

**FACULTY OF
ENGINEERING & TECHNOLOGY
SAURASHTRA UNIVERSITY, RAJKOT.**

**PROPOSED
SYLLABUS OF
B.E. SEM: VI**

(ELECTRICAL & ELECTRONICS ENGINEERING)

YEAR OF IMPLEMENTATION: 2005-06

CHAIRMAN

SAURASHTRA UNIVERSITY

PROPOSED

SYLLABUS

FOR

ELECTRICAL & ELECTRONICS ENGINEERING

B.E. SEMESTER VI

TEACHING AND EXAMINATION SCHEME

YEAR OF IMPLEMENTATION: 2005-06

Code	Subject	Teaching Scheme		Examination scheme				
		Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper hrs.	Oral/ prac.	T.W.	Total Marks
601	Industrial management & operation research	4	-	100	3	-	-	100
602	Power plant control & instrumentation	4	2	100	3	50	25	175
603	Microprocessors & micro-controller	4	2	100	3	50	25	175
604	Utilization of electrical energy	4	2	100	3	50	25	175
605	Power transmission & distribution	4	2	100	3	50	25	175
606	Seminar	-	2	-	-	50	25	75
	Total	20	10	500	-	250	125	875

One industrial visit be held during the semester college level examination

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:601		SUBJECT:INDUSTRIAL MANAGEMENT & OPERATION RESEARCH				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
4	-	100	3	-	-	100

1. **Introduction to industrial management:** Management and organization structure
 Definition, difference between management administration and organization, principles of management, organization types, types of decisions, procedure and tools of decision making.
2. **Personnel management:** personnel function and places of personnel management
 In the organization, job evaluation and merit rating, wages & payment.
3. **Financial management :** break even analysis, balance-sheets, budgetary controls
 Standard costing, element of cost and overhead allocation.
4. **Introduction to operation research :** the origin, development, nature definition, History, scope and phase of operation, research, problem formulation, model Construction, deriving solution from model.
5. **Linear programming :** introduction general linear programming problem, mathematical formulation, graphical method for solution of L.P.P. , simplex method, slack surplus and artificial variable degeneracy ,duality in L.P.P., two method sensitivity analysis.
6. **Assignment problems:** introduction, mathematical statement, the Hungarian method, maximization problems, unbalanced problem, traveling sales problems.
7. **Project management:** introduction, history, advantage and development, network construction, numbering the event, difference between C.P.M & P.E.R.T., P.E.R.T analysis updating analysis of resources.
8. **Inventory management:** introduction, cost event holding, const re-order cost inventory mode is deterministic, and probabilistic I to IV.

Reference Books:

1. Operation management
By Barry Shore.
2. Industrial engineering & management system
By Dr. S. Dalela &
Dr. Mansoor Ali
3. Industrial engineering
By O.P. Khanna
4. Fundamentals of operation research
By Askoff &
Sesiene
5. Operation research
R.C. Patel &
N.R.Dave
6. Optimization method in operation research and
System analysis
K.V.Mittal.
7. Operation research
By R.K. Gupta
8. Optimization teachings
By S.S.Rao.

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:602		SUBJECT: POWER PLANT CONTROL & INSTRUMENTATION				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
4	2	100	3	50	25	175

- Major electrical equipment in power plant:** Introduction, alternators, exciters, voltage regulator, bus-bars, reactors, insulators, isolators, circuit breakers, load interrupters, switches, power transformers, current transformers, potential transformers, measuring instruments, fuses, protective relays, lightning arrestors, batteries, carrier-current equipment, control cables.
- Combined operation of power plants:** Introduction, comparison of various types of power plants, merits of combined operation of power plants, plant selection, base load and peak load, inter connection of power stations, combined operation of run-off river power plant and steam power plant, combined operation of storage hydro plant and steam power plant.
- Instrument application:** water level gauges for boiler drums, CCTV, gas analysis meters, smoke measurement, dust monitors, dust hopper level indicator.
- Measurement:** Measurement of impurities in feed water & steam, generator coolant control and instruments, fuel measurement, water flow measurement, pressure measurement, temperature measurement.
- Control:** Automatic boiler control, steam temperature control, feed water control, turbine control, criteria for station control and control room design.
- Automatic generation and voltage control:** Introduction, load frequency control(single area case), load frequency control and economic dispatch control, two area load frequency control, optimal(two-area) load frequency control, automatic voltage control, load frequency control with generation rate constraints(GRCs), speed governor dead-band and its effect on AGC, digital LF controllers, decentralized control.
- SCADA** in power plant.

