JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)

BE (PTDC) **Branch : Electrical Engineering** **Sem: Eighth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
EE-47	Power System Protection	3	1	-	10	20	30	70	100	4
EE-50	Process control	3	1	-	10	20	30	70	100	4
Refer Table	Elective -II	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EE-48L	Power System Protection Lab	-	-	2	20	-	20	30	50	2
EE-65L	Power System Simulation Lab	-	-	2	20	-	20	30	50	2
EE-66AL	Major Project	-	-	8	60	-	60	90	150	6
EE-69L	Professional Activity	-	-	2	50	-	50	-	50	2
	Total	**9**	**3**	**12**	**180**	**60**	**240**	**360**	**600**	**24**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 600 Total Periods : 24, Total Credits : 24

Elective-II					
EE-052A	**1. Power System Control**	**EE-052B**	**2.Advance Digital Communication**	**EE-052C**	**3. Digital Image Processing**

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**POWER SYSTEM PROTECTION**	EE-47	Min "D"	Min "D"	5.0

POWER SYSTEM PROTECTION

Unit-I : Relays : General consideration, sensing of fault, primary and back up protection, basic requirements of protective relaying, classification of relays, construction of electromagnetic relays, induction type relay principle, inverse time and definite time characteristics, over current, over voltage, directional, distance relays, differential buchholz and negative phase sequence relays.

Unit-II : Advance relays : Static Relays : Classification of static relays, block diagram & components of static relays, comparators, static over current, static directional, static distance and static differential relays. Microprocessor Based Relays: General considerations, flow chart and software development for protection, microprocessor based over current relay, directional relay, distance relay, security and reliability.

Unit-III : Protection : Types and detection of faults and their effects, alternator protection scheme, power transformer protection, generation-transformer unit protection scheme, busbar protection, transmission line protection, frame leakage protection, pilot relay scheme.

Unit-IV : Switchgear : Fuse : Characteristics, types of fuses, selection of fuses, construction and application of HRC fuses.
Circuit breaker : basic principle of operation, are phenomenon, initiation and maintenance of are, arc interruption methods, are voltage and current waveform in AC circuit break in, re-striking and recovery voltage, current chopping, rating of circuit breakers, breaking capacity, making capacity, short time rating, working principle and important features of oil CB, minimum oil CB, air blast CB, Vacuum CB and SF6CB, auto high speed re-closing.

Unit-IV : Over voltage protection and neutral grounding : Surge over voltages : Causes of over voltages, lightning phenomenon, protection of transmission line against over voltages, klydonograph and magnetic link, switching surges, surge diverters petersion coil and insulation coordination.
Neutral grounding : Resistance earthing, reactance earthing, resonance earthing, voltage transformer earthing, earthing transformer.

References:

1. S.L. Uppal, Power System
2. Sunil S.Rao, Switchgear and Protection, Khanna Pub New Delhi, 1986
3. C.L. Wadhwa, Electrical Power Systems, Newage International (P) Ltd 2000
4. B.Ravindranath and N. Chander Power System Protection & Switchgear, wiley Erstern Ltd 1977
5. Badri Ram, Vishwakarma, Power System Protection and Switchgear, Tata Mc Graw Hill 2001

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**PROCESS CONTROL**	EE-50	Min "D"	-	5.0

PROCESS CONTROL

Unit I
Special characteristics of process systems large time constants, interaction, multistaging, pure lag; control loops for simple systems and their Dynamics & stability.

Unit II
Generation of control action in electronic and pneumatic controllers. Control valves, valve positioners, relief and safety valves, relays, volume boosters, pneumatic transmitters for process variable. Tuning of controllers - Zeigler Nichols and other techniques.

Unit III
Different control techniques and interaction of process parameters e.g. feed forward, cascade, ratio, override controls Batch continuous process controls. Feed forward Control schemes.

Unit IV
Various process schemes / unit operations and their control schemes e.g. distillation columns, absorbers,
heat exchangers, furnaces, reactors, mineral processing industries, etc. Use of control schemes for process optimization.

Unit V
Advanced control strategies with case studies. Use of DDC and PLC. Introduction to supervisory control. Conversion of existing control schemes in operating plants, data loggers.

References:

- Dale Patrick, Stephen Fardo, "Industrial Process Control System".
- Shinskey F.G., "Process Control System", III Ed., McGraw Hill.
- Smith C.A. & A.B. Corripio, "Principle & Practiced Automatic Process Control", J. Willey.
- Rao M & S.Qiv, "Process Control Engg.", Gorden & Breach.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**POWER SYSTEM CONTROL**	EE-052A	Min "D"	-	5.0

POWER SYSTEM CONTROL

Unit – I : General -1 problem associated with modern interconnected power systems, deregulation of electric utilities **,** Competitive market for generation, power system restructuring, congestion available transfer capacities, pricing of energy,

Unit – II : General – 2 – Distribution in deregulated market, the development in competition, demand side management, Maintaining distribution planning, transmission expansion in new environment Transmission in open access, Unbundling Generation, Trans mission and distribution, BOT, ISO power exchange (PX)

Unit – III : PS control- Introduction to SCADA, Introduction to Flexible AC Transmission System (FACTS), Voltage quality in power systems, Distributed generation.

Unit – IV : MW Frequency control – Coherency, Control area, modeling of speed control mechanism, load damping, block diagrammatic representation of single and two area interconnected system, static and dynamic response, optimum parameter adjustment.

Unit – V : MVAR Voltage Control – Difference in control strategy over MW-f-control characteristics of an exciting system, DC AC and static excitation system, general block diagram representation of voltage regulators.

