



Concepts of Electrical Machines and Transformers in Power System Operation

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THE VIRTUAL EDUCATION PROJECT PAKISTAN

The Higher Education Commission has initiated a National Video Conferencing Program in collaboration with the L.E.J. National Science Information Center (ICCBS), University of Karachi. The program focuses on lectures/courses being delivered by eminent scholars/researchers in the chosen disciplines, aimed at building concepts, enhancing critical thinking, and developing understanding of the subject at undergraduate, graduate, and doctoral levels. This program also includes skill development courses/modules, and research lectures in which cutting edge technologies/research results in various fields of higher education will be presented.

These lectures/courses are relayed nationwide in various Universities and other HEI through VEPP (Virtual Education Project Pakistan). Every one eligible is welcome to register, attend and benefit from this important and innovative program.

Course Contents:

The course fulfills 1 credit-hr designed for engineering students. Students will be able to understand how power is generated and transmitted and how to overcome the faults. Understanding about the electrical machines used in operation of a power plant. Concepts of AC and DC Machines. Construction and working principles.

Introduction of the Speaker:

Engr Muhammad Nadeem Iqbal has been working since last seventeen years at Sir Syed University of Engineering and Technology in Karachi and he was acting Chairman of Electrical and Telecommunication Engineering Department. He has field experience of 5 years in Textile industries and Teaching experience of more than 20 years. He is PhD Scholar in Electronic Engr. and Graduated from NED in 1997 in Electrical Engineering. Performing research in Image Processing area under supervision of Dr. Tahir Qadri. He is a member of HEC National Curriculum Revision Committee. He is life member PEC and IEP.

Program:

Date: 1st April to 19th April, 2019
Days: Every Monday, Wednesday and Friday
Time: 02:00 PM to 04:00 PM (Friday: 02:30 PM to 04:30 PM)
Venue: VC Room of LEJNSIC, ICCBS, University of Karachi

How to Register?

For registration, kindly contact VEPP Focal Person in your University. The LEJNSIC will issue a certificate (1 credit hr) to successful participants.

For online courses registration and participation kindly register on events registration portal URL: <http://events.hec.gov.pk>, also contact focal person in your institute/university. The L. E. J. Center will issue a certificate (1 credit hr) to successful participants.

Steps of Online Registration:

- Open URL: <http://events.hec.gov.pk>
- Click on Login/Register Link, **2.** Create Your Account
- Enter your Account details, Personal Details, Education Details
- After account creation Login then click on Prescribed Event
- Click on Register Event button, **6.** Select joining Venue
- Click on Register
- After this confirmation mail is sent that you are successfully register against event.

1st April, 2019 Monday	MAGNETIC FIELD AND CIRCUITS: Magnetic field; magnetic circuit; magneto motive force; magnetic field intensity; flux density; reluctance and the magnetic circuit equation; analogies between electric and magnetic circuits; hysteresis loss, electromagnetically induced voltage. BASIC CONCEPTS OF AC & DC MACHINES; Working principle of DC Machines, action of commutator; construction; simple lap & wave windings; E.M.F. equation of a D.C. generator; separately & self-excited D.C. generators; shunt, series and compound generators.
3rd April, 2019 Wednesday	LOSSES IN A DC MACHINES, power stages and efficiency; armature reaction; characteristics of a separately excited D.C. generators; characteristics of a shunt generator; voltage regulation SPEED CONTROL OF D.C. MOTORS: Speed control methods of flux control, armature control, voltage control, and Ward Leonard system of dc shunt motors. Speed control methods of field diverters, armature diverter, tapped field control, paralleling field coils, armature-resistance control, series-parallel control. Different types of faults and its rectification.
5th April, 2019 Friday	INDUCTION MOTORS: Motor construction; rotating magnetic field due to 3-phase currents; principle of operation; slip speed; rotor current frequency; effect of slip on rotor circuit; relation between torque and rotor power factor; condition for maximum starting torque; torque/ speed characteristics; speed regulation and speed control TYPES OF ROTORS OF THREE PHASE INDUCTION MOTORS; Squirrel cage and phase wound rotor Construction. Advantages and disadvantages of these motors. Practical application of these motors
8th April, 2019 Monday	SINGLE PHASE INDUCTION MOTOR; Rotating magnetic field creation in single phase Motor. stator and rotor Construction, split phase, capacitor start and capacitor run motor, reluctance motor, shaded pole motor. Practical applications of these motors SYNCHRONOUS GENERATOR: Construction of alternator; principles of operation; armature winding; armature reaction; alternator on load; equivalent circuit; voltage regulation; parallel operation
10th April, 2019 Wednesday	SYNCHRONOUS MOTORS; working and operation of motor, comparative analysis of synchronous motor and induction motor, Applications of synchronous motor. SINGLE PHASE TRANSFORMERS: Working principle, construction and classification of transformers; e.m.f. equation of a transformer; voltage transformation ratio; ideal transformer, power in ideal transformer
12th April, 2019 Friday	PRACTICAL TRANSFORMER; Practical transformer, transformer at no load; loading of transformer; impedance ratio of transformer; equivalent circuit of transformer; referred to the primary and secondary sides voltage regulation; percentage resistance, reactance and impedance TESTING OF A TRANSFORMER; losses and efficiency of transformer; autotransformer; parallel operation of single phase transformers
15th April, 2019 Monday	THREE PHASE TRANSFORMER; Three phase Transformer and its construction, Three phase transformer connections, Star and Delta connection. bank of three single-phase transformers. PARALLEL OPERATION OF A TRANSFORMER; applications of three phase transformers; current transformer; potential transformer
17th April, 2019 Wednesday	REVIEW AND REVISION
19th April, 2019 Friday	FINAL EXAM