



Gautam Buddha University
(Established by UP Act(9) of 2002)
School of Engineering

Electrical Engineering

Circuits and Networks:

Circuit's elements and theorems, Transient response and steady state response for sinusoidal and arbitrary inputs, Properties of networks, Resonant circuits, Three-phase circuits, Transfer function., two-port networks, network synthesis.

Electro-magnetic field theory:

Electric and magnetic fields and associated laws, Fields in dielectrics, conductors and magnetic materials. Resistance, inductance and capacitance calculations, Maxwell's equations, Time varying fields, Wave propagation and mode in dielectric and conduction media, Transmission lines. Smith chart.

Instrumentation and Control:

Error analysis, Units and Standards, measurement of current, Voltage, power, Power-factor and energy. Indicating instruments. Measurement of resistance, inductance, capacitance and frequency. Bridge measurements. Electronic measuring instruments. Digital voltmeter and frequency counter, Hall effect and its applications. Transducers and their applications for non-electrical quantities like temperature, pressure, flow-rate displacement, acceleration, noise level, etc. Data acquisition systems modeling of physical systems. Block diagrams and signal flow graphs and their reduction. Time domain and frequency domain analysis of linear system. Errors for different inputs and stability criteria for feedback systems. Stability analysis using Routh-Hurwitz array, Nyquist plot and Bode plot. Root locus and Nicols chart and the estimation of margin. Basic concepts of compensator design. State variable matrix and its use in system modeling and design. Sampled data system and performance with the samples in the error channel. Stability of sampled data system, Elements of non-linear control analysis, Control system components, electromechanical, hydraulic, pneumatic components.

Poser Apparatus and Drive

Magnetic materials and Circuits analysis: construction, Design, performance of 1-phase and three-phase Power transformers. Auto-transformer Concepts in rotating machines, Construction, governing equations, machine types, operation, leakage, losses and efficiency, regulation, starting, speed control of DC, theory and principle of induction and synchronous, characteristics and application of Poser semiconductor devices., 1-phase and 3-phase power converters, AC switches. Thyristor controlled reactors, switched capacitor networks. Inverters: 1-phase and 3-phase PWM techniques, Switched mode power supplies.

Power Systems



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Types of Power Stations, Pumped storage plants, Economics and operating factors, Power transmission lines, Modeling and performance characteristics, Voltage control, Load flow studies, Optimal power system operation, Load frequency control, Symmetrical component and circuit analysis, Z-Bus formulation, Per Unit system, Fault analysis, Transient and steady-state stability of power systems, Power system Protection Circuit breakers, Relays, Power system Transients, HVDC and HVAC transmission, Renewable energy sources, energy management systems, FACTS devices, power quality.

Analog, Digital Circuits and Micro-processors

Semiconductor physics, PN junctions and transistors, models and parameters, various devices and applications, switching behavior of semi conductor devices, Small signal amplifiers, biasing circuits, frequency response and improvement, multi-stage and feed-back amplifiers, D.C. amplifiers, Oscillators, Large Signal amplifiers, coupling methods, push pull and operational amplifiers, wave shaping circuits, Multi-vibrators and flip-flops and their applications, Digital logic and gates, universal gates combinational circuits for arithmetic and logic operation, sequential logic circuits, Counters, registers, RAM and ROMs, 80 family Micro-processor architecture, instruction set and assembly language programming, interfacing for memory and I/O, Applications of Micro-processors in electrical engineering.


11/11/16

MECHANICAL ENGINEERING:

1. Mechanical Workshop

a) Machine shop/ Manufacturing Technology Lab

- 3 D Optical Profilometer,
- Bench Grinder,
- CNC Machining Center,
- Double Ended Pedestal Grinder,
- Drilling Machine,
- Hydraulic Power Hacksaw,
- Lathe Machines,
- Machine Tools- Turning, Boring, Threading, Knurling, Power Saw Blade, Reamers, Milling Cutters, Shaper, Slotter, Tool Kit etc. (For All Machine Tools)
- Radial Drilling Machine,
- Shaping Machine,
- Surface Grinder,
- Universal Milling Machine,
- Universal Tool and Cutter Grinder,

b) Welding Shop

- Arc Welding Machine,
- Metal Inert Gas (MIG) Welding Machine,
- Tungsten Inert Gas (TIG/WIG) Welding Machine
- Submerged Arc Welding Machine-800 Amp (Tractor Mounted Trolley Type)
- Oxy-Acetylene Gas Welding Set,
- Electrode Drying Oven,
- Magnetic Particle Tester,
- Microscope and Image Analyzer,
- Electro Polisher,

Blue
2-12-15

Logit
2/12/15

Logit
2/12/15

Shaper
2/12/15

3/2

c) Smithy & Foundry Shop

All Foundry and Smithy Shop Hand Tools,
All Foundry and Smithy Shop Measuring Tools,
High Precision weighing Balance,
Induction Furnace for Melting,
Induction Furnace for Heat Treatment,
Metal Melting Crucible,
Universal Vice,
Weighing Balance,

d) Sheet Metal & Carpentry Shop

All Measuring Tools Used in Sheet Metal and Carpentry Shop
All Sheet Metal Hand Tools,
All Wood Working Hand Tools,
Hydraulic Power Press and Press Dies,

