



CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY ISLAMABAD

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PhD Comprehensive Examination Faculty of Engineering

Following is the department wise list of the subjects from which the comprehensive examination question papers will be prepared. All engineering students are required to select three (3) courses from the respective list for preparation of the question papers. The selected list is to be sent/ handed over to Graduate Studies Office at the time of registration for comprehensive examination.

Electrical Engineering

| <u>Control Systems</u> | | |
|--|--------|---------------------------------------|
| 1 | EE5813 | Linear System Theory |
| 2 | EE5823 | Nonlinear Control Systems |
| 3 | EE5843 | Control Systems Design |
| 4 | EE6893 | Sliding Mode Control |
| 5 | EE6843 | Robust Control Systems |
| 6 | EE6853 | Adaptive Control Systems |
| <u>Signal Processing</u> | | |
| 1 | EE5613 | Advanced Digital Signal Processing |
| 2 | EE5623 | Advanced Digital Image Processing |
| 3 | EE6633 | Adaptive Signal Processing |
| 4 | EE6643 | Pattern Recognition |
| 5 | EE6673 | Radar Signal Processing |
| 6 | EE6653 | Computer Vision |
| 7 | EE6683 | Machine Learning |
| 8 | EE6363 | Advanced Artificial Intelligence |
| <u>Telecommunications</u> | | |
| 1 | EE6703 | Advanced Digital Communications |
| 2 | EE6733 | Cellular and Mobile Communications |
| 3 | EE5703 | Principles of Digital Communications |
| 4 | EE6763 | Mobile and Wireless Networks |
| <u>Electronics and Microwaves</u> | | |
| 1 | EE6213 | Analog Integrated Electronic Circuits |
| 2 | EE6523 | Advanced Antenna Theory & Design |
| 3 | EE6533 | Advanced Microwave Engineering |
| 4 | EE6343 | Embedded Systems Design |
| 5 | EE6313 | Advanced Computer Architecture |

| Power Systems | | |
|----------------------|--------|----------------------------|
| 1 | EE6153 | Smart Grid |
| 2 | EE6163 | Renewable Energy Systems |
| 3 | EE6263 | Advanced Power Electronics |

Civil Engineering

| (a) Specialization Courses | | | |
|-----------------------------------|--|---------|---|
| (i) | Water Resources Engineering & Management | CE 5103 | Advanced Open Channel Hydraulics |
| | | CE 5113 | Advanced Hydrology |
| | | CE 6123 | River Engineering |
| | | CE 5153 | Drainage & Irrigation Engineering |
| | | CE 6133 | Design of Hydraulic Structures |
| (ii) | Structural Engineering | CE 5303 | Dynamics of Structures |
| | | CE 5313 | Fiber Reinforced Composites |
| | | CE 6323 | Computer Aided Analysis & Design of Structures |
| | | CE6423 | Structural Fire Engineering |
| | | CE 6333 | Earthquake Engineering |
| (iii) | Construction Engineering & Management | CE 5803 | Advanced Construction Management |
| | | CE 5813 | Project Planning and Control |
| | | CE6873 | Sustainability in Construction Projects |
| | | CE6863 | Construction Contracts for Civil Engineers |
| | | CE5823 | Advanced Project Management for Construction Projects |
| (b) Elective Courses | | | |
| (iv) | Elective Courses | CE 5023 | Research Methods in Civil Engineering |
| | | CE 5903 | Advanced Geo-informatics |
| | | CE 5913 | Disaster Risk Assessment & Evaluation |
| | | CE 6613 | Pavement Evaluation and Rehabilitation |
| | | CE 6643 | Highway Planning and Design |

Mechanical Engineering

| <u>Core Courses</u> | | |
|--------------------------------|--------|------------------------------|
| 1 | ME5703 | Research Methodologies |
| 2 | ME5713 | Optimization Methods |
| 3 | ME5723 | Experimental Methods |
| <u>Thermal Sciences</u> | | |
| 1 | ME5113 | Internal Combustion Engines |
| 2 | ME5123 | Thermal Power Generation |
| 3 | ME5133 | Gas Dynamics |
| 4 | ME5153 | Combustion |
| 5 | ME5513 | Computational Fluid Dynamics |
| 6 | ME5533 | Transport Phenomena |

| <u>Manufacturing</u> | | |
|---------------------------------|--------|---|
| 1 | ME5643 | Digital Manufacture and Rapid Manufacture |
| 2 | ME5653 | Manufacturing System Design & Analysis |
| 3 | ME5673 | Production Planning and Control |
| 4 | ME5683 | Operation Research |
| 5 | ME6643 | Nano Fabrication and Manufacturing |
| <u>Mechanical Design</u> | | |
| 1 | ME5053 | Finite Element Method of Composites |
| 2 | ME5623 | Mechanism Design |
| 3 | ME6043 | Design of Machine Tools |