal, and Hexadecimal numbers and their arithmetic (addition, subtraction, multiplication, and division): 1's and 2's complements

UNIT II

Basic Operating System Concepts: MS-DOS, WINDOWS, UNIX, Functional knowledge of these operating systems. Introduction to basic commands of DOS & UNIX, Managing Files and Directories in various operating systems, Introduction to Internet, Basic terms related with Internet, TCP/IP.

UNIT III

Programming in C: History, Introduction to C Programming Languages, Structure of C Programs, Compilation and Execution of C Programs, Debugging techniques, Data Type and sizes, Declarations of variables, Modifiers, Identifiers and keywords, Symbolic Constants, Storage classes(automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor.

Operators: Unary operators, Arithmetic & Logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, Precedence and order of evaluation.

Control Statements: If-else, switch, break, continue, the coma operator, goto statement. **Loops:** while, do-while, for loop.

UNIT IV

Arrays: One-dimensional arrays: declaration, initialization and application. Two-dimensional array: declaration, initialization and application, Multidimensional arrays.

Handling of Character Strings: Declaring and initializing string variables, Reading strings, Writing strings, Arithmetic operation on strings, comparison of two strings and string handling functions.

Pointers: Accessing the address of the variable, Declaring and initializing pointers, accessing a variable through its pointer expression, pointer increment and scale factor, pointers and array, pointers and character strings.

UNIT V

Functions: Need for user defined function, Return value and its type, function calls, No argument and No return values function, Argument and No return values functions, argument and return value functions. Handling of non integer function, Scope and life time of variable in functions.

Recursion: Recursive Definition and processes, recursion in C, example of recursion, Tower oh Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

References

1. Rajaraman V.(3/e), Fundamental of Computers, PHI, New Delhi, 1999
2. Sanders,D.H., Computers Today, Mcgraw Hill, 1998
3. Kris Jamsa, DOS the complete reference, Tata McGraw Hill
4. J.Peek Tim O'reilly & M.Locekides, UNIX POWER TOOLS, BPB Publication
5. Yashwant Kanetkar, Let Us C, BPB
6. Yashwant Kanetkar, C In Depth, BPB

BCE-C 251
COMPUTER PROGRAMMING LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Practice of all internal and external DOS commands.
2. Write simple batch program.
3. Giving exposure to windows environment.
4. File and program management in windows.
5. Practice of all UNIX commands.
6. Introduction to text editing and word processing.
7. Net surfing.
8. Creation and usage of E-mail account.
9. Write a program in C to perform different arithmetic operations.
10. Write a program in C to greater of two numbers.
11. Write a program in C to check whether no. is odd or even.
12. Write a program in C to check whether no. is prime or not.
13. Write a program in C to print Fibonacci series.
14. Write a program in C to print factorial of a no.
15. Write a program in C to add two matrices.
16. Write a program in C to search a no. in array

NOTE

1.In practical examination the student shall be required to perform one experiment.
2.A teacher shall be assigned 20 students for daily practical work in laboratory.
3.No batch for practical class shall consist of more than 20 students.
4.The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5.Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BHU-S 201
VEDIC SCIENCE &ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
2 0 0
Credits 2

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Science in Vedic literature and Indian Philosophy-I : Kanad's atomic theory, concept of parmanu, Formation of molecules, Parimandal, Comparison with Dalton's atomic theory and models of Thompson, Rutherford and Bhor. Concept of SAMATA and VISHAMTA vs Maxwell-Boltzmann's distribution of velocities and energies.

UNIT II

Science in Vedic literature and Indian Philosophy-II : First and Second Law of thermodynamics in daily life. Law of helplessness of mankind in thermodynamics and Indian philosophy. Entopy in life and concept of pralaya. Dhananjay Vs concept of Radioactivity-life after death. Atomic spectrum Vs concept of Kundalini.

UNIT III

Vedic Mathematics : Measurements in Vedic Times, ancient scale of length, mass, time and temperature, Number system, Geometry according to sulba Sutra. Overview of Vedic Mathematical Rules (ekadhiken pooren, Nikhil navtascharaman dashatah, oordhavatriyagyabhyam)

UNIT IV

Electrical, Electronics & Aeronautical Engineering in Vedas : Concept of electrical Engineering, type of electricity – Tadit, Saudamini, Vidyut, Shatakoti, Haradini, Ashani. Electronics Engineering in Vedic literature. Aeronautical Engineering in Vedic literature, Types of Vimanas and their construction and working, Shakun viman, Rukma viman, Tripura viman, concept of calculator and ancient ways of computation.

UNIT V

Mechanical, Chemical, Civil & Architectural engineering in Vedic Literature : Mechanical & Chemical Engineeering in ancient India,Art of Alchemy,Types of Iron and steel.Civil and Architectural engineering in Vedic literature.Concept of cryptography & Art of secret writing.

Suggested Readings :

1. Science in Vedas by Acharya Vaidyanath Sashtri.
2. Science in the Vedas by Hansraj, Shakti Publications, Ludhiana.
3. Vedic Mathematics by Swamisri Bharati Krishana Teerathaji, Motilal Banarasi Das, Delhi.
4. Brahad Viman shastra by Maharishi Bhardwaj.
5. Vymanika shastra, English translation by G. R. Josyer.
6. Alchemy and Metallic Medicines in Ayurveda by : Vaidya Bhagwan Das.
7. History of Hindu Chemistry by : P. C. Raya

8. Indian Alchemy by : Dr. S. Mahdihassan.
9. Ancient Scientist of Indian by Satya Prakash.
10. Vaishaishik Darshan by Maharishi Kanad.
11. Vedas : The sources of ultimate science by S. R. Verma, Nag Publisher, New Delhi.

BEN-A 201
ENVIRONMENTAL STUDIES

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
2 0 0
Credits 2

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Multidisciplinary Nature of Environmental Studies & Ecosystems: (a) definition, scope and importance of ecology and environment (b) ecological components: (i) abiotic components: soil, water, light and temperature (ii) biotic components & their relationships- symbiosis, commensalisms, parasitism, predation and antibiosis (c) concept of an ecosystem (d) structure and function of an ecosystem (e) producers, consumers and decomposers (f) energy flow in the ecosystem (g) ecological succession (h) food chains, food webs and ecological pyramids (i) introduction, types, characteristic features, structure and function of the following ecosystems: (i) forest ecosystem (ii) grassland ecosystem (iii) desert ecosystem (iv) aquatic ecosystems (pond, river, ocean) (j) Need for public awareness

UNIT II

Natural Resources: (a) forest resources: use and over-exploitation, deforestation, timber extraction, mining; dams and their effects on forest and tribal people (b) water resources: use and over-utilization of surface and ground water, benefits and problems of dams (c) mineral resources: use and exploitation, environmental effects of extracting and using mineral resources (d) energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources (e) land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification (f) biodiversity & its conservation: definition- genetic, species and ecosystem diversity, values of biodiversity- consumptive use, productive use, social, ethical, aesthetic and option values (g) India as a mega-diversity nation, hot-spots of biodiversity, threats to biodiversity- habitat loss, poaching of wildlife, man-wildlife conflicts; endangered and endemic species of India, conservation of biodiversity: *in-situ* & *ex-situ* methods (h) bio-geographical classification of India (i) role of an individual in conservation of natural resources (j) equitable use of resources for sustainable lifestyles

UNIT III

Environmental Pollution: (a) Definition, causes, effects and control measures of: air pollution, water pollution, soil pollution, noise pollution, thermal pollution and nuclear hazards (b) solid waste management-causes, effects and control measures of urban and industrial wastes (c) role of an individual in prevention of pollution (d) disaster management: floods, earthquake, drought & landslides

UNIT IV

Social Issues and the Environment: (a) from unsustainable to sustainable development (b) urban problems related to energy (c) rain water harvesting (d) resettlement & rehabilitation of people- problems and concerns (e) environmental ethics- issues and possible solutions (f) wasteland reclamation (g) population growth and

family welfare programme (h) environment and human health, human rights, value education (i) HIV/AIDS (j) role of information technology (IT) in environment and human health (k) global environmental issues: global warming, acid rain, ozone layer depletion

UNIT V

Environmental policies and laws: (a) salient features of following acts i. Environment Protection Act 1986 ii. Air (Prevention and Control of Pollution) Act 1981 iii. Water (Prevention and Control of Pollution) Act 1974 iv. Wildlife Protection Act 1972 v. Forest Conservation Act 1980 (b) issues involved in enforcement of environmental legislation (c) public awareness

References

1. Agarwal, K.C. *Environmental Biology*, Nidhi Publ. Ltd., Bikaner.
2. Bharucha E. *The Biodiversity of India*, Mapin Publishing Pvt. Ltd., Ahmedabad.
3. Clark R.S. *Marine Pollution*, Clanderson Press Oxford.
4. Cunningham, W.P., Cooper, T.H., Gorhani, E. & Hepworth, M.T. *Environmental Encyclopedia*, Jaico Publ. House, Mumabai.
5. De A.K. *Environmental Chemistry*, Wiley Eastern Ltd.
6. Gleick, H.P. *Water in Crisis*, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press.
7. Hawkins R.E. *Encyclopedia of Indian Natural History*, Bombay Natural History Society, Bombay.
8. Heywood, V.H & Waston, R.T. *Global Biodiversity Assessment*, Cambridge Univ. Press.
9. Odum, E.P. *Fundamentals of Ecology*, W.B. Saunders Co. USA.
10. Rao M N. & Datta, A.K. *Waste water treatment*, Oxford & IBH Publ. Co. Pvt. Ltd.
11. Sharma B.K. *Environmental Chemistry*, Geol Publ. House, Meerut.
12. Trivedi R.K. *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol. I and II, Enviro Media.
13. Trivedi R. K. and Goel, P. K. *Introduction to air pollution*, Techno-Science Publication.
14. Wanger K.D. *Environmental Management*, W.B. Saunders Co. Philadelphia, USA.

BME-C 253
ENGINEERING GRAPHICS

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To understand graphics as a tool to communicate ideas, lettering and dimensioning, construction of geometrical figures.
2. To understand orthographic projection: principles of orthographic projections.
3. To understand principle and auxiliary planes.
4. To understand first and third angle projections.
5. To draw a sheet on projections of points.
6. To make two sheets based on projection of lines parallel to both the planes, parallel to one and inclined to other, inclined to both the planes, true length and traces of a line.
7. To make a sheet based on projection of planes, traces of planes, angles of inclinations of planes, parallel planes.
8. To make a sheet projection of solid in simple position, axis or slant edge inclined to one and parallel to other plane, solids lying on a face.
9. To make a sheet using section of solids lying in various positions, true shape of the section.
10. To make a sheet on development of lateral surfaces.
11. To understand isometric projection: principle of isometric projection, isometric projection using box and offset methods.
12. To practice two exercises using computer aided drawing: basic concepts and application.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BSP-S 251
SEC02-PHYSICAL TRAINING & YOGA

MM : 100 **Sessional : 100**
L T P **Credits : 0**
0 0 2

1. Sports Activities and Development of motor abilities.
   Track and field events
   Game event

2. Yogic Exercises and Pranayam
   Surya Namaskar
   Bhujangasana
   Shalabhasana
   Shrishasana
   Anuloma-Viloma
   Kapal Bhati
   Shatali
   Bhramari

BAM-C 301
ENGINEERING MATHEMATICS III

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Laplace Transform: Laplace transform of elementary functions. Shifting theorems. Transform of derivatives. Differentiation and Integration of transforms. Heaviside unit step and Dirac Delta functions. Convolution theorem. Solution of ordinary linear differential equations used in Mechanics, Electric circuits and Bending of beams.

UNIT II

Fourier Transforms : Definition of Fourier transform, Fourier sine and cosine transforms. Fourier integral formula. Applications to solutions of boundry value problems.

UNIT III

Z - transform : Definition, Linearity property, Z - transform of elementary functions, Shifting theorems, Initial and final value theorem, Convolution theorem, Inversion of Z - transforms, Solution of difference equations by Z - transforms.

UNIT IV

Functions of a 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.

UNIT V

Functions of a Complex Variable - II : Representation of a function by power series, Taylor's and Laurent's series, Singularities, zeroes and poles, Residue theorem, evaluation of real integrals of type $\int_{o}^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and $\int_{-\infty}^{\infty} f(x)/F(x)dx$, Conformal mapping and bilinear transformations.

References

1. Prasad C., Advanced mathematics for Engineers, Prasad Mudranalaya

2. Schaum outline Series, Integral Transform,TMH
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Brancewel, Fourier Transforms and their applications, McGraw
5. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999

BEE-C 301
ELECTRICAL MACHINES-I

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Principles of Electro-mechanical Energy Conversion: Introduction, Flow of Energy in Electromechanical Devices, Energy in magnetic systems(defining energy & Co-energy) , Singly Excited Systems; determination of mechanical force, mechanical energy, torque equation , Doubly excited Systems; Energy stored in magnetic field, electromagnetic torque , Generated EMF in machines; torque in machines with cylindrical air gap .