2. **Fluid Mechanics Laboratory,**
3. **Fluid Machines Laboratory,**
4. **Automobile Engineering Laboratory,**
5. **I.C. Engine & Gas Turbine Laboratory,**
6. **Modeling and Simulation Laboratory,**
7. **Engineering Measurement and metrology Laboratory,**
8. **Dynamics of Machine Laboratory,**
9. **Auto CAD Laboratory,**
10. **Advanced Design Engg. Laboratory,**
11. **Advanced Thermal Engg. Laboratory,**
12. **Advanced Manufacturing Engg. Laboratory.**

Syllabus for Ph.D. Examination (GPTR-2017)

AR ARCHITECTURE AND PLANNING

Section 1: Architecture and Design

Visual composition in 2D and 3D; Principles of Art and Architecture; Organization of space; Architectural Graphics; Computer Graphics– concepts of CAD, BIM, 3D modeling and Architectural rendition; Programming languages and automation. Anthropometrics; Planning and design considerations for different building types; Site planning; Circulation- horizontal and vertical; Barrier free design; Space Standards; Building Codes; National Building Code. Elements, construction, architectural styles and examples of different periods of Indian and Western History of Architecture; Oriental, Vernacular and Traditional architecture; Architectural developments since Industrial Revolution; Influence of modern art on architecture; Art nouveau, Eclecticism, International styles, Post Modernism, Deconstruction in architecture; Recent trends in Contemporary Architecture; Works of renowned national and international architects.

Section 2: Building Materials, Construction and Management

Behavioral characteristics and applications of different building materials viz. mud, timber, bamboo, brick, concrete, steel, glass, FRP, AAC, different polymers, composites. Building construction techniques, methods and details; Building systems and prefabrication of building elements; Principles of Modular Coordination; Estimation, specification, valuation, professional practice; Construction planning and equipments; Project management techniques e.g. PERT, CPM etc.

Section 3: Building and Structures Principles of strength of materials; Design of structural elements in wood, steel and RCC; Elastic and Limit State design; Structural systems in RCC and Steel; Form and Structure; Principles of Pre-stressing; High Rise and Long Span structures, gravity and lateral load resisting systems; Principles and design of disaster resistant structures.

Section 4: Environmental Planning and Design

Ecosystem- natural and man-made ecosystem; Ecological principles; Concepts of Environmental Impact Analysis; Environmental considerations in planning and design; Thermal comfort, ventilation and air movement; Principles of lighting and illumination; Climate responsive design; Solar architecture; Principles of architectural acoustics; Green Building- Concepts and Rating; ECBC; Building Performance Simulation and Evaluation; Environmental pollution- types, causes, controls and abatement strategies.

Section 5: Urban Design

Concepts and theories of urban design; Public Perception; Townscape; Public Realm; Urban design interventions for sustainable development and transportation; Historical and modern examples of urban design; Public spaces, character, spatial qualities and Sense of Place; Elements of urban built environment – urban form, spaces, structure, pattern, fabric, texture, grain etc; Principles, tools and techniques of urban design; Urban renewal and conservation; Site planning; Landscape design; Development controls – FAR, densities and building byelaws.

Section 6: Urban Planning and Housing

Planning process; Types of plans - Master Plan, City Development Plan, Structure Plan, Zonal Plan, Action Area Plan, Town Planning Scheme, Regional Plan; Salient concepts, theories and principles of urban planning; Sustainable urban development; Emerging concepts of cities - Eco-City, Smart City, Transit Oriented Development (TOD), SEZ, SRZ etc. Housing; Concepts, principles and examples of neighbourhood; Housing typologies; Slums; Affordable Housing; Housing for special areas and needs; Residential densities; Standards for housing and community facilities; National Housing Policies, Programs and Schemes.

Section 7: Planning Techniques and Management

Tools and techniques of Surveys – Physical, Topographical, Landuse and Socioeconomic Surveys; Methods of non-spatial and spatial data analysis; Graphic presentation of spatial data; Application of

G.I.S and Remote Sensing techniques in urban and regional planning; Decision support system and Land Information System. Urban Economics; Law of demand and supply of land and its use in planning; Social, Economical and environmental cost benefit analysis; Techniques of financial appraisal; Management of Infrastructure Projects; Development guidelines such as URDPFI; Planning Legislation and implementation – Land Acquisition Act, PPP etc.; Local self-governance.

Section 8: Services, Infrastructure and Transportation

Building Services: Water supply; Sewerage and drainage systems; Sanitary fittings and fixtures; Plumbing systems; Principles of internal and external drainage system; Principles of electrification of buildings; Intelligent Buildings; Elevators and Escalators - standards and uses; Air-Conditioning systems; Firefighting Systems; Building Safety and Security systems.

Urban Infrastructure – Transportation, Water Supply, Sewerage, Drainage, Solid Waste Management, Electricity and Communications.

Process and Principles of Transportation Planning and Traffic Engineering; Road capacity; Traffic survey methods; Traffic flow characteristics; Traffic analyses and design considerations; Travel demand forecasting; Land-use – transportation - urban form inter-relationships; Design of roads, intersections, grade separators and parking areas; Hierarchy of roads and level of service; Traffic and transport management and control in urban areas,; Mass transportation planning; Paratransits and other modes of transportation, Pedestrian and slow moving traffic planning; Intelligent Transportation Systems.

Principles of water supply and sanitation systems; water treatment; Water supply and distribution system; Water harvesting systems; Principles, Planning and Design of storm water drainage system; Sewage disposal methods; Methods of solid waste management - collection, transportation and disposal; Recycling and Reuse of solid waste; Power Supply and Communication Systems, network, design and guidelines.