Reference Books :

1.P.S. Kundur Prabha Kundur, "Power System Stability and Control" ,McGraw HillEducation,2005

2. D.P.Kothari and I.J.Nagrath, "Modern Power System Analysis",Tata Mc-Graw Hill Publishing Company, Third Edition, 2008.

3. C.L.Wadhwa, "Electrical Power Systems", New-Age International Publishers", Sixth edition, 2009.

4. PSR Murthy," Power System Operation and Control",McGraw Hill Publishing

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**ADVANCE DIGITAL COMMUNICATION**	EE-052B	Min "D"	-	5.0

ADVANCE DIGITAL COMMUNICATION

Unit – I : Digital PAM, binary PAM formats, line coding, bandlimited digital PAM systems Nyquist pulse shaping, equalization, synchronization techniques, bit and frame synchronization. Coded pulse modulation, voice digitization rate (VDR) of PCM, DPCM, DM, ADM, CVSD, log PCM, their performance comparison, VDR reduction by speech coding, VOCODERS, noise performance of PCM and DM, Digital multiplexes. AT & T and CCITT hierarchies, quasi-synchronous multiplexes.

Unit – II : Digital CW modulation, BPSK, DPSK, DEPSK, QPSK, M PSK, QASK, BFSK, Doubinary encoding, QPR coherent and non-coherent systems, error probabilities in PSK, DPSK, FSK, QPSK, 16QAM, MSK, QPR and bit.

Unit – III : Matched correlation and optimum filters and symbol error rate.

Unit – IV : Spread Spectrum techniques : DS, CAMA, FH, PN sequence, power requirement PN-sequence code, and Walsh code.

Unit – V : ISDN & Value added communication system simulation & Analysis using MATLAB & Simulink Application using communication toolboxes.

Reference Books :

1. Digital Communication by Haykins Mc Graw Hill Int Edition
2. Modern Digital & Analog Communication by B.P. Lathi, Willey Eatern Ltd 2000
3. Communication Systems by A B Carlson, Tata Mc Graw Hill 2000

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**DIGITAL IMAGE PROCESSING**	EE-052C	Min "D"	-	5.0

DIGITAL IMAGE PROCESSING

UNIT-I : DIGITAL IMAGE PROCESSING :

Elements of a Digital Image Processing system, Structure of the Human eye, Image Formation and contrast sensitivity, Sampling and Quantization, Neighbors of a pixel, Distance measures, Photographic file structure and exposure, Linear scanner, Video camera, Image processing applications.

UNIT-II : IMAGE TRANSFORMS:

Introduction to Fourier transform-DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transforms, , Discrete Cosine transform, Wavelet transform .

UNIT - III : IMAGE ENHANCEMENT :

Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Lowpass filtering, Image sharpening.

UNIT – IV : IMAGE RESTORATION :

Definition, Degradation model, Noise Models, Restoration in the presence of Noise Models ,Inverse filtering .

UNIT - V : IMAGE ENCODING :

Fundamentals ,Image compression Models, Basic encoding process, Variable length coding, Bit-plane coding, Lossless predictive coding - Lossy compression: Lossy predictive coding, transform coding, wavelet coding. Introduction to Image compression techniques and standards.

References :

1. "Digital Image Processing" by Rafael, C. Gonzlez., and Paul, Wintz, Addison-Wesley Publishing Company.
2. "Fundamentals of Digital Image Processing" by Jain Anil K. Prentice Hall.
3. "Digital Image Processing" by Sosenfeld, and Kak, A.C., Academic Press.
4. The Image Processing Handbook, (5/e), CRC, 2006 by J.C. Russ,
5. Digital Image Processing with MATLAB by . R.C.Gonzalez & R.E. Woods; Prentice Hall, 2003

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**POWER SYSTEM PROTECTION LAB**	EE-48L	Min "D"	Min "D"	5.0

POWER SYSTEM PROTECTION LAB

LIST OF EXPERIMENTS :

1. To plot operating characteristics by performing operation of inverse definite minimum time (IDMT) relay.
2. To check the percentage setting of percentage differential relay by performing operation.
3. To find the pick-up value and reset-value of instantaneous relay by performing operation.
4. To perform operation and plot the directional characteristics of directional over current relay on R-X diagram.
5. To perform operation and plot the characteristics of over/under voltage microcontroller based relay.
6. To check the operation of microcontroller based over current relay and plot the curves.
7. To plot the directional characteristics of microprocessor based directional relay by performing operation.
8. To perform operation and plot characteristics of microprocessor based differential relay.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**POWER SYSTEM SIMULATION LAB**	EE-65L	-	Min "D"	5.0

POWER SYSTEM SIMULATION LAB

1. Find out the responses of RLC parallel circuits(transient condition, speed, state)
2. Find out the responses of RLC parallel circuits(with different excitations)
3. Design of low pass, high pass and band pass, band reject filters
4. Design of single phase &three phase bridge rectifier with RRL, RLE load
5. Find out the responses of RL,RC&LC circuit with special function like (unit step, ramp, impulse functions)

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**MAJOR PROJECT**	EE-66AL	-	Min "D"	5.0

MAJOR PROJECT

The objectives of the course 'Major Project' are

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do some thing creative and to assimilate real life work situation in institution.
- To adapt students for latest developments and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.

The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit the same in the form of a write-up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration.

The faculty and student should work according to following schedule:

i) Each student undertakes substantial project in an approved area of the subject and supervised by a member of staff.

ii) The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty.

iii) At all the steps of the project, students must submit a written report of the same.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE(PTDC)	**PROFESSIONAL ACTIVITY**	EE-69L	-	Min "D"	5.0