UNIT II

D.C. Machines-Generators: Construction of DC Machines, Armature winding , EMF and torque equation, Armature Reaction ,Commutation , Interpoles and Compensating Windings, Performance Characteristics of D.C. generators, losses and efficiency.

UNIT III

D.C. Machines- Motors: Performance Characteristics of D.C. motors, Starting of D.C. motors; Concept of starting (3 point and 4 point starters), Speed control of D.C. motors; Field Control, armature control and Voltage Control (Ward Lenonard method) ,Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test).

UNIT IV

Transformer : Review of Single-phase transformer, Three phase transformer Construction, Three – phase unit transformer and Bank of three single phase transformers with their advantages , Three-phase transformer Groups(Phasor groups) and their connections , Y-Δ connection, Open delta connection , Three-phase/ 2 - phase Scott connection and it's application.

UNIT V

Transformer (Contd.) :

All day efficiency, Sumpner's test , polarity test Excitation Phenomenon in Transformers, Harmonics in Single phase and 3-phase transformers , Parallel operation and load sharing of Single phase and three phase transformers.

Auto Transformer: Single phase Auto transformer, Volt-Amp relation, efficiency, Copper saving, Advantages, disadvantages and applications of autotransformers.

Text Books

1. I.J. Nagrath & D.P. Kothari, Electrical Machines, Tata McGraw Hill.
2. Irving L. Kosow, Electric Machine and Transformers, Prentice Hall of India.
3. M.G. Say, The Performance and Design of AC machines, Pit man & Sons.
4. Langsdorf, Theory of Alternating Current Machinery, Tata McGraw Hill.

Reference Books

1. A.E. Fitggerald, C.Kingsley Jr. and Alexander Kusko, Electric Machinery, McGraw Hill, International Student Edition.
2. Hussain Ashfaq, Electrical Machines, Dhanpat Rai & Sons.

BEE-C 302
NETWORK ANALYSIS AND SYNTHESIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Graph Theory : Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis.

UNIT II

Network Theorems: Applications to ac networks- Super-position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem.

UNIT III

Network Functions: Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode plots.

UNIT IV

Two Port Networks: Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T and Π Representation.

UNIT V

Network Synthesis: Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

Filters: Image parameters and characteristics impedance, passive and active filter fundamentals, low pass, high-pass, band pass, band elimination filters.

Text Books

1. M.E. Van Valkenburg, Network Analysis, Prentice Hall of India.
2. D. Roy Chaudhary, Networks and Systems, Wiley Eastern Ltd.
3. Donald E. Scott, An Introduction to Circuit analysis: A System Approach, McGraw Hill Book Company.

Reference Books

1. M.E. Van Valkenburg, An Introduction to Modern Network Synthesis, Wiley Eastern Ltd.
2. W.H. Hayt & Jack E-Kemmerly, Engineering Circuit analysis, Tata McGraw Hill.
3. Soni, Gupta , Circuit Analysis, Dhanpat Rai & Sons.
4. A. Chakrabarti, Circuit Theory, Dhanpat Rai & Co.

BEE-C 303
ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Philosophy Of Measurement: Methods of Measurement, Measurement System**,** Classification of instrument systems , Characteristic of instrument & measurement system**,** Errors in Measurement & its Analysis , Standards .

Analog Measurement of Electrical Quantities: Electrodynamics ,Thermocouple Electrostatic & rectifier type Ammeters & Voltmeters , Electrodynamics Wattmeter, Three Phase Wattmeter, Power in three Phase System , Errors & remedies in Wattmeter and energy meter.

UNIT II

Instrument Transformer (CT and PT), and their application in the extension of instrument range, Introduction to measurement of speed, Frequency and Power factor, Vibration etc.

UNIT- III

Measurement of Parameter: Different methods of measuring low, medium and high resistances**,** Measurement of Inductance & Capacitance with the help of AC Bridges, Q Meter.

UNIT- IV

AC Potentiometer: Polar type & Co-ordinate type AC potentiometer, Application of AC Potentiometers in Electrical measurement.

Magnetic Measurement: Ballistic Galvanometer, Flux meter, Determination of Hysteresis loop **,** Measurement of iron losses**.**

UNIT- V

Digital Measurement of Electrical Quantities: Concept of digital Measurement, Block Diagram Study of digital voltmeter, frequency meter power analyzer and harmonics analyzer; Electronic Multimeter.

Cathode Ray Oscilloscope : Electronic multimeter , Power Analyzer, Harmonics analyzer, , Electronic multimeter , Power Analyzer, Harmonics analyzer , Basic CRO circuit (Block Diagram),Cathode ray tube (CRT) & its component **,** Application of CRO in measurement ,Lissajous Pattern., Dual trace & dual beam Oscilloscope.

Text Books

1. E.W. Golding & F.C. Widdis, Electrical Measurement &Measuring Instrument , A.W. Wheeler& Co. Pvt. Ltd. India .
2. A.K. Sawhney, Electrical & Electronic Measurement & Instrument, Dhanpat Rai & Sons , India

Reference Books

1. Forest K. Harries , "Electrical Measurement " Willey Eastern Pvt. Ltd. India .
2. M.B. Stout , "Basic Electrical Measurement" Prentice hall of India ,India.
3. W. D. Cooper , "Electronic Instrument & Measurement Technique" prentice hall International.

BEC-C 301
ELECTRONIC DEVICES & CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B & Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Varactor, tunnel, Schottkey barrier, LED, Photodiode and their characteristics, p-n-p-n diode and their characteristics, SCR, UJT. Ebers-Moll model of BJT, T model of BJT, Hybrid model of BJT at low frequency, computation of voltage gain, current gain and power gain, Z_i and Z_o and approximate formulas, high frequency transistor hybrid π model.

UNIT II

Field Effect Transistor: JFET and its characteristics, biasing of JFET, small signal low frequency and high frequency model of JFET amplifier, configurations of JFET, MOSFET, MESFET (Enhancement & depletion types) their construction and characteristics, configuration of MOSFET, AND, OR, NAND, and NOR Gates using PMOS, NMOS and CMOS.

UNIT III

Multistage Amplifier: Effect of coupling and by-pass capacitors, types of coupling (DC, RC, and TC), Darlington connection, cascode amplifier, coupling schemes for multistage amplifier and frequency response of transistor amplifier.

Power amplifiers: Class A, Class B, Class C and Class AB amplifiers and their efficiencies, harmonic distortion, push-pull amplifier. Basic idea of tuned amplifier.

UNIT IV

Feedback Amplifiers: Principles of feedback in amplifiers, advantages of negative feedback, classification of feedback(voltage-series, voltage-shunt, current-series, current-shunt)amplifiers, effect of negative feedback on gain, stability of gain, input and output impedances, bandwidth and gain-bandwidth product.

UNIT V

Oscillators: Positive feedback, Berkhausen criterion for sinusoidal oscillation, Phase-shift oscillator, Weinbridge oscillator, Tuned oscillator, Hartley, Colpitts and Crystal oscillator.

Text Books

1. J.Millman & A. Grabel, ‘Microelectronics’, TMH

References

1. R.L. Boylestad L. Nashelsky, ‘Electronics Devices & Circuit Theory. Prentice hall
2. J.Millman & Halkias, ‘Integrated Electronics’, MGH
3. Sedra & smith, “Microelectronics circuit.”

Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BCE-C 302
COMPUTER ORGANIZATION

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro-operation, Arithmetic Logic Shift Unit, Arithmetic Algorithms (addition, subtraction, Booth's Multiplication), IEEE standard for Floating point numbers.

UNIT II

Control Design: Hardwired & Micro Programmed Control Unit, Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction.

UNIT III

Processor Design: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer (RISC), Complex Instruction Set Computer (CISC).

UNIT IV

Input-Output Organization: I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.

UNIT V

Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), organization of 2D, Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.

References

1. M. Mano, Computer System Architecture, PHI
2. Vravice, Zaky & Hamacher, Computer Organization, TMH Publication
3. Tannenbaum, Structured Computer Organization, PHI
4. Stallings, Computer Organization, PHI
5. John P.Hayes, Computer Organization, McGraw Hill

BEE-C 351
ELECTRICAL MACHINE-I LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To obtain magnetization characteristics of a D.C. shunt generator.
2. To obtain load characteristics of a D.C. compound generator (a) Cummulatively compounded (b) Differentially compounded.
3. To obtain load characteristics of a D.C. shunt generator.
4. To obtain load characteristics of a D.C. shunt motor.
5. To obtain load characteristics of a D.C. series motor.
6. To obtain efficiency of a D.C. shunt machine using Swinburn's test.
7. To perform Hopkinson's test and determine losses and efficiency of D.C. machine.
8. To obtain speed-torque characteristics of a D.C. shunt motor.
9. To obtain speed control of dc shunt motor using (a) armature resistance control (b) field control
10. To study polarity and ratio test of single phase transformer.
11. To perform open circuit and short circuit tests on a single-phase transformer and determine parameters of equivalent circuit.
12. To perform open circuit and short circuit tests on a three- phase transformer and determine parameters of equivalent circuit.
13. To obtain 3-phase to 2-phase conversion by Scott connection.
14. To obtain efficiency and voltage regulation of a single phase transformer by load test.
15. To perform Sumpner's test (back-to-back) on single-phase transformers.

NOTE

6. In practical examination the student shall be required to perform one experiment.
7. A teacher shall be assigned 20 students for daily practical work in laboratory.
8. No batch for practical class shall consist of more than 20 students.
9. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
10. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 352
MEASUREMENT LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Calibration of A.C. voltmeter and A.C. ammeter.
2. Measurement of low resistance by Kelvin's double bridge.
3. Measurement of voltage, current and resistance using D.C. potentiometer.
4. Measurement of inductance by Maxwell's bridge.
5. Measurement of inductance by Hay's bridge.
6. Measurement of inductance by Anderson's bridge.
7. Measurement of capacitance by Owen's bridge.
8. Measurement of capacitance by De Sauty bridge.
9. Measurement of capacitance by Schering bridge.
10. Measurement of power and power factor of a single-phase inductive load and to study effect of capacitance connected across the load on the power factor.
11. Measurement of power and power factor of a three-phase load.
12. Measurement of phase difference and frequency of a sinusoidal A.C. voltage using C.R.O.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 353
SEMINAR

MM : 100 **Sessional :50**
Time: 2 hrs **ESE: 0**
L T P
0 0 2
Credits 2

Objective: To increase the communication ability on students and to prepare then for presenting seminar on advanced topics of their branch.

The students will be required to deliver a seminar on a topic of general interest in or any advanced technical topics related to the theory papers studied. The topic will be decided by mutual consent of the Faculty- in-charge and students.

* Total 100 marks include 50 marks for report and 50 marks for presentation.

Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 351
ELECTRONIC DEVICES & CIRCUITS LAB

MM : 100 **Sessional: 30**
Time : 2Hr **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To draw the input and output characteristics of FET and to measure the pinch off voltage.
2. To draw the drain and transfer characteristic curve of MOSFET.
3. To draw the frequency response of FET amplifier.
4. To design and study various logic gates using MOS.
5. To draw the frequency response curve of RC Coupled Amplifier.
6. To draw the frequency response curve of Transformer Coupled Amplifier.
7. To draw the frequency response curve of Emitter Follower.
8. To find the efficiency of A, B & AB Push pull Amplifier.
9. To find the frequency of oscillation of Hartley Oscillator.
10. To find the frequency of oscillation of Colpitt Oscillator.
11. To find the frequency of oscillation of R-C phase shift oscillator.
12. To find the frequency of oscillation of Wein Bridge Oscillator.
13. To find the frequency of oscillation of Crystal Oscillator.
14. To draw the characteristic of SCR.
15. To draw the characteristic of UJT.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 401
ELECTRICAL MACHINES –II

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Synchronous Machine-Generator: Constructional features, Armature winding, EMF Equation, Winding coefficients, equivalent circuit and phasor diagram, Armature reaction, O. C. & S. C. tests, Voltage Regulation using Synchronous Impedance Method, MMF Method, Potier's Triangle Method, Parallel Operation of synchronous generators, operation on infinite bus, synchronizing power and torque co-efficient.

UNIT II

Synchronous Machine-Motor: Two Reaction Theory, Power flow equations of cylindrical and salient pole machines, operating characteristics, Starting methods, Effect of varying field current at different loads, V-Curves, Hunting & damping, synchronous condenser.

UNIT III

Three phase Induction Machine – I: Constructional features, Rotating magnetic field, Principle of operation Phasor diagram, equivalent circuit, torque and power equations, Torque- slip characteristics, no load & blocked rotor tests, efficiency, Induction generator.

UNIT IV

Three phase Induction Machine- II: Starting, speed control (with and without emf injection in rotor circuit), Deep bar and double cage rotors, Cogging & Crawling,

UNIT V

Single phase Induction Motor: Double revolving field theory, Equivalent circuit, No load and blocked rotor tests, Starting methods, repulsion motor.

AC Commutator Motors: Universal motor, Single-phase a.c. series compensated motor, stepper motors.

