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)

M.E. III Sem. **Branch : Electrical Engg.**

Specialization : High Voltage & Power System Engineering

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOT			
EE-144	Transient in Power System	3	1	-	10	20	30	70	100	4
-	**Elective - III (Any One)**									
EE-145 A	Adv. Electrical Drives									
EE-120C	Adv. Micro Processor and Micro Controllers	3	1	-	10	20	30	70	100	4
EE-145B	Fuzzy Logic & Control									
(PRACTICAL/DRAWING/DESIGN)										
EE-146L	Seminar/ Project	-	-	4	100	-	100	-	100	4
EE-147L	Industrial Training (4 weeks)	-	-	-	-	-	-	100	100	4
EE-148L	Preliminaries of Dissertation	-		4	40	-	40	60	100	4
	Total	**6**	**2**	**8**	**160**	**40**	**200**	**300**	**500**	**20**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 500
Total Periods : 16 Total Credits : 20

NOTE : The students shall go on industrial training at the end of second semester and the evaluation shall be done at the end of third semester. The student has to present a report on the training and also has to face a viva voice examination infront of a panel headed by head of the department. The seminar /project shall be asigned by the supervisor

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	TRANSIENTS IN POWER SYSTEM	EE-144	Min "D"	Min "D"	5.0

TRANSIENTS IN POWER SYSTEM

UNIT I Probability distributions of switching surge, over voltages, mathematical and numerical formulation, application of insulators to withstand switching surges, Data necessary for line insulation, design influence of atmospheric condition.

UNIT II Probability of failure on an EHV transmission line, method of calculating the probability of failure, calculation by integration accuracy of statistical methods in insulation, evaluation of phase to phase methods of grading EHV cables based on statistical breakdown stress.

UNIT III Probability of failure of motor winding, General aspects of insulation co-ordination, basic requirements, effects of system design, philosophy of coordination, surge diverter selection, transformer insulation level.

UNIT IV Surge phenomenon in the single layer coil, electrically and magnetically coupled coils, surge phenomenon in transformers, core type and shell type transformer with multilayer and disc winding.

UNIT V Modelling surge phenomenon in transformers, dimensional analysis and modelled phenomenon, electro magnetic model, analysis of damping conversion factor for the cross section of the iron core design of electromagnetic model, accuracy in modelling, surge phenomenon in transformers.

Reference Books:

1. C S Indulkar," Power System Transients-,A Statistical Approach"
2. Heller and Antonin ,Veverka," Surge Phenomena on Electrical Machines".

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	Advanced Electrical Drives	EE-145A	Min "D"	Min "D"	5.0

Advanced Electrical Drives

Unit I Review of electrical motors & solid state converters: Speed control techniques of DC, Induction & synchronous motor, Converters, inverters, choopers and cyclo converter operation, Effects of power electronics equipments on load side & supply side.

Review of closed loop controllers, sensors & transducers: PI, PID, Variable structures, AC, DC & Pulse tacho-generators.

Unit II DC Drive: Converter & chopper fed DC drive, Reversing, Starting, Regenerative breaking, Four quadrant operation, High power application.

AC Drive: Inverter & cyclo converter fed drive, Vector control, Sensor less operation, Linear electrical motor concept, Synchronous motor drive.

Unit III Special Drives: Switched reluctance & permanent magnet brushless DC operation, Converters, Characteristics & Control, PLC based drives.

Unit IV Servo drives & stepper motor- AC & DC Servomotor, Stepper motor, Control techniques, Controllers, Microstepping, Sensorless operation.

Unit V Power Quality & Energy Conservation – Line Side pollution, standards, Harmonic elimination techniques in converter, Filters, Energy efficient electrical motors, pay back periods, Energy conservation through sold state control.

Reference:

1. Ned Mohan, T.M. Undeland, W.P.Robbins, "Power Electronics-Converters, Applications and Design", John Wiley & Sons.
2. J.M.D. Murphy, F.O. Turnbull, "Power Electronic Control of AC motors"' Pergamon Press.
3. P.C.Sen , D.C.drive, Pergamon Press.
4. B.K.Bose, Power Electronics & AC drive Prentice Hall.
5. Dubey G.K. "Power Semi Conductor Controller Drive, Prentice Hall.
6. Vedam Subramanyam, "Electrical Drives".
7. T.J.E. Miller, Switched Reluctance & P.M.B.L.DC motor, Pergamon Press.
8. P.V.Rao, "Power Semiconductor Drives", BS Publications.