Reference Books:

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| 1. A course in electrical power. | By J.B.Gupta. |
| 2. A text book in electrical power system. | By Soni, Gupta & bhatnagar. |
| 3. Modern power system analysis. | By Nagrath & Kothari. |
| 4. Power system design | By M.V.Despande. |
| 5. Modern power system practice (vol-6) | By Central Electricity. |
| 6. Electrical power system | By S.L.Uppal. |
| 7. Power plant control & instrumentation | By David Lindsley. |

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:603		SUBJECT: MICROPROCESSOR AND MICROCONTROLLER				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
4	2	100	3	50	25	175

1. **Microprocessor, microcomputer & languages:**
 Introduction of microprocessor & microcomputer, high level & low level Languages, introduction of large computer, medium size computer
 Microcomputers & different terms related to microprocessor.
2. **Overview of 8085 –microprocessor architecture :**
 8085 pin out & internal (functional) block diagram, 8085 pin signals.
3. **Overview of 8086- microprocessor architecture:**
 8086 pin out & internal (functional) block diagram, 8086 pin signals.
4. **Advanced microprocessors :**
 Introduction of 80186, 80286, 80386 & Pentium processor, RISC, CISC, Real & protected virtual mode of each processor.
5. **Overview of general purpose peripheral chips** like 8255, 8254, 8279.
6. **Microprocessor & microcontroller:**
 Comparison between microprocessor & microcontrollers, four bit, eight bit & Sixteen bit & thirty two bit microcontroller’s comparison.
6. **8051 architecture :**
 Introduction, 8051 pin out & features, the internal architecture, programming module, memory organization, 8051 oscillator & clock, stack & stack pointer, various special function registers, I/O port & circuits, counters & timers, serial I/Os, interrupts, interfacing of 8051 with external RAM & ROM.

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:604		SUBJECT: UTILIZATION OF ELECTRICAL ENERGY				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
4	2	100	3	50	25	175

- 1. Industrial utilization of electrical motors :** Introduction, group drive, industrial drive, Selection of motor, characteristics of DC motors, comparison of DC motor Characteristics, application of DC motors, characteristics of AC motor, comparison of AC motor characteristics, application of AC motor.

Braking: Mechanical consideration and control equipment, breaking, regenerative Breaking, calculation of energy return during regeneration, mechanical regenerative Breaking, mechanical breaking, magnetic brakes, electro-mechanical drum brakes, Control equipment, multiple unit control.

Electric drives: Advantages of electric drives, factors governing the selection of Motors, application of motors, nature of electrical supply, nature of drives, nature of Load, electrical characteristics, size & rating of motors, mechanical characteristics, Costs.
- 2. Speed control of motors :** speed control of DC motors, speed control of induction Motors, electronic control of AC motors, classes of electric drives, variable frequency Of speed control of a squirrel cage induction motor, variable voltage speed control of Squirrel cage induction motor.
- 3. Traction system:** Ideal traction system, different systems of traction, systems of Electric traction, system of track electrification, comparison between DC and AC Systems of railway electrification.
- 4. Train movement and energy consumption:** Speed-time curve, typical speed-time Curves, crest speed, average speed and schedule speed, factors affecting the schedule Speed, simplified speed-time curves, mechanics of train movement, tractive effort for Propulsion of train, power output from the driven axles, energy output from driving Axles, determination of specific energy output using simplified speed-time curves, Factors affecting the energy consumption, factors affecting the specific energy Consumption of an electric train operating on a given schedule speed, dead weight, Accelerating weight, and adhesion weight.
- 5. Electric traction motors :** General Features of traction motors, characteristics of DC Motors, DC series motors, DC shunt motors, AC series motors, and three phase Induction motors, linear induction motors, rating and ventilation.