Text Books

1. D.P.Kothari & I.J. Nagrath, Electric Machines, Tata Mc Graw Hill.
2. P.S. Bimbhra Generalized Theory of Electrical Machines, Khanna Publishers.
3. Fitzerald, A.E., Kingsley and S.D.Umans, Electric Machinery, MC Graw Hill.

Reference Books

1. P.S. Bimbhra, Electrical Machines, Khanna Publisher.
2. M. G. Say, Alternating Current Machines, Pitman & Sons.
3. O.C. Taylor, The performance & design of A.C. Commutator Motors, A.H. Wheeler & Co(P) Ltd.

BEE-C 402
ELECTRICAL ENGINEERING MATERIALS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Crystal Structure of Materials: Bonds in solids, crystal structure, co-ordination number, atomic packing factor, Miller Indices, Bragg's law and x-ray diffraction, structural Imperfections, crystal growth**,** Energy bands in solids, classification of materials using energy band.

UNIT II

Conductivity of Metals: Electron theory of metals, factors affecting electrical resistance of materials, thermal conductivity of metals, heat developed in current carrying conductors, thermoelectric effect, superconductivity and super conducting materials.

UNIT III

Dielectric Properties of Material: Polarisation and dielectric constant, dielectric constant of mono-atomic, poly atomic gases and solids, frequency dependence of electronic and ionic Polaris abilities, dipolar relaxation, dielectric loss, piezoelectricity, ferroelectric materials.

UNIT IV

Mechanism of Conduction in semiconductor materials: Types of semiconductors, current carriers in semiconductors, Half effect, Drift and Diffusion currents, continuity equation, P-N junction diode, junction transistor, FET & IGFET.

UNIT V

Magnetic Properties of Material: Origin of permanent magnetic dipoles in matters, Classification Diamagnetism, Para magnetism, Ferromagnetism, Antiferromagnetism and Ferrimagnetisms, magnetostriction.

Electrical Engineering Materials: Properties and application of electrical conducting, semiconducting, insulating and magnetic materials, soft and hard magnetic materials, permanent magnetic materials, mechanical properties of metals, optical properties of solids.

Text Books

1. A.J. Dekker, Electrical Engineering Materials, Prentice Hall of India
2. R.K. Rajput, Electrical Engg. Materials, Luxmi Publications.
3. C.S. Indulkar & S.Triruvagdan , An Introduction to Electrical Engg. Materials, S.Chand & Co.
4. Solymar, Electrical Properties of Materials" Oxford University Press.

References Books

1. Ian P. Hones, Material Science for Electrical and Electronic Engineering,, Oxford University Press.
2. Narula, Material Science, Tata McGraw Hill.
3. Van Vlash,, Elements of Material Science & Engineering, John Wiley & Sons.

BEC-C 403
ELECTROMAGNETIC FIELD THEORY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Electrostatics – Fundamentals: Electric charges – Coulomb's Law – Electric Field Intensity – Linear, Surface and Volume charge density – Gauss Law and its application – electric Scalar Potentials and potential difference – Potential due to uniformly charged disc and uniformly charged line, potentials between two coaxial cylinders and between two conducting spherical shell – Electric field lines and equipotential contours – Potential gradient and electric field due to electric dipoles – Conservative nature of electric field.

UNIT II

Dielectrics & Capacitance: Dielectric boundaries – Capacitance – Capacitance of system of conductors – Overhead lines and underground cables – Methods of images and its application –
Electrostatic energy and energy density – Force between charged conductors – dielectric strength and breakdown. Divergence and curl of vector fields – Divergence theorem – Stokes theorem – solutions of electrostatic problems – Examples on Laplace's equation.

UNIT III

Magnetic Fields – Fundamentals: Magnetic field intensity and magnetic flux density – Biot Savarat law – Force between current carrying wires. Torque on closed circuits – Ampere's law – Magnetic scalar and vector potentials – Boundary conditions at magnetic surfaces.

UNIT IV

Magnetic Circuits and Inductance: Faraday's law of electromagnetic induction – Inductor and inductance – Inductance of solenoids, toroids, transmission lines and cables – Mutual inductance – Inductors in series and parallel – energy stored in magnetic field – Pull of an electromagnet – magnetic circuits.

UNIT V

Electro Magnetic Waves: Maxwell's equations – Equation of continuity – displacement current – Maxwell's equation in point and integral forms – The wave equations – Uniform plane wave – relation between electric and magnetic field intensities in a uniform plane wave, Poynting vector – Poynting theorem.

Text Books

1. Gangodhar, K.A., ' Field Theory', Khanna Pub. Delhi 11th edition, 1994.
2. William H. Hayt, ' Engineering electromagnetics', Tata- McGraw Hill, 5th edition, 1992.

References

1. Sarwate, V.V., ' Electromagnetic Fields and Waves', Wiley Eastern Limited, New Delhi, 1993.
2. Mahajan, A.S. and Rangawala, A.A. 'Electricity and Magnetism, Tata-McGraw Hill Publishing Company, Ld, New Delhi, 1989.
3. Seely, S., Introduction to electromagnetic Fields', McGraw Hill.

4. Joseph, a. Edminister, ‘ Electromagnetic – Schaum’s outline Series’, International Edition, McGraw Hill Inc., New York, 1993.
5. Narayana Rao, N., ‘Elements of Engineering Electromagnetics’, Prentics Hall of India, 1991.
6. David J. Griffths, ‘ Introcuation to electrodynamics’, Prentice Hall of India, New Delhi, 1991.

Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 405
SIGNALS & SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signals and Systems: Continuous-time and discrete-time Signals, Transformations of the Independent Variable, Exponential and Sinusoidal Signals, Continuous-Time and Discrete-Time LTI Systems and their properties, convolution sum and convolution integrals, LTI System described by differential and difference equations.

Z-Transform: Z-Transform, Region of convergence, Inverse Z-transform, analysis and characterization of LTI system, Block diagram representation, Unilateral Z-transform.

UNIT II

Fourier Series and Fourier Transform: The response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-time Periodic Signals and their Properties, Continuous time and discrete time Fourier Transforms and their properties, System Characterized by Linear Constant Coefficient Differential equations and Difference equations.

UNIT III

Time and Frequency Characterization of Signals and Systems: Magnitude Phase Representation of the Fourier Transform, Magnitude Phase Representation of the Frequency response of LTI systems, Time domain Properties of Ideal Frequency Selective filter, Time Domain and Frequency Domain aspects of Non ideal filters, First Order and Second Order Continuous Time and Discrete time Systems.

UNIT IV

Sampling and Laplace Transform: Signal representation by samples, sampling theorem, Impulse train sampling, sampling of discrete time signals, discrete time processing of continuous time signals. Laplace Transform, Region of convergence, inverse Laplace Transform, Analysis and characterization of LTI System, Block diagram representation, Unilateral Laplace transform.

UNIT V

Random variable, random process correlation functions, cumulative distribution function, probability density function, joint-cumulative distribution, probability density function. Expectation, mean, variance, covariance, auto-correlation, power spectral density, Gaussian Pdf and Raleigh Pdf.

Text Books

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, ‘signals & System’, Pearson Education, Second Edition, 2003.

References

1. Roberts, “Signals and Systems” Tata McGraw Hills.
2. P. Ramesh Babu, R. Ananda Natarajan,”Signals and Systems”, SCITECH Publications.
3. Charles L. Phillips, John M.PARR and EVEA. RISKIN, “Signals, Systems and Transforms”, PEARSON Education, Third Edition.
4. Chen ‘Signals & Systems, Oxford University, Press.

Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BCE-C 405
C & DATA STRUCTURE

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Structures: Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions,Structure Pointrers.
File Handling: Creating and Deleting a File, Updating File, Copying File, Searching & Sorting in a File.
Complexity: Algorithm Complexity and Time-Space trade-off.

UNIT II

Stack: Array representation and Implementation of stack, Operations on stack: Push & Pop, Array representation of Stack, Linked representation of Stack, Operation associated with stacks, Application on stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix expression using stack.
Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque and Priority Queue.

UNIT III

Linked List: Representation and Implementation of Singly Linked List, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and Deletion to/from Linked List, Insertion and Deletion Algorithms, Doubly linked List, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT IV

Trees: Basic terminology, Binary Trees, Binary Tree Representation, Algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked representation of Binary trees, Traversing Binary trees.
Binary Search Tree: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of search algorithm, Path Length, AVL Tree, B-trees.

UNIT V

Searching and Hashing: Sequential Search, Comparison and Analysis, Hash table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.
Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.
File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

References

1. Horowitz and Sahani, Fundamentals of Data Structure, Galgotia.
2. R.Kruse etal, Data Structures and Program Design in C, Pearson Education.
3. A M Tenenbaum etal, Data Structure using C & C++, PHI.
4. Lipschutz, Data Structure, TMH.
5. K. Loudon, Mastering Algorithms with C, Sheoff Publisher & Distributors.
6. Bruno R Preiss, Data Structures and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons, Inc.
7. Yashwant Kanetkar, Pointers in C, BPB

BAM-C 402
NUMERICAL ANALYSIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Errors and Roots of Equations : Absolute, relative, round-off and truncation errors. Significant digits. Algebraic and Transcendental Equations, Numerical solution, Method of bisection, Newton-Raphson method, Direct iterative method, convergence.

UNIT II

Linear Simultaneous Algebric Equations : Method of Gauss elemination, LU - decomposition Jacobi's and Gauss- Seidal methods, Largest eigen value and corresponding eigen vector (Powers method).

UNIT III

Interpolation : Finite difference operators, Greogory- Newton, Stirling, Bessel and Lagrange's formula. Errors in interpolation. Divided differences.

UNIT IV

Numerical Differentiation and Integration : Differentiation, Newton- Cotes formula of Inegration, Gaussian Quadrature formula. Extension of Trapezodial and Simpson's rules to multiple integration.

UNIT V

Ordinary Differential Equations : Picard, Taylor, Eulers, Runge-Kutta, Adams-Bash forth and Milne's method. System of ordinary differential equations, Partial Differential Equations: Numerical solutions of Laplace and Poisson equations by finite difference method.

References

1. Jain M.K, Iyengar S.R.K., Jain R.K., Numerical Methods for scientific & Engineering Computation, Wiley ,1987
2. Grewal, B.S., Numerical Methods in Engineering & Sciences, Khanna, New Delhi,
3. Sastry B., Introductory Method of Numerical Analysis, PHI
4. Flowers, Numerical Methods in C++, Oxford
5. Gerald C.F. (5/e), Applied Numerical Analysis, Addison Wesley, 1994

BEE-C 451
ELECTRICAL MACHINE-II LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To perform no load and blocked rotor tests on a three phase squirrel cage induction motor and determine equivalent circuit.
2. To perform load test on a three phase induction motor and draw:
   (i) Torque -speed characteristics
   (ii) Power factor-line current characteristics
3. To perform no load and blocked rotor tests on a single phase induction motor and determine equivalent circuit.
5. To study speed control of three phase induction motor by varying supply voltage.
6. To study speed control of three phase slip ring induction motor by varying rotor resistance.
7. To perform open circuit and short circuit tests on a three phase alternator and determine voltage regulation at full load and at unity, 0.8 lagging and leading power factors by (i) EMF method (ii) MMF method.
8. To determine V-curves and inverted V-curves of a three phase synchronous motor.
9. To determine Xd and Xq of a three phase salient pole synchronous machine using the slip test and draw the power-angle curve.
10. To study the methods of synchronization of an alternator with bus bars.
11. To perform load test on universal motor and determine performance characteristics.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 452
CIRCUIT LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Verification of principle of superposition theorem with A.C. source.
2. Verification of principle of Thevenin's theorem with A.C. source.
3. Verification of principle of Norton's theorem with A.C. source.
4. Verification of principle of maximum power transfer theorem with A.C. source.
5. To study RLC series circuit.
6. To study RLC parallel circuit.
7. Determination of transient response of current in RL and RC circuits.
8. Determination of transient response of current in RLC circuit.
9. Determination of frequency response of current in RLC circuit with sinusoidal A.C. input.
10. To study T and ∏ networks.
11. Determination of z and h parameters (D.C. only) for a network and computation of Y and ABCD parameters.
12. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values.
13. Verification of parameter properties in inter-connected two port networks: series, parallel and cascade also study loading effect in cascade.
14. Determination of frequency response of a Twin-t notch filter.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2016-17)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BAM-C 452
NUMERICAL ANALYSIS LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

Roots of Algebraic and transcendental equations

1. Bisection method
2. Newton Raphson method
3. Direct iterative method

Solutions of simultaneous equations-

4. Gauss Elimination method
5. LU – Decomposition method
6. Jacobi method
7. Gauss Seidel method

Interpolation

8. Lagrange's Interpolation method
9. Newton Forward's interpolation method and Newton Backward's interpolation method

Numerical differentiation and integration

10. first and second order differential coefficient
11. Trapezoidal formula composite
12. Simpson's 1/3 formula composite
13. Simpson's 3/8 formula
14. Lagendre Gaussian Quadrature

Solution of differential equations

15. Picards method
16. Euler's method
17. Runge-Kutta method
18. Milne's method

Statistics

19. Method of least square curve fitting
20. Regression analysis
21. Linear square fit and polynomial fit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BCE-C 454
DATA STRUCTURE LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

Write Program in C

1. Array implementation of Stack.
2. Array implementation of Queue.
3. Array implementation of Circular Queue.
4. Implementation of Linked List.
5. Implementation of Stack using list.
6. Implementation of Queue using list.
7. Implementation of Binary Search Tree, Tree Traversal.
8. Insertion and Deletion in BST.
9. Implementation of Searching and Sorting Algorithms.
10. Sort a double linked list.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 501
POWER SYSTEM-I

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Power System Components: Single line Diagram of Power system, Brief description of power system Elements: Synchronous machine, transformer, transmission line, bus bar, circuit breaker and isolator.