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	ADVANCED MICRO PROCESSOR & MICRO CONTROLLER	EE-120C	Min "D"	Min "D"	5.0

ADVANCED MICRO PROCESSOR & MICRO CONTROLLER

Unit I Introduction: MP overview, data representation, addresses, operation, review of 8 bit & 16 bit MP

Unit II 8086 Architecture: CPU, operation, instruction, formats and execution timing, addressing models, 8086 ALU, Instructions arithmetic, branch, loop, NOP and HL T logic, shift and rotate, directive and operations assembly process.

Unit III Modular Programming Linking and relocation, stacks, procedure, interrupts, macros, program design, I/O programming programmed I/O, interrupts I/O, block transfer and DMA, multi programming process management, common procedure sharing, memory management, virtual memory and 80286.

Unit IV I/O Interface: Series and parallel communication interface, programmable timers and counters, DMA controllers.

Unit V Multiprocessor Configuration: 8086/8088 based multiprocessing systems, 8087 numeric data processor, 8089 I/O processor 80286/80287 task single level, multilevel, interrupt system, interfacing.
Single Chip Microcomputers : Architecture of 8084/8078 pin out ALP, UPI (5), 16 bit microcontroller 16 MC 8096, PLAs.

Books Recomended:

1. Y. C. Liu and G. A. Gibson," Micro Computer System: The 8086/8088 family, second edition Micro Computer System: The 8086/8088 family, second edition PHI, 1986.
2. S. K. Bose, "Digital Systems " Wiley Eastern, 1986.
3. D.V. Hall," Digital Computer Fundamentals" PHI.

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	FUZZY LOGIC & CONTROL	EE-145B	Min "D"	Min "D"	5.0

FUZZY LOGIC & CONTROL

UNIT I Fuzzy set vagueness, fuzzy set theory versus probability theory, classical set theory, fuzzy set, properties of fuzzy set, operations on fuzzy sets, fuzzy relations, operations on fuzzy relations. The Extensions principle, fuzzy number

Unit II Membership function, fuzzy logic, approximate reasoning, linguistic variables, fuzzy propositions, fuzzy statements, Approximate Reasoning Introduction, linguistic variables, fuzzy proposition, fuzzy if-then statement, inference rules, the composition rule of inference, representing the meaning of if-then rules.

Representing a set of rules Mamdani versus godel, properties of a set of rules, completeness of a set of rules, consistency of a set of rules, continuity of a set of rules, interaction of a set of rules.

Unit III Design parameters Structure of a FKBC: Fuzzification module, knowledge base, inference engine, defuzzification module, Rule base, Choice of variables and content of rules, choice of term set, derivation of rules.

Data base,Choice of membership functions, choice of scaling factors, Inference engine

Choice of Fuzzification procedure, Choice of Fuzzification procedure

Center of area/gravity, center –of-sums, height, center-of-largest area, first-of-maximum, middle-of-maximum, description of two examples, comparison and evaluation of defuzzification methods.

Unit IV Introduction The control problem, The FKBC as a nonlinearity transfer elements, FKBC computational structure, the nonlinearity of the controller, rule based representation of conventional TE, benefits of fuzzy controller and limits of fuzzy controllers.

Unit V Types of Fuzzy Knowledge Base Control, PID like FKBC, Sliding mode FKBC, Sugeno FKBC Fuzzy controller for washing machines, water geezers, inverted pendulum and flight controller system.

Reference Books:

1. T. J. Ross," Fuzzy logic with Engg Application " ,Mc Graw Hill.
2. D. Drainkar, H. Hellendoom and M. Reinfrank.,' An Introduction to Fuzzy Control ",Narosa Publication

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	SEMINAR/PROJECT	EE-146L			5.0

SEMINAR/PROJECT

The student shall take up a small project under the supervision of a supervisor and shall complete the task. He has to present the report before a committee credit by H.O.D. and answer the queries

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	INDUSTRIAL TRAINING	EE-147L	Min "D"	Min "D"	5.0

INDUSTRIAL TRAINING

The student shall go to an Industry at the end of Second Semester during summer and shall prepare a report on the Practical Training undergone there. He has to present the report at the time of practical examination of Third Semester.

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

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	PRELIMINARIES OF DISSERTATION PRESENTATION	EE-148L	Min "D"	Min "D"	5.0

PRELIMINARIES OF DISSERTATION PRESENTATION

The student shall prepare a literature review of the dissertation work to be undertaken. He shall also prepare the scheme of dissertation