- 6. Control of traction motors :** Speed control of DC traction motors, plain rheostat Starting (Notching), series-parallel starting, transition methods, drum controller Contactor type controller, the metadyne control, speed control and starting of Single phase series motors, starting and speed control of 3-phase induction motor.
- 7. Electrical heating :** Advantages and methods of electrical heating, various types of Resistance & arc furnaces, power supplies & heat control for above furnaces, Comparison of various furnaces, high frequency heating, induction heating, various Types of core and coreless induction furnace, skin effect, choice of frequency, & Applications of induction heating, high frequency generation, dielectric heating, Choice of voltage and frequency, depth penetration, application and use of dielectric Heating.

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:605		SUBJECT: POWER TRANSMISSION & DISTRIBUTION				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
4	2	100	3	50	25	175

- 1. Transmission line constants :** Introduction, resistance of a transmission line, skin Effect, Inductance of a transmission line, proximity effect, capacitance of a Transmission line, Electrical potential, capacitance of a single phase overhead Transmission lines, effect of earth on the capacitance of a single phase overhead Lines, capacitance of 3-phase overhead lines, capacitance of double circuit 3-Phase overhead lines, transposition of conductors and bundled conductor.
- 2. Performance of short and medium transmission line:** Introduction, Classification of Transmission lines, regulation and efficiency of a short Transmission lines, effect of load power factor on transmission efficiency and Regulation, mixed sending and Receiving-end condition, medium transmission Lines, end condenser method Nominal T method, nominal II method, Ferranti Effect, charging current line Losses in open circuited line, effect of capacitance And induction on performance Of loaded line, generalized circuit constants.
- 3. Performance of long transmission line :** Introduction, analysis of long Transmission lines (Rigorous method of solution of long transmission lines), Evaluation of constants (A, B, C, D), surge impedance, surge impedance loading, Transmission line with series impedance at the receiving end, transmission line With series impedance at the sending end, transmission line with the series Impedance at the both ends, transmission line with transformer at both ends, Equivalent T-network of a long transmission line, equivalent II –network of a Long transmission line, constant voltage transmission, synchronous phase Modifiers.
- 4. Power circle diagram:** Receiving end & sending end power circle diagram, Universal circle diagram, power circle diagram for several sending end and Receiving end voltages, power loss circle diagram, efficiency circle diagram.
- 5. DC distribution:** Introduction, classification of distribution system, DC Distribution, types of distributors, types of loading, DC distribution fed at one End, distribution fed at both ends, ring distributor, three wire DC system, Boosters.

6. **AC distribution:** Introduction, AC distribution calculation, AC distributors with Concentrated loads, AC interconnected systems, 3-phase 4-wire star-connected On balanced load circuits, consequences of disconnecting neutral in a 3-phase 4-Wire systems.
7. **Extra high voltage transmission:** Introduction, extra high voltage DC Transmission, extra high voltage AC transmission.

Reference Books:

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|---------------------------------------|----------------------------|
| 1. A text book on engg. Power system. | By Soni, Gupta& Bhatnagar. |
| 2. A course in electrical power. | By J.B.Gupta. |
| 3. Electric power. | By S.L.Uppal. |
| 4. Principles of power system | By V.K.Mehta. |
| 5. Electrical power system design | By M.V.Despande. |

SAURASHTRA UNIVERSITY – RAJKOT
BE SEMESTER – VI
Electrical & electronics engineering

CODE:606		SUBJECT: SEMINAR				
Teaching scheme		Examination scheme				
Lect. Hrs.	Prac. Hrs.	Theory Marks	Paper Hrs.	Oral/ Prac.	T.W.	Total marks
-	2	-	-	50	25	75

The student are required to prepare a write up on a particular topic which is not studied so far but may be an extension to the topics of the students studied or collections of material Related to the recent advances in the area of electrical &electronics engineering by:

1. Literature survey from books & periodicals.
2. Interaction with experts.
3. Internet surfing.
4. Industrial visit or survey.