Supply System: Different kinds of supply system and their comparison, choice of transmission voltage.

Transmission Lines: Configurations, types of conductors, resistance of line, skin effect, Kelvin's law. Proximity effect.

UNIT II

Over Head Transmission Lines: Calculation of inductance and capacitance of single phase, three phase, single circuit and double circuit transmission lines. Representation and performance of short, medium and long transmission lines, Ferranti effect. Surge impedance loading.

UNIT III

Corona and Interference: Phenomenon of corona, corona formation, calculation of potential gradient, corona loss, factors affecting corona, methods of reducing corona and interference. Electrostatic and electromagnetic interference with communication lines.

Overhead line Insulators: Type of insulators and their applications, potential distribution over a string of insulators, methods of equalizing the potential, string efficiency.

UNIT IV

Mechanical Design of transmission line: Catenary curve, calculation of sag & tension, effects of wind and ice loading, sag template, vibration dampers. **Insulated cables:** Type of cables and their construction, dielectric stress, grading of cables, insulation resistance, capacitance of single phase and three phase cables, dielectric loss, heating of cables.

UNIT V

Neutral grounding: Necessity of neutral grounding, various methods of neutral grounding, earthing transformer, grounding practices. Electrical Design of Transmission Line: Design consideration of EHV transmission lines, choice of voltage, number of circuits, conductor configuration, insulation design, selection of ground wires. EHV AC and HVDC Transmission**:** Introduction to EHV AC and HVDC transmission and their comparison, use of bundle conductors, kinds of DC links, and incorporation of HVDC into AC system.

Text Books

1. W. D. Stevenson, Element of Power System Analysis, McGraw Hill, USA
2. C. L. Wadhwa, Electrical Power Systems, New age international Ltd. Third Edition
3. S. L. Uppal, Electric Power, Khanna Publishers, India.

Reference Books

1. S.N.Singh, Electric Power Generation, Transmission& distribution, PHI, New Delhi.
2. Asfaq Hussain, 'Power System, CBS Publishers and Distributors, India
3. B. R. Gupta, Power System Analysis and Design, Third Edition, S. Chand & Co.
4. M. V. Deshpande, Electrical Power System Design, Tata Mc Graw Hill.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 502
POWER ELECTRONICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Power Semiconductor Devices: Power semiconductor devices their symbols and static characteristics and specifications of switches, types of power electronic circuits BJTO operation steady state and switch characteristics, switching limits Operation and steady state characteristics of MOSFET and IGBT Thyristor – Operation V- I characteristics, two transistor model, methods of turn-on Operation of GTO, MCT and TRIAC.

UNIT II

Power Semiconductor Devices(Contd.): Protection of devices, Series and parallel operation of thyristors Commutation techniques of thyristor DC-DC Converters: Principles of step-down chopper, step down chopper with R-L load Principle of step-up chopper, and operation with RL load, classification of choppers.

UNIT III

Phase Controlled Converters: Single phase half wave controlled rectifier with resistive and inductive loads, effect of freewheeling diode. Single phase fully controlled and half controlled bridge converters. Performance Parameters Three phase half wave converters Three phase fully controlled and half controlled bridge converters, Effect of source impedance Single phase and three phase dual converters.

UNIT IV

AC Voltage Controllers: Principle of On-Off and phase controls Single phase ac voltage controller with resistive and inductive loads Three phase ac voltage controllers (various configurations and comparison) Single phase transformer tap changer. Cyclo Converters Basic principle of operation, single phase to single phase, three phase to single phase and three phase to three phase cyclo converters, output voltage equation.

UNIT V

Inverters: Single phase series resonant inverter Single phase bridge inverters Three phase bridge inverters Voltage control of inverters Harmonics reduction techniques Single phase and three phase current source inverters.

Text Books

1. M.H. Rashid, Power Electronics: Circuits, Devices & Applications, Prentice Hall of India Ltd. 3rd Edition, 2004.
2. M.D. Singh and K.B. Khanchandani, Power Electronics, Tata MC Graw Hill, 2005

Reference Books

1. M.S. Jamil Asghar, Power Electronics, Prentice Hall of India Ltd., 2004
2. A. Chakrabarti, Rai & Co. , Fundamentals of Power Electronics &Drives, Chanpat Rai &Co.
3. K. Hari Babu , Power Electronics, Switch Publications.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 503
AUTOMATIC CONTROL SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Control System: Open loop & closed control; servomechanism, Physical examples. Transfer functions, Block diagram algebra, Signal flow graph, Mason's gain formula Reduction of parameter variation and effects of disturbance by using negative feedback.

UNIT II

Time Response analysis: Standard test signals, time response of first and second order systems, time response specifications, steady state errors and error constants Design specifications of second order systems: Derivative error, derivative output, integral error and PID compensations, design considerations for higher order systems, performance indices.

UNIT III

Control System Components: Constructional and working concept of ac servomotor, synchros and stepper motor.

Stability and Algebraic Criteria: Concept of stability and necessary conditions, Routh- Hurwitz criteria and limitations.

Root Locus Technique: The root locus concepts, construction of root loci.

UNIT IV

Frequency Response Analysis: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots.

Stability in Frequency Domain: Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, constant M&N circles.

UNIT V

Introduction to Design: The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain.

Review of State Variable Technique: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa, diagonalization, Controllability and observability and their testing.

Text Books

1. Nagrath & Gopal, Control System Engineering, 4th Edition, New age International.
2. K. Ogata, Modern Control Engineering, Prentice Hall of India.

Reference Books

1. Norman S. Mise, Control System Engineering 4th edition, Wiley Publishing Co.
2. M.Gopal, Control System; Principle and design, Tata McGraw Hill.
3. M.Gopal, Modern Control system, Tata McGraw Hill.
4. D.Roy Choudhary, Modern Control Engineering, Prentice Hall of India.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BCE-C 506
OBJECT ORIENTED PROGRAMMING USING C++

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Review of C, Difference between C and C++, Cin, Cout, new ,delete operators, abstraction, encapsulation, inheritance, polymorphism, Structured versus object-oriented development, elements of object-oriented programming.

Class Overview: Class specification, class objects, accessing class members, defining member functions, outside member functions as inline, accessing member functions within a class, data hiding, access boundary of objects revisited, empty classes, pointers within a class, passing objects as arguments, returning objects from functions, friend functions and friend classes, constant parameters and member functions, structures and classes, static data and member functions, class, objects and memory resource, class design steps.

UNIT II

Object initialization and cleanup: Class revisited, constructors, parameterized constructors, destructor, constructor overloading, order of construction and destruction, constructors with default arguments, dynamic initialization through constructors, constructors with dynamic operations, copy constructor, static data members with constructors and destructors.

Operator overloading: Introduction, over loadable operators, unary operator overloading, operator keyword, operator return values, limitations of increment/decrement operators, binary operator overloading, arithmetic operators, overloading of new and delete operators, data conversion, conversion between basic data types, conversion between objects and basic types, conversion between objects of different classes, overloading with friend functions.

UNIT III

Inheritance : Introduction, class revised, derived class declaration, forms of inheritance, inheritance and member accessibility, constructors in derived classes, destructors in derived classes, constructors invocation

and data members initialization, overloaded member functions, multilevel inheritance, multiple inheritance, hierarchical inheritance, multi-path inheritance and virtual base classes, hybrid inheritance.

UNIT IV

Virtual functions and classes: Introduction, need for virtual functions, static and dynamic binding, pointer to derived class objects, definition of virtual functions, pure virtual functions, abstract classes, virtual destructors.

Generic programming with templates: Introduction, function templates, overloaded function templates, multiple arguments function templates, user defined template arguments, class templates, class template with overloaded operators.

UNIT V

Streams computation with streams: Predefined console streams, hierarchy of console stream classes, unformatted I/O operations, formatted console I/O operations, manipulators, custom/user-defined manipulators, stream operator with user-defined classes.

Stream computation with files: Introduction, hierarchy of file stream classes, opening and closing of files, testing for errors, file modes, file pointers and their manipulators, sequential access to a file, ASCII and binary files, saving and retrieving of objects, file input/output with stream class, random access to a file, in-memory buffers and data formatting, error handling during file manipulations, filter utilities.

Exception handling: Introduction, error handling, exception handling model, exception handling constructs.

References

1. E.Balagurusamy, Object Oriented Programming with C++, TMH
2. R.Lafore, Object Oriented Programming using C++, Galgotia
3. S.B.Lippman & J.Lajoie, C++ Primer, Addison Wesley
4. G.Booch, Object Oriented Design & Applications, PHI

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 506
DIGITAL ELECTRONICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Number System: Representation of negative numbers, 9's and 1's complement, 10's and 2's complement, arithmetic using 2's complement. BCD Code, Gray Code, Excess-3 Code, Introduction to Boolean algebra, Truth table verification of various gates, Realization of Switching functions with gates.

UNIT II

K- Map: Representation up to 4 variables, simplification and realization of various functions using gates, Tabular Method, Combinational logic and design procedure.

UNIT III

Combinational logic Circuits: Arithmetic circuits, Half and Full adder, Subtractors, BCD adders, Code Conversion, 4 bit Magnitude Comparator (IC -7485), Cascading of IC 7485, Decoder, Multiplexer, Demultiplexers, Encoders.

UNIT IV

Sequential Logic Circuits: Flip Flops, S-R latch, gated latches, Edge triggered Flip Flops, Master-slave Flip Flops, Conversion of flip flops, Analysis of clocked sequential circuits, Design of synchronous circuits, State transition diagram, state reduction and assignment.

UNIT V

Counters: Design of Asynchronous and Synchronous Counters, Two bits & four bits up & down counters and their design, Shift registers, Serial & Parallel data transfer, Shift left/Right register, Shift Register applications.

Text Books

1. M. Morris Mano, Digital Design, PHI

References

1. R.P.Jain, Modern Digital electronics, TMH
2. A.Anand Kumar, Fundamentals of Digital Circuits, PHI
3. Lee S.C, Modern Switching Theory and Digital design, PHI
4. Greenfield J.D., Practical Digital design using ICs, John Wiley
5. Zvi Kohavi, switching & finite automata theory, PHI

BAM-C 501
OPTIMIZATION TECHNIQUES

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Linear Programming : Introduction, Construction of LP Model, Graphical of Solution LP. Simplex Method, Introduction, Standard LP Form and its basic Solutions, Simplex Algorithm, Artificial Starting Solution, Special cases in Simplex Method, Applications.

UNIT II

Duality: Introduction, Definition of Dual Problems, Relationship between the Optimal Primal and Dual Solutions, Economic Interpretation of Duality, Dual Simplex Method, Primal Dual Computation.

UNIT III

Integer Programming : Methods of Integer Programming, Cutting-Plane Method: Fractional (Pure Integer) Method, Mixed-Cut method, Branch and Bound Technique.

Deterministic Dynamic Programming : Introduction, Recursive Nature of Computing, Forward and Backward Recursion, Applications of Dynamic Programming in Shortest Route Problem, Cargo Loading Problem, Work Force Size Model.

UNIT IV

Transportation and Assignment Model : Definition of Transportation Model, Non Traditional Transportation Model, Transportation Algorithms, Assignments Model.

Game Theory : Minimax-Maximin criterion, Pure strategies, Mixed strategies and Expected Payoff, Concept of Dominance, Graphical Solution of m x 2 and 2 x n Games. Solution by Linear Programming method.

UNIT V

Queuing Theory : Definition of Queuing System, Characteristics of Queuing Models, Notation, Transient and Steady State of Queuing System, Birth-Death process, Pure birth & Pure Death processes, (M/M/1):(FIFO/ ∞ / ∞); (M/M/s):(FIFO/ ∞ / ∞); (M/M/1):(FIFO/N/∞) Models, Their Characteristics, State Transition Diagrams.

References

1. Taha, Hamdy A., Operations Research, (Maxwell Macmillan)
2. Kanti Swarup, P.K. Gupta, Man Mohan Operations Research, (Sultan Chand & Sons)
3. Gillet, Billy E.,Introduction to Operations Research, A Computer Oriented Algorithmic Approach (TMH)

BEE-C 551
POWER SYSTEM LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To study single line to ground fault as practical application in transmissions lines.
2. To study three phase fault as practical application in transmissions lines.
3. To study phase displacement between the current & voltage at input of line using transmission line trainer kit.
4. Measurement of input impedance and attenuation of transmission line using transmission line trainer kit.
5. Measurement of characteristics of transmission using transmission line trainer kit.
6. To locate the faulted point on the cable using cable fault locator.
7. To find resistivity of the earth using hand driven earth tester.
8. To study the performance characteristics of a typical D.C. distribution system (Radial Configuration).
9. To study the performance of a long transmission line under no load & light load conditions.
10. i) To plot the equipotential line of paper model of multiple layer cable.
    ii) To plot electric stress distribution in a paper model of multiple layer cable.
11. To determine the voltage distribution across a string insulator and calculate string efficiency.
12. To test the breakdown voltage of the transformer oil by transformer oil testing set.

NOTE

11. In practical examination the student shall be required to perform one experiment.
12. A teacher shall be assigned 20 students for daily practical work in laboratory.
13. No batch for practical class shall consist of more than 20 students.
14. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
15. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 553
CONTROL AND INSTRUMENTATION LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To study the performance of various types of controllers (P, PI, PID) used to control the temperature of an oven & find
   (a) Open loop response of oven & it's transfer function
   (b) Closed loop response of oven using P, PI and PID controller.
2. To study the performance characteristics of DC motor angular position control system.
3. To study the performance characteristics of DC motor angular position error detector using potentiometer.
4. To study the Linear Variable Differential Transformer (LVDT) & draw it's characteristic.
5. To study the performance of Strain Gauge & draw the following characteristics
   (a) Strain vs. Weight
   (b) Strain vs. Strain Gauge Resistance
6. To study the performance of Resistance Temperature Detector (RTD) & draw the following characteristics
   (a) Time vs. Temperature (for heating)
   (b) Time vs. Temperature (for cooling)
   (c) Temperature vs. Resistance of RTD
7. To study the performance characteristics of analog P, PI and PID controllers on the simulated system.
8. To study the configuration and evaluate the performance characteristics of a feedback light intensity control system.
9. To study digital control of a simulated system using a 8 bit microprocessor.
10. Study of the characteristics of Linear System Simulator trainer kit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 552
POWER ELECTRONICS LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To study the DC voltage trigger with superimposed AC (SCR triggering circuit)
2. SCR trigger by R and R-C phase shift circuit.
3. To study the SCR phase control circuit.
4. To study the Triac phase control circuit.
5. To study the voltage commutated DC Chopper.
6. To study the current commutated DC Chopper.
7. To study the IGBT single-phase Inverter.
8. To study MOSFET single-phase Inverter.

NOTE
1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BCE-C 554
OBJECT ORIENTED PROGRAMMING LAB

MM : 100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P
0 0 2
Credits 2

Programming exercise on the following topics.

Functions in C++, parameter passing, call and return by reference, friend functions, inline functions, function overloading.

Classes and objects: arrays within a class, memory allocation for objects, static members, returning objects, constructor and destructors, operator overloading.

Inheritance: derived classes, single and multiple inheritance, hierarchical inheritance, constructors in derived classes, classes containing objects of other classes.

Polymorphism: pointers to objects, this pointer, pointer to derived classes, virtual functions.

Templates: class and function templates, template arguments, exception handling; use of files, learning to use Visual C++ environment.

NOTE

1. Each experiment shall carry 20 marks and 15 marks shall be reserved for viva-voce examination.
2. In practical examination the student shall be required to perform one experiment.
3. A teacher shall be assigned 20 students for daily practical work in laboratory.
4. No batch for practical class shall consist of more than 20 students.
5. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
6. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 601
POWER SYSTEM –II

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Representation of Power System Components: Synchronous machines, Transformers, Transmission lines, one line diagram, Impedance and reactance diagram, per unit System.

Symmetrical components: Symmetrical Components of unbalanced phasors, power in terms of symmetrical components, sequence impedances and sequence networks.

Symmetrical fault analysis: Transient in R-L series circuit, calculation of 3-phase short circuit current and reactance of synchronous machine, internal voltage of loaded machines under transient conditions.

UNIT II

Unsymmetrical faults: Analysis of single line to ground fault, line-to-line fault and Double Line to ground fault on an unloaded generators and power system network with and without fault impedance. Formation of Zbus using singular transformation and algorithm, computer method for short circuit calculations.

UNIT III

Load Flows: Introduction, bus classifications, nodal admittance matrix (Y Bus), development of load flow equations, load flow solution using Gauss Siedel and Newton-Raphson method, approximation to N-R method, line flow equations and fast decoupled method.

UNIT IV

Power System Stability: Stability and Stability limit, Steady state stability study, derivation of Swing equation, transient stability studies by equal area criterion and step-by- step method. Factors affecting steady state and transient stability and methods of improvement.

UNIT V

Traveling Waves: Wave equation for uniform Transmission lines, velocity of propagation, surge impedance, reflection and transmission of traveling waves under different line loadings. Bewlay's lattice diagram, protection of equipments and line against traveling waves.

Text Books

1. W.D. Stevenson, Jr. Elements of Power System Analysis, Mc Graw Hill.
2. C.L. Wadhwa, Electrical Power System, New Age International.
3. Kothari & Nagrath, Modern Power System Analysis, Tata Mc Graw Hill.

Reference Books

1. L. P. Singh, Advanced Power System Analysis & Dynamics, New Age International.
2. Hadi Sadat, Power System Analysis, Tata McGraw Hill.
3. A. R. Bergen and V. Vittal, Power System Analysis, Pearson Publication.
4. Chakraborthy, Soni,Gupta & Bhatnagar, Power System Engineering, Dhanpat Rai & Co.
5. Stagg and El-Abiad, Computer Methods in Power System Analysis, Tata Mc Graw Hill.

BEE-C 602

COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Basic Considerations: Basic concept of design, limitation in design, standardization, modern trends in design and manufacturing techniques. Classification of insulating materials. Modes of heat dissipation & temperature rise-time curves. Methods of cooling ventilation (induced & forced, radial & axial), direct cooling & quantity of cooling medium. Calculation of total mmf and magnetizing current. Specific permeance and leakage reactance.

UNIT II

Transformer Design: Output equation design of core, yoke and windings, overall dimensions, Computation of no load current to voltage regulation, efficiency and cooling system designs.

UNIT III

Design of Rotating Machines – I: Output equations of rotating machines, specific electric and magnetic loadings, factors affecting size of rotating machines, separation of main dimensions, selection of frame size. Core and armature design of dc and 3-phase AC machines.

UNIT IV

Design of Rotating Machines – II: Rotor design of three phase induction motors. Design of field system of DC machine and synchronous machines. Estimation of performance from design data.

UNIT V

Computer Aided Design: Philosophy of computer aided design, advantages and limitations. Computer aided design approaches analysis, synthesis and hybrid methods, Concept of optimization and its general procedure. Flow charts for the design of transformer, dc machine, three-phase induction and synchronous machines.

Text Books

1. A. K. Sawhney, A Course in Electrical Machine Design, Dhanpat Rai & Sons.
2. M.G. Say, The Performance and Design of AC Machines, Pitman & Sons.
3. S.K. Sen, Principle of Electrical Machine Design with Computer Programming, Oxford and IBM Publications.

Reference Books

1. A.E. Clayton and N.N. Hancock, "The Performance and Design of D.C. Machines" Pitman & Sons.
2. K.G. Upadhyay," Conventional and Computer Aided Design of Electrical Machines" Galgotia Publications.

BEE-C 603
INSTRUMENTATION AND PROCESS CONTROL

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Transducer-I : Definition, advantages of electrical transducers, classification, characteristics, factor affecting the choice of transducers, Potentiometers, Strain gauges, Resistance thermometer, Thermisters, Thermocouples, LVDT, RVDT.

UNIT II

Transducer-II: Capacitive, Piezoelectric Hall effect and opto-electronic transducers, Measurement of motion, Force pressure, Temperature, Flow and liquid level.

UNIT III

Telemetry: General telemetry system, land line and radio frequency telemetering system, transmission channel and media, receiver and transmitter. Data Acquisition System. Analog data acquisition system, modern digital data acquisition system.

UNIT IV

Display Devices and Recorders: Display devices, storage oscilloscope, spectrum analyzer, strip chart and X-Y recorders, magnetic tape and digital tape recorders.

Recent Developments: Computer aided measurements, fibro optic transducers, microprocessors, and smart sensors, smart transmitters.

UNIT V

Process Control: Principal elements of process control system, process characteristics, proportional (P), Integral (I), derivative(D), PI, PD and PID control modes, Electronic, Pneumatic and digital controllers.

Text Books

1. B. C. Nakara and K. Chaudhary, Instrumentation, measurement and analysis, Tata Mc Graw Hill 2nd Edition.
2. Curtis Johns, Process Control Instrumentation, Prentice Hall.

Reference Books

1. E.O. Decblin, Measurement system-applications and design, Mc Graw Hill.
2. W.D. Cooper & A. P. Beltried, Electronics Instrumentation and Measurement Techniques, Prentice Hall International.
3. A.K. sawhney , Advance measurement and instrumentation, Dhanpat Rai & Sons.

BEC-C 605
MICROPROCESSOR & MICROCONTROLLER

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Microprocessors and assembly language, 8085 μp architecture, addressing modes of 8085, basics of memory interfacing, 8085 instruction set and programming techniques, timing diagrams.

UNIT II

Counters, time delays, stacks and subroutines, programming of basic arithmetic operations: addition, subtraction, multiplication, division, code conversion etc Interrupts, interfacing I/o devices: Data converters, Switches, LED'S, Seven segment LED display, printer.

UNIT III

Programmable interface devices: 8155A I/O & timer, 8279 programmable keyboard / display interface, general-purpose programmable peripheral devices: PPI-8255, Programmable interrupt controller (8259), DMA & DMA controller (8237), Serial I/O and data communication.

UNIT IV

Introduction to 16 bit microprocessors, architecture of 8086, Physical address, segmentation, memory organization, addressing modes,

UNIT V

Introduction to 8051 microcontroller, architecture, Addressing modes, timer/counter, interrupts,

Text Books

1. Microprocessor, architecture, programming and applications with 8085 R.S Gaonkar.

References

1. 8086 microprocessor: programming and interfacing the pc- K.J Ayala
2. 8051 microcontroller architecture programming and applications-K. J Ayala
3. Microprocessors and interfacing: Douglas hall.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 601
ANALOG INTEGRATED CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

IC OP-AMP applications: OP-AMP Fundamentals (brief review of differential amplifier, current mirror, active load, level shifter, output stage; ac and dc characteristics) Basic building blocks using OP-AMPS. Inverting/ Non-inverting VCVS, Integrators, Differentiators, CCVS and VCCS, Instrumentation Amplifiers.

UNIT II

Waveform Generator: Square wave generators: 555Timer, Crystal controlled Oscillator Ramp Generator: Triangle generator, Sawtooth generator, Sine wave generator: Requirement for sinusoidal oscillations, Wien-bridge and twin-T oscillators. Function Generators: Multi op-amp function generators, IC function generators PLL Fundamentals.

UNIT III

Active Filters: Introduction to filtering: Frequency response, Characteristics and terminology, Active versus passive filters, Low pass filter: First order low pass active filter, second order active filter model, second order low pass filter characteristics, Sallen-Key unity gain filter, Sallen-Key equal component filter, Higher order filters.High pass active filter. Band pass filter: single op-amp band pass filter, multistage band pass filter,State variable filter

UNIT IV

Non-linear Circuits: Logarithmic Amplifiers, Log/Antilog Modules, Precision Rectifier, Peak Detector, Sample and Hold Circuits. OP-AMP as Comparator, Schmitt Trigger, Square and Triangular Wave Generator, Monostable Multivibrator. IC Analog Multiplier applications OTA

UNIT V

Voltage Regulators: OP-AMP Regulators, IC Regulators, Fixed Voltage Regulators (78/79, XX), SMPS.

Text Books

1. Gayakwad, R.A, Op-Amp and Linear Integrated Circuits, Phi

References

1. Sedra and Smith, Microelectronic Circuits", Oxford University press, 5th Edition, 2005.
2. J. Michael Jacob, Applications and design with Analog Integrated Circuits", PHI, 2nd Edition, 2004
3. B.P. singh and Rekha Singh, Electronic Devices an Integrated Circuits; Pearson Education, 1st Edition 2006.

BHU-C 601
INDUSTRIAL ECONOMICS AND BUSINESS ADMINISTRATION

MM : 100 **Sessional: 30**
Time : 3hrs **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Industrial Economics: Elasticity of demand and supply, Demand forecasting methods, Consumption laws, Types of competition, Break even analysis, National income accounting, Trends in Industrialization in India, Economies of scale, Production Planning and control.

UNIT II

Money, Banking and Financial Management: Nature and functions of money, Functions of commercial and central banks, Credit creation in the banks, Balance of payment and trade, Foreign Exchange, Exchange control, Devaluation and Revaluation, Sources of Industrial Finance, Principles of accounting, Balance sheet & P & L A/C, Cash flow statement.

UNIT III

Principles of Management: Managerial functions - Planning, Organizing Leading & Controlling.

UNIT IV

Marketing Management: Concept of marketing management, P's of marketing, Product life cycle, Market segmentation.

UNIT V

Personnel Management and Industrial Psychology: Concept and importance of Personnel Management recruitment and selection, Training and development, Job evaluation, Fatigue, Accidents - causes and prevention, Nature of Industrial relations, Industrial disputes, Quality of work life.

References

1. Dewtt. K.K., Modern Economic Theory" S. Chand, & Co (r) Ltd (r) 1999.
2. Robbins (r) P. Stephen, Coutter Mary, 'Management' PHI 1998.
3. Kotler Philip, 'Marketing Management', PHI latest edition.
4. Nair N.G.,Latha Nair,Personnel Management and Industrial Relations', S.Chand &Co 1999.
5. Singh S.P. "Industrial Economics & Management" AITBS, New Delhi, 2006
6. Kooutsnnis, 'Modern Economic Theory', PHI, 1996.
7. Maheswari S.N., 'An Introduction to Accountancy' Vikas Publishing House 1999.
8. Koontz Harold, O Donnel Cyril, Weihirch Heniz, 'Management', TMH-1983.
9. Monoppan Arun, Sayadain S (r) Mirza, 'Personnel Management', TMH 1997 Edn.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 651
CAD OF ELECTRICAL MACHINES LAB

MM : 100 **Sessional : 30**
Time : 2 Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To develop a computer program to design single phase core type transformer.
2. To develop a computer program to design single phase shell type transformer.
3. To develop a computer program to design three phase core type transformer.
4. To develop a computer program to design three phase shell type transformer.
5. To develop a computer program to design three phase squirrel cage Induction motor.
6. To develop a computer program to design three phase slip ring Induction motor.
7. To develop a computer program to design a D. C. series motor.
8. To develop a computer program to design a synchronous machine.
9. To develop a computer program to design a DC shunt motor.
10. To develop a computer program to design a DC generator.

NOTE
1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEG-A 651
TECHNICAL COMMUNICATION LAB

MM : 100 **Sessional: 30**
Time : 2 Hr **ESE:70**
L T P
0 0 2
Credits 2

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication

LIST OF PRACTICALS

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills with emphasis on Paralinguistics/Kinesics.
4. Presentation Skills based on proper Stress and Intonation Mechanics.
5. Official/Public Speaking based on suitable Rhythmic Patterns.
6. Argumentative Skills/Role Play Presentation with Stress and Intonation.
7. Comprehension Skills based on Reading and Listening Practical on a model Audio-Visual Usage.
8. Word formation, Synonyms and Antonyms, Homophones
9. Selection of vocabulary of about 100-200 New words;

RECOMMENDED BOOKS

Agarwal, S K. & Singh, *P K. Effective Business Communication.* New Delhi: Himanshu publications.
Balasubramaniam, T. *Phonetics for Indian Students*. Macmillan India Ltd.
Krishnaswamy, N. "*Modern English*. Macmillan India Ltd.
Koneru, Aruna. Professional Communication. New Delhi: Tata Mc Graw-Hill Publishing Company Ltd.
Mohan, Krishna & Banerji, Meera. *Developing Communication Skill*. Macmillan India Ltd.
Pandey, L.U.B. & Singh, R.P. *A Manual of Practical Communication*. A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
Rizvi, M Ashraf. *Effective Technical Communication*. New Delhi: Tata Mc Graw-Hill Publishing Company Ltd.

DICTIONARIES

Daniel, Jones. *English Pronouncing Dictionary*. Cambridge University Press.
Oxford Advanced Learners' Dictionary.
Longman's Dictionary of Contemporary English

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 651
ANALOG INTEGRATED CIRCUITS LAB

MM : 100 **Sessional: 30**
Time : 2 Hr **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To measure different parameter of the Op-Amps.
2. To find the CMRR in differential amplifier.
3. To study the gain and frequency response of Inverting Amplifier.
4. To study the gain and frequency response of Non Inverting Amplifier.
5. To study the operational amplifier as Differentiator.
6. To study the Op-Amp as summer.
7. To study the Op-Amp as subtractor.
8. To study the operational amplifier as Integrator.
9. To find the response of clipper circuit.
10. To study the OP-AMP as square wave generator.
11. To study 2^{nd} order Low Pass active Filter.
12. To study 2^{nd} order High Pass active Filter.
13. To study the hysteresis characteristics of the Op- Amp based Schmitt trigger.
14. To study the monostable multivibrator using Timer IC 555.
15. To find the frequency of oscillation for astable multivibrator using Timer IC 555.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 654
MICROPROCESSOR & MICROCONTROLLER LAB

MM : 100 **Sessional: 30**
Time : 2 Hr **ESE: 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. Addition of 8 bit hexadecimal numbers without carry.
2. Addition of 8 bit hexadecimal numbers with carry.
3. To calculate 2's compliments of a 8 bit number.
4. Subtraction of two 8 bit hexadecimal number.
5. Interfacing with 8255 in I/O mode & BSR mode.
6. Verification of all interrupts.
7. Multiplication of 8 bit hexadecimal number by 2.
8. Division of 8 bit hexadecimal numbers.
9. Addition of two 8 bit decimal numbers.
10. Transfer the block from one memory location to another.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

BEE-C 701
SWITCHGEAR AND PROTECTION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Theory of Arc Quenching: Arcing phenomena and arc quenching – circuit breaker rating – RRRV – current chopping and capacitance current breaking – characteristics of HRC fuses – d.c. circuit breaking.

Circuit Breakers: Bulk oil and oil minimum circuit breakers – air blast circuit breakers – vacuum and SF6 circuit breaker – Rating, speed of operation, selection and testing of circuit breakers.

UNIT II

Relays and Relay Characteristics and Relaying Schemes: Basic ideas of short circuit currents and concepts of relay protection – basic terminology- essential qualities of a protective relay – classification of protective relays and protective schemes-operation relays-directional overcurrent relays-distance relays-differential relays-negative sequence relays-earth fault protection –reverse power protection – electromagnetic and solid state relays.

UNIT III

Distance Protections: Introduction, impedance relay, operating principle and characteristics of an impedance relay, protective scheme using impedance relay, Reactance relay: electromagnetic reactance relay, static reactance relays, Admittance relay: Electromagnetic MHO relay, static MHO relays, sampling comparator, effect of arc resistance and power surges on distance relay. Principle of out of step tripping, effect of line length and source impedance on distance relays, selection of distance relay.

UNIT VI

Apparatus and Line Protection: Application of over current relays and distance relays to feeder protection – ring main protection- busbar protection-carrier current protection of transmission lines-protection of generators and transformers.

UNIT V

Protection Against Over Voltages: Over voltages due to Lightning and switching – arcing grounds – Peterson Coil – methods of protection against over voltages – ground wires-surge absorber and diverters – Power System earthling – Earth resistance – Neutral Earthing-basic ideas of insulation coordination.

Text Books

1. Badri Ram Vishwakarma, & D.N., Power System Protection and Switchgear, Tata-McGraw Hill publishing company Ltd., 1995.

References

1. Uppal. S.L., Electrical power, Khanna publication, Delhi, 1976.
2. Ravindranath, B. ,Chander, N., Power Systems Protection and Switch Gear, Wiley Eastern Ltd.,

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 702
ELECTRIC DRIVES AND THEIR CONTROL

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Fundamentals of Electric Drive: Electric Drives and its parts, advantage of electric drives, Classification electric drives, Speed-torque conventions and multi-quadrant operations, Constant torque and constant power operations, Types of load, Load torque: components, nature and classification.

UNIT II

Dynamics of Electric Drives: Dynamics of motor-load combination; Steady states stability of Electric Drives; Transient stability of Electric Drives.

UNIT III

Electric Breaking: Purpose and types of electric breaking, breaking of dc, Three Phase induction and synchronous motors.

Dynamics During Starting and Breaking: Calculation of acceleration time and energy loss during starting of dc shunt and 3-Phase induction motors, method of reducing energy loss during starting. Energy relation during breaking, Dynamics during breaking.

UNIT IV

Power Electronic Control of DC Drives: Single phase and three phase controlled converter feed separately excited dc motor drives (continuous conduction only) ; dual controlled converter feed separately excited dc motor drives, rectifier control of dc series motor .Supply harmonics, power factor and ripples in motor current Chopper control of separately excited dc motor and dc series motor.

UNIT V

Power Electronic Control of AC Drives: Three phase Induction motor drive: static Voltage control scheme, static frequency control scheme (VSI, CSI, and cyclo-converter based) static rotor resistance and slip power recovery control schemes.

Three Phase Synchronous Motors: Self control schemes.

Special Drivers: Switched Reluctance motor, Brushless dc motor, selection of motor for particular applications.

Text Books

1. S.L. Uppal, Electrical Power, Khanna publishers, New Delhi, 1992.
2. S. K. Pallai, A First course on Electric Drives, New age International.
3. M. Chilkin, Electric Drives, Mir Publishing, Moscow.

References

1. Mohammed A. El-Sharkawi, Fundamentals of Electric drives, Thomoson Asia, Pvt.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 703
POWER SYSTEM OPERATION AND CONTROL

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Approach adopted in utilities for providing reliable, quality and economic electric power supply-necessity for regulation of system frequency and voltage -p-f and Q- V control structure- Recent trends in real time control of power systems- Load dispatching- System load characteristics- load curves-chronological load curves- load duration curves- energytime curves- load factor- utilization factor-diversity factor- coincidence factor- demand factor- reserve requirements- installed reserve –spinning reserve- cold reserve- hot reserve- operational restrictions- load dispatching.

UNIT II

Pre-Requisities to Load Dispatching: Load forecasting -components of system load- classification of base load- forecasting of the base load by method of least square fit- introduction to unit commitments-constraints on unit commitment- unit commitment using priority ordering.

UNIT III

Power Frequency Control: Local control- Power control mechanism of individual machine- mathematical model of speed governing mechanism -speed load characteristics of governing mechanism-regulation of two generators in parallel- System control- Division of power system
into control areas- LFC control of a single area- static and dynamic analysis of controlled system-proportional plus integral control of a single area- LFC control of two area system – uncontrolled case-static and dynamic response- Tie line with frequency bias control of two area.

UNIT IV

Economic Dispatch Control: Incremental cost curve- co-ordination equations with loss neglected -solution by iteration- co-ordination equation with loss included (No derivation of Bmmco-efficients)- solution of co-ordination equations using Bmm co-efficients by iteration method- Base point and participation factors - Economic dispatch controller added to LFC.

UNIT V

Reactive Power Voltage Control: Local control - Fundamental characteristics of excitation system-block diagram model of exciter System control- Generation and absorption of reactive power-method of voltage control-Injection of reactive power – static shunt
capacitor/Inductor V AR compensator- Tap changing transformer.

Text Book

1. Olle I. Elgerd, Electric Energy System Theory -An Introduction, Tata McGraw Hill Publishing Company, New Delhi, 1991 2nd edition.

References

1. Allem. J. Wood. Bruce. F.Wollenbarg, Power Generation, Operation and Control, John Wiley and Sons, 1984.75
2. Weedy, B.M., Electric Power System, John Wiley and Sons, Elsevier Publishing.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEC-C 701
DIGITAL SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Discrete Fourier Transform: Frequency Domain Sampling: The Discrete Fourier Transform Frequency-Domain Sampling and Reconstruction of Discrete-Time Signals. The Discrete Fourier Transform (DFT). The DFT as a linear Transformation.Relationship of the DFT to Other Transforms. Properties of the DFT. Periodicity, Linearity, and Symmetry Properties. Multiplication of two DFTs and Circular Convolution. Additional DFT Properties. Frequency analysis of signals using the DFT.

UNIT II

Efficient Computation of DFT: Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix-2 FFT algorithms. Efficient computation of the DFT of two real sequences, computations, efficient computation of the DFT of a 2NPointreal sequences, Gortezel Algorithm, Chirp Z-transform algorithm.

UNIT III

Basic IIR Filter Structures: Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure. FIR structures.

UNIT IV

Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency Sampling Method, Design of FIR, Equi-ripple filter design Differentiators. Design of Hilbert Transformers.

UNIT V

Design of IIR Filters from Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters.

Text Books

1. Proakis, J.G. & Manolakis, D.G., "Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall (India).

References

1. Sanjit K. Mitra, "Digital Signal Processing", Third Edition, TMH, 2005
2. Oppenheim A.V. & Schafer, Ronald W., "Digital Signal Processing", Pearson Education.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 751
SWITCHGEAR AND PROTECTION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To study the construction of under voltage relay and draw it's time vs. voltage characteristics.
2. To study the construction of over voltage relay and draw the following characteristics
   (a) Operating current & de-operating voltage of disc.
   (b) Voltage & operating time.
3. To study the construction of thermal relay and determine
   (a) Operational characteristics of the relay.
   (b) Time current characteristics of given fuse.
4. To study the construction of I.D.M.T. relay and determine
   (a) Operational characteristics of the relay for two time & current setting.
   (b) Reset ratio.
5. To study the construction of instantaneous over current relay and draw the following characteristics
   (a) Operating & de-operating current of the relay.
   (b) Current vs. time characteristics.
6. To study the construction of earth fault relay and determine operational characteristics of the relay for time & current setting.
7. To study the construction of percentage differential relay and determine
   (a) Operational characteristics of the relay.
   (b) Percentage bias & minimum operating current.
8. To study the different parts of Circuit Breaker.
9. To study performance of the different types of fuses.
10. To study performance of miniature circuit breaker (MCB).

NOTE

16. In practical examination the student shall be required to perform one experiment.
17. A teacher shall be assigned 20 students for daily practical work in laboratory.
18. No batch for practical class shall consist of more than 20 students.
19. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
20. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 752
CAD OF POWER SYSTEM LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P
0 0 2
Credits 2

LIST OF EXPERIMENTS

1. To develop a computer program for Y-bus.
2. To develop a computer program for Z-bus.
3. To develop a computer program for Gauss-Seidal method.
4. To develop a computer program for Newton-Raphson method.
5. To develop a computer program to analyze symmetrical short circuit fault.
6. To develop a computer program to analyze L-G faults.
7. To develop a program for L-L fault in the power transmission line.
8. To develop a program to simulate the L-L-L fault.
9. Study of computer aided power system stability.
10. To calculate the transmission line parameters using any computer language.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-C 760
MINOR PROJECT

MM : 200 **ESE: 150**
Time:3 hrs **Sessional : 50**
L T P
0 0 4
Credits 4

Each student shall be assigned a Minor Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MINOR PROJECT SHALL BE AS FOLLOWS:

MINOR PROJECT	
Project**	100
Viva-voce/Presentation**	50
Seminar (Internal)***	50
Total	200

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

S. No	CODE	SUBJECT
Elective I		
1.	BEE-G 704	HIGH VOLTAGE ENGINEERING
2.	BEE-G 711	BIO-MEDICAL INSTRUMENTATION
3.	BEE-G 710	EHV AC AND DC TRANSMISSION
4.	BEE-G 709	ELECTRICAL POWER UTILIZATION

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-G 704
HIGH VOLTAGE ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Over voltages and Insulation Coordination: Causes & types of over voltages -Lightning, switching, temporary over voltages -Effects of over voltages on power system components -EMI and EMC protection against over voltages - Surge diverters -Insulation co-ordination.

UNIT II

Generation of High Voltages And Currents: Generation of high AC and DC, impulse and switching voltages – Generation of high impulse currents.

UNIT III

Measurement of High Voltages and High Currents: Measurement of high AC, DC, impulse and switching voltages using sphere gaps, peak voltmeters, potential dividers, high speed CRO and digital techniques; -Measurement of high currents.

UNIT IV

Dielectric Breakdown: Self and non self restoring insulation -Breakdown in gases, liquids and solids - Breakdown in uniform and non-uniform fields -partial discharges -Corona.

UNIT V

High Voltage Testing: Standards and specifications -Types of tests -Testing and fault diagnostics - Testing of circuit breakers, isolators and air switches -Testing of insulators, bushing and surge diverters.

Text Books

1. Wadhwa,C.L., High Voltage Engineering, Wiley Eastern Limited, New Delhi, 1994.
2. Naidu,M.S. and Kamaraju,V., High Voltage Engineering, Tata McGraw Hill Publishing Company, New Delhi, 1994, 2nd edition.

Reference Books

1. Gallaghar,P.J. and Pearmin,A.J., High Voltage Measurement, Testing and Design, John Wiley and Sons, New York, 1982.
2. Kuffel,E., and Abdullah,M., High Voltage Engineering, Pergawon Press, Oxford, 1970.
3. Kuffel,E and Zaengl W.S.,'High Voltage Engineering Fundamental. Pergamon press, Oxford, London, 1986.

Revised Syllabus (Effective from the session 2017-18)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-G 709
ELECTRICAL POWER UTILIZATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Electric Drives and Control: Electric drives -Group drive -Individual drive -selection of motors - starting characteristics - Running characteristics -mechanical features of electric motors -Electric drives for general factory, textile mills -printing press, mines, hoists, lifts, conveyers, pumps, blowers, and ship propulsion -choice of drives -calculation of power requirement power factor improvement.

UNIT II

Electric Traction: Traction system -series, parallel control of D.C. motors, open circuited, shunt and bridge transition -tractive effort calculations -electric braking -control. wire -A.C. traction -recent trend in electric traction.

UNIT III

Illumination: Production of light -lighting calculations -determination of MHCP and MSCP -Polar curves of different types of sources -Roasseau's construction -photometers -interior and exterior illumination systems -lighting schemes -Design of lighting schemes -factory lighting -flood lighting - electric lamps -gaseous discharge lamp-high pressure and low pressure neon signs- light frequency , low pressure discharge tubes.

UNIT IV

Electric Furnaces and Welding: Resistance, inductance and Arc Furnaces -Construction and fields of application -control equipment, efficiency and losses -high frequency dielectric heating, resistance - welding equipment -mechanical, thyratron, current and energy actuated control devices -characteristics of carbon and metallic arc welding -butt welding –spot welding.

UNIT V

Refrigeration and Air-Conditioning: Control of temperature -protection of motors -basic wiring diagram - simple heat load and motor calculations. Air-conditioning -function of complete air conditioning system -type of compressor motor and fan motor-wiring diagram for a typical air conditioning unit- estimation of tonnage capacity and motor power.

Text Books

1. Uppal, S.L., Electrical Power, Khanna publishers, New Delhi, 1992.
2. Gupta, J.B., Utilisation of Electrical Energy and Electric, Traction', S.K.Kataria and sons, 1990.
3. Partab, .H., Art and Science of Utilisation of Eleclrical Energy, Dhanpat Rai and Sons, 65 New Delhi, 1986. ,

BEE-G 710
EHV AC AND DC TRANSMISSION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

General aspects and converter circuits: Historical developments -HV AC and HVDC links. comparison - economic, technical performance -reliability -limitation -properties of thyristor converter circuits - assumptions - choice of best circuit for HVDC converters -transformer connections.

UNIT II

Bridge converters- analysis and control: Analysis with gate control but no overlap -with overlap less than 60 degrees-operation of inverters -basic means of control -power reversal- desired features of control -actual control characteristics.

UNIT III

Disoperation of converters and protection: Converter disturbance -bypass action in bridges - commutation failure -basics of protection. DC reactors -voltage and current oscillations -circuit breakers - over voltage protection.

UNIT IV

Harmonics, filters and converter charts: Characteristics and uncharacteristic harmonics -troubles due to harmonics -ham1onic filters. Converter charts of direct current and voltage -active and reactive power.

UNIT V

EHV AC Transmission: Design of EHV lines based on steady state limits and transient over voltages – design of extra of HV cable transmission -XLPE cables -gas insulated cables -corona.

Text Books

1. Padiyar, K.R. HVDC transmission systems , Wiley Eastern Ltd., New Delhi,1992.

Reference Books

1. Arrilaga, .J., High voltage direct current transmission, Peter Peregninver Ltd., London, U.K., 1983.
2. Rakosh Das Begamudre, Extra HVAC Transmission Engineering, Wiley Eastern Ltd., Madras, 1990.
3. Kimbark. E. W., Direct current transmission -Vol I, Wiley Interscience, New

BEE-G 711
BIO-MEDICAL INSTRUMENTATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Human Physiological Systems: Cell and its Structure -Electrical and mechanical activity of heart- cardiovascular system- central nervous system -respiratory system -musculo-sketetal system-digestive system -kidney.

Electrodes: Origin of resting and action potential -propagation of action potential- electrode potential - electrode impedance- equivalent circuit for extra cellular electrodes –micro electrodes- micropipette and their equivalent circuits -PH, PO2 and PCO2 electrodes.

UNIT II

Measurement of Non-Electrical Parameters: Blood flow, blood pressure, respiration rate, temperature, mean and instantaneous heart rate measurements.

Biosignal Acquisition: Special requirements of physiological signal amplifiers -various types of pre amplifiers - Isolation amplifier -Differential amplifier -Instrumentation amplifier -bridge amplifier - chopper amplifier - Biosignal analysis -signal recovery and Data acquisition.

UNIT III

Biopotential Recorders: Electro cardiography -echocardiography -vector cardiography -electro encephalography - echo encephalography -applications of ECG and EEG in vartous investigations - Arrythonia monitor.

Operation Theater Equipment: Short wave Diathermy.: Microwave Diathermy -ultrasonic diathermy - surgical diathermy -anaesthetic monitor -Gas analyses -PH meters, Oxymeters.

UNIT IV

Physiological Stimulators: Cardiac pacemakers -Defibrillators -nerve and muscle stimulators -Heart valves-heart-lung machines -artificial kidney -bio telemetry .

Radio therapeutic Equipments: Applications of X-rays in various investigations -Generation of X- rays - properties of X-rays - Diagnositic X-rays -Super voltage therapy -radiation detectors -properties of isotopes - usage , of isotopes in various investigation.

UNIT V

Recent Trends in Biomedical Instrumentation: Computer analysis of ECG and EEG -computers in patient monitoring system-computers in clinical laboratories -application of lasers in various investigations -endoscopes -computer tomography -thermography -Ultrasonic imaging systems-NMR imaging -application of microprocessors in medical instrumentation, electron microscopy.

UNIT V

Patient –Safety: Micro and macro shocks -possible causes of electric shock -GFL and other measures against shock -recent trends in patient isolation.

Textbooks

1. Cromwell L., Weibell, F.J. and Fliffer, E.A., 'Biomedical Instrumentation and Measurements', Prentice Hall of India, New Delhi,2nd edition, 1997.
2. Dr. Arumugam, M., 'Biomedical Instrumentation', Amerada agencies publishers, 1992.

References

1. Khandpur, R.S., 'Handbook of Biomedical Instruments', Tata McGraw Hill Publishing Co. Ltd, New Delhi, 1998.
2. Jacobson and Webster, ' Clinical Engineering'; PHI, 1979.

BEE-G 801
DIGITAL CONTROL SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signal Processing in Digital Control: Basic digital control system, advantages of digital control and implementation problems, basic discrete time signals, z-transform and inverse z-transform, modeling of sample-hold circuit, pulse transfer function, solution of difference equation by z-Transform method.

UNIT II

Design of Digital Control Algorithms: Steady state accuracy, transient response and frequency response specifications, digital compensator design using frequency response plots and root locus plots.

UNIT III

State Space Analysis and Design: State space representation of digital control system, conversion of state variable models to transfer functions and vice versa, solution of state difference equations, controllability and observability, design of digital control system with state feedback.

UNIT IV

Stability of Discrete System: Stability on the z-plane and Jury stability criterion, bilinear transformation, Routh stability criterion on rth plane. Lyapunou's Stability in the sense of Lyapunou, stability theorems for continuous and discrete systems, stability analysis using Lyapunor's method.

UNIT V

Optimal Digital Control: Discrete Euler Largranga equation, max. min. principle, optimality & Dynamic programming, Different types of problem and their solutions.

Text Books

1. B. C. Kuo, Digital Control System, Saunders College Publishing.
2. M. Gopal, Digital Control and State Variable Methods, Tata McGraw Hill.

Reference Books

1. J. R. Leigh, Applied Digital Control, Prentice Hall, International.
2. C. H. Houpis and G. B. Lamont, Digital Control Systems; Theory, Hardware, Software, McGraw Hill.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-G 802
POWER GENERATION SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Electric energy demand and growth in India, electric energy sources.
Thermal Power Plant: Site selection, general layout and operation of plant, detailed description and use of different parts. **Hydro Electric Plants**: Classifications, location and site selection, detailed description of various components, general layout and operation of Plants, brief description of impulse, reaction, Kaplan and Francis turbines, advantages & disadvantages, hydro-potential in India.

UNIT II

Nuclear Power Plant: Location, site selection, general layout and operation of plant. Brief description of different types of reactors Moderator material, fissile materials, control of nuclear reactors, disposal of nuclear waste material, shielding. **Gas Turbine Plant**: Operational principle of gas turbine plant & its efficiency, fuels, open and closed-cycle plants, regeneration, inter-cooling and reheating, role and applications. **Diesel Plants**: Diesel plant layout, components & their functions, its performance, role and applications.

UNIT III

Sub-stations Layout: Types of substations, bus-bar arrangements, typical layout of substation.
Power Plant Economics and Tariffs: Load curve, load duration curve, different factors related to plants and consumers, Cost of electrical energy, depreciation, generation cost, effect of Load factor on unit cost. Fixed and operating cost of different plants, role of load diversity in power system economy. Objectives and forms of Tariff;. Causes and effects of low power factor, advantages of power factor improvement, different methods for power factor improvements.

UNIT IV

Economic Operation of Power Systems: Characteristics of steam and hydro-plants, Constraints in operation, Economic load scheduling of thermal plants neglecting and considering transmission Losses, Penalty factor, loss coefficients, Incremental transmission loss. Hydrothermal Scheduling.

UNIT V

Non Conventional Energy Sources: Power Crisis, future energy demand, role of Private sectors in energy management. **MHD Generation:** Working principle, open and closed cycles, MHD systems, advantages, parameters governing power output. **Solar Power Plant:** Conversion of solar heat to electricity, Solar energy collectors, Photovoltaic cell, power generation, future prospects of solar energy use. **Wind Energy**: Windmills, power output with combined operation of wind turbine generation and isolated generating system, technical choices& economic size. **Geothermal Energy:** Earth energy, heat extraction, vapor turbine cycle, difficulties & disadvantages. **Tidal Energy:** Tidal phenomenon, tidal barrage, tidal power Schemes. **Ocean Thermal Energy:** Introduction, energy conversion, problems.

Text Books

1. B.R. Gupta, Generation of Electrical Energy, S. Chand Publication.
2. Soni, Gupta & Bhatnagar, A text book on Power System Engg., Dhanpat Rai & Co.
3. P.S.R. Murthy, Operation and control of Power System, BS Publications, Hyderabad.

BEE-G 803
RENEWABLE ENERGY SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

General: Primary and commercial energy resources-study of availability, energy consumption pattern growth rate in India, Non conventional energy sources availability, Economics and efficiency.

UNIT II

Solar Photo Voltaic: Silicon PN junction, PV circuit properties and loads, PV fed drives.

UNIT III

Wind Energy: Energy from the wind-General theory of wind mills-types of wind mills -performance of wind machines-wind power-efficiency-wind generator characteristics.

UNIT IV

Tidal Energy and Geothermal: Energy from tides and waves-working principles tidal plants-tidal power generations. Geothermal energy-principle of working of geothermal power plants.

UNIT V

Bio-Energy: Energy from Bio-mass-Biogas plants-various types-Industrial wastes-Municipal wastes-Burning - plants - Energy from the agricultural wastes-Applications.

Text Books

1. John W. Turdell, Anthony W. Wein, Renewable Energy resources, CLBS, 1987.

References

1. Rai, G.D., Non Conventional Energy Sources, Khanna publishers, 1993.
2. Rai, G.D., Solar Energy Utilisation , M/S Khanna publishers, 4th edition,1991.
3. Ronald Shaw (I/c), Wave Energy : (A design challenge), Ellis Horwood Limited publishers,1982.
4. Daniel Hunt.V., Wind Power-A hand book of WECS systems, Van Nostrand Co., New York, 1981.

BEE-G 804
MODERN CONTROL SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

State Variable Systems: Controllability and observability- state variable feedback and its effect on controllability and observability - elements of observer theory.

UNIT II

Non Linear System: Common types of non-linear phenomena- linearization- singular points- phase plane method- construction of phase trajectories- .applications to ON-OFF control systems.

UNIT III

Stability of Non-Linear Systems: Basic concepts- derivation of describing functions -stability of non- linear systems by describing ': function method- jump resonance- Liapunov's method of stability studies- Popov's criterion.

UNIT IV

Pole Placement and High Gain Control Techniques: Pole placement technique by state feed back for linear SlS0 time invariant system- Theory of high gain feedback - back advantages-Pole placement technique along with high gain feedback control.

UNIT V

Modern Control Approaches: Optimal control, adaptive control, Robust control and intelligent control methods.

Text Books

1. Nagarth and Gopal, Control System Engineering, Wiley Eastern, reprint, 1995.
2. Stanley M. Shiners, Modern Control System theory and Design, John Wiley and Sons, Singapore, 1992.

References

1. Ogata K., Modern Control Engineering, P.H.I. New Delhi, 1982.
2. Chalam V. V, Adaptive Control Systems, Marcel Dekker, INC, New York and Easel, 1987.

BEE-G 805
STATIC RELAYS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Philosophy of power systems protection and its requirements -Conventional Vs static relays -generalised characteristics and operational equations of relays -steady state and transient performance of signal deriving elements, signal mixing techniques and measuring techniques - CTs and PTs in relaying schemes -saturation effects –stabilizing resistors.

UNIT II

Over Current Protection: Static relay using analog and digital ICs for over current protection. time, current characteristics, inverse definite time relay- instantaneous over current relay -directional over current relay-applications -differentials relays.

UNIT III

Generator and Transmission Line Protection: Static relay circuits for generator loss of field, under frequency, distance (impedance, reactance, mho and special characteristics -reverse power relays.

UNIT IV

Carrier Protection and Testing of Relays: Static relay circuits for carrier current protection -steady state and transient behavior of static relays -testing and maintenance of relays -tripping circuits using thyristors.

UNIT V

Microprocessor Based Relays: Hardware and software for the measurement of voltage, current, frequency and phase angle -microprocessor based implementation of over current, directional, impedance and mho relays.

Text Books

1. Ram. B., 'Fundamentals of Microprocessors and Microcomputer, M/s. Dhanpat Rai &sons, New Delhi, 1992.
2. Madhava Rao T.S., Power System Protection -Static Relays, McGraw Hill, New Delhi, 1984

Reference

1. Van. C. Warrington, Protective Relays -Their Theory and Practice, Vols. I & II.

Revised Syllabus (Effective from the session 2018-19)
Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

BEE-G 806
AC COMMUATATOR MACHINES

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

General Principles: Types of windings, stator windings, Rotar phase windings, Commutator windings, 3-phase m.m.f's, Transformer and rotational e.m.f's in phase and Commutator windings, Action of Commutator as frequency converter, Commutation with A.C. machines.

UNIT II

Effect of EMF injected into secondary circuit, sources of injected EMF, Torque-slip relations with injected EMF, Analytical treatment of motor and auxiliary machine having injected EMF proportional to current. The Leblane exciter, the walker series machine, application of series regulator.

UNIT III

Analytical treatment of motor and regulating machine giving constant injected EMF, the frequency converter, Kramer control, Scherbiues machine, Applications of shunt machines.

UNIT IV

Doubly-fed motor-MMF's and flux, EMF's phaser diagram, approximate characteristics. The Scharage motor construction, working phasor diagram performance characteristics applications.

UNIT- V

The Osnos (No-lag) motor- Principle and construction, phasor diagram, equivalent circuit performance characteristics applications. The three phase series motor- Principle and construction, phasor diagram, performance characteristics, equivalent circuit, applications.

Text Book

1. E. Openshaw Taylor, The performance and design of A.C. Commutator Motors, - A.H. Wheeler & Co.

References

1. M.G. Say, Performance and design of alternating current machines.

BHU -G 801
ENTEREPRENEURSHIP DEVELOPMENT

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introudction: Meaning, importance, benefits of entrepreneurship -characteristics, factors of Entrepreneur -Barriers to entrepreneurship -Difference between entrepreneurship and management Evolution of the concept of Entrepreneur -Difference between entrepreneur and entrepreneur. Motivational aspects of entrepreneur (McClelland's theory).

UNIT II

Project Identification And Selection: Meaning, classification of projects -Factors involved in project identification, selection - significance, contents, formulation of a project report-specimen of a project report-planning commission's guidelines for formulating a project -Basics of capital budgeting -Pay Back period, Net present value, Internal Rate of Return.

UNIT III

Sources of Finance: Cost of capital -importance of cost of capital -Basic concepts, rational assumptions - cost of debt, reference, equity capital-source of finance-internal, external sources-institutional finance to entrepreneurs and institutional support to entrepreneurs.

UNIT IV

Project Appraisal : Concept of project appraisal-Methods of project appraisal, economic analysis Financial analysis Market Analysis Technical feasibility and Managerial competence (Assessment of working and fixed capital Govt. Policies, qualitative methods of market analysis, Life cycle segmentation.

UNIT V

Ownership Structures & Evaluation of EDPS: Ownership structures -sole trader, partnership (Partnership deed) type of partnership - Joint stock companies -Difference between private and a public company – Advantages and Disadvantages of the ownership structures -Distinction between MDP and EDP - Training methods and Role playing (Games).

Textbooks

1. Stoner James, A.F., Freeman Edward, R. Gillbert, Jr. Daneil, R, "Management"--PHI-1996 Edn.
2. Udai Pareek, Venkateswara Rao, T. "Developing Entrepreneurship -A hand Book - Learning Systems -1978 Edn.

References

1. Chndraprasanna, Financial Management Theory and Practice, TMH, 1994 Edn.
2. Khanka, S.S., Entrepreneurial Development, S. Chand -.1999 End.
3. Shukla, M.C. , Business Organizations and Management, 1994 Edn. Oxford, London, 1986.

BEE-G 807

COMPUTER METHODS IN POWER SYSTEM ANALYSIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Modelling of Power System Components for Computer Analysis: Circuit model of synchronous machines- transformers-induction motors – Representation – single line diagram – per unit quantities - per unit impedance diagram – primitive impedance and admittance matrix – Busimpedence matrix- bus admittance matrix and its formation – bus impedance matrix and its formation.

UNIT II

Power Flow Analysis: Formation of power flow equation using admittance matrix – solution by Gauss-Seidel and Newton-Raphson methods for systems with voltage controlled buses – flow chart for the above methods.

UNIT III

Symmetrical Short Circuit Analysis: Types of faults in power systems – symmetrical fault analysis symmetrical fault analysis through bus impedance matrix – current limiting reactor, transient and sub-transient reactances.

UNIT IV

Unsymmetrical Short Circuit Analysis: Symmetrical components – sequence impedance of lines, transformers, synchronous machines and induction motors – unsymmetrical faults – analysis of single line to ground, line to line – double line to ground faults – using zbus and using symmetrical component transformations.

UNIT V

Stability Studies: Steady state and transient stability – stability limits – swing equation for signle machine infinite bus system – equation area criterion – solution of swing equation by modified Euler method-Qualitative treatment of multimachine stability analysis.

Text Books

1. John J Grainger & Stevenson. W.D., ' Power System Analysis', McGraw Hill. 1994.
2. Wadhwa, C.L., 'Electrical Power Systems', New age international Pvt. Ltd.1995.
3. Stagg, C.W. and Elabiad, A.H. Computer Methods in Power System Analysis', McGraw Hill International Book Company, 1990.

References

1. Nagrath, J. and Kothari, D.P. 'Modern Power System Analysis', Tata McGraw Hill, New Delhi, 1989.
2. Elgerd, O.I 'Electric Energy System Theory', An Introduction, Tata McGraw Hill Publishing Company, 1991.

BEE-G 808
VIRTUAL INSTRUMENTATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P
3 1 0
Credits 4

NOTE: The question paper shall consist of three section (Sec-A, Sec-B &Sec-C). Sec-A Shall contain10 objective type questions of one mark each and student shall be required to attempt all question Sec-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Review Of Virtual Instruments – Historical Perspective and traditional bench-top instruments, Virtual Instruments and their advantages, Application of various Vls.

UNIT II

Structure of Virtual Instruments – Acquisition,, analysis and presentation of signal using Vls, Interface buses serial(Rs-232,Rs485, GPIB USB etc.) PCI etc., HLL programming basic C, C++ etc.

UNIT III

Basics of data Acquisition, Real time data acquisition & Real time systems.

UNIT IV

Mathematical tools in analyzing signals, Digital signal processing tools.

UNIT V

TCP/IP VI's memory management, DLL, Bus extensions (PXI & PCMCIA) Computer based instruments, image Acquisition Motion Control.

Text Books

1. Raman Baican 7 DNA.S. Necsulesus, Applied Virtual Instrumentation, WIT Press, 2000

Reference Books

1. Jeffney Travis, Internet Applications in Labview, National Inst. Press.

BEE-C 860
MAJOR PROJECT

MM : 400 **Sessional : 100**
Time : 8 Hr **ESE : 300**
L T P
0 0 8
Credits 8

Each student shall be assigned a Major Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VIII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MAJOR PROJECT SHALL BE AS FOLLOWS:

MAJOR PROJECT	
Project**	200
Viva-voce/Presentation**	100
Seminar (Internal)***	100
Total	400

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

Revised Syllabus (Effective from the session 2018-19)

Gurukula Kangri Vishwavidyalaya, Haridwar
Faculty of Engineering & Technology
Electrical Engineering

B. Tech. Fourth Year

SEMESTER-VIII

List of Electives

S. No	CODE	SUBJECT
1.	BEE-G801	Digital Control System
2.	BEE -G 803	Renewable Energy Systems
3.	BEE -G 804	Modern Control Systems
4.	BEE -G 805	Static Relays
5.	BEE –G 806	AC Commutator Machines
6.	BEE-G 807	Computer Methods in Power System Analysis
7.	BEE-G 808	Virtual Instrumentation
8.	BEE-G 802	POWER GENERATION SYSTEMS
9.	BHU -G801	Entrepreneurship Development

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.