



University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: Computer/Electronics Engineering

Form no. (12)
Course Specification

1- Course Data

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| Course Code: EE 328 | Course Title: Electrical Power and Machines | Academic Year/Level: 3 |
| Specialization: Computer/Electronics | No. of Instructional Units: 3 | Lecture 2 Practical 2 |

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| 2- Course Aim | To investigate the different stages of power system generation and distribution. To study the basic concepts of transformers, single-phase and 3-phase motors. To study the basics of power generation and dc machines. |
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| 3- Intended Learning Outcome |
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| a- Knowledge and Understanding | Review on electric and magnetic circuits Explain basic theory of motor and generator action Explain theory, construction, operation, equivalent circuit and characteristics of DC machine, transformer, synchronous machine and induction motor. Show how to calculate power and efficiency of DC machine, transformer, induction motor and synchronous machine Show how to find parameters of transformer, induction motor Understand elements, distribution, protection and quality improvement of power system |
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| b- Intellectual Skills | <p>Analyze operational characteristics of various types of transformers.</p> <p>Analyze and interpret DC machine theory and operational characteristics.</p> <p>Evaluate performance of DC machines.</p> <p>Analyze and interpret AC machine theory and operational characteristics.</p> <p>Evaluate performance of principle AC machines: (synchronous generator, synchronous motor and induction motor).</p> <p>Analyze and interpret theory of operation of single-phase induction motor.</p> <p>Analyze basic concepts of electric power systems, protection devices and power factor correction</p> |
| c- Professional Skills | <p>Perform open-circuit and short-circuit tests on real transformers to obtain equivalent circuit parameters.</p> <p>Perform laboratory experimental tests on DC machines: no-load test, load test, and speed-torque characteristic tests of DC motors.</p> <p>Perform laboratory experimental tests on three-phase AC synchronous machine to obtain operational characteristics in addition to performing synchronization procedure.</p> <p>Perform laboratory experimental tests to determine IM motor equivalent circuit parameters, and speed-torque characteristics.</p> <p>Distinguish the differences between short, medium and long transmission lines</p> |
| d- General Skills | <p>Communicate effectively with colleagues and others to interchange knowledge and information in transformers, DC machines and AC machines.</p> <p>Communicate to work individually in small group to perform laboratory experiments and tutorial exercises in transformers, DC machines and AC machines.</p> <p>Estimate DC, AC machines, transformers parameters</p> <p>Sketch the construction of DC, AC machines, transformer</p> <p>Follow the standards rules to propose different distribution systems</p> <p>Verify a protection for an electric power system</p> |

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| 4- Course Content | <p><i>Week Number 1:</i> Revision on electric and magnetic circuits.</p> <p><i>Week Number 2:</i> The law of motor and generator action.</p> <p><i>Week Number 3:</i> DC Motors.</p> <p><i>Week Number 4:</i> DC Generators.</p> <p><i>Week Number 5:</i> Core Loss and transformer basics.</p> <p><i>Week Number 6:</i> Transformer model and regulation.</p> <p><i>Week Number 7:</i> 7th week exam + Transformer ratings and testing.</p> <p><i>Week Number 8:</i> AC rotating field.</p> <p><i>Week Number 9:</i> 3-phase induction motor.</p> <p><i>Week Number 10:</i> Synchronous machines.</p> <p><i>Week Number 11:</i> Single phase and small motors.</p> <p><i>Week Number 12:</i> 12th week + Electric power system.</p> <p><i>Week Number 13:</i> Plant distribution system.</p> <p><i>Week Number 14:</i> Protective devices and distribution of electricity in buildings.</p> <p><i>Week Number 15:</i> System protection & PF correction.</p> <p><i>Week Number 16:</i> Final Exam.</p> |
| 5- Teaching and Learning Methods | <ul style="list-style-type: none"> - Lectures - Tutorials - Reports & sheets - Laboratories |
| 6- Teaching and Learning Methods for Students with Special Needs | <ul style="list-style-type: none"> - Lectures - Tutorials - Reports & sheets - Laboratories |
| 7- Student Assessment: | <p>Written Examinations to assess The Intended Learning Outcomes</p> <p>Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills</p> |

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| a- Procedures used: | Written Examinations to assess The Intended Learning Outcomes Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills |
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| b- Schedule: | Assessment 1 | 7 th Week Written Exam |
| | Assessment 2 | 12 th Week Written Exam |
| | Assessment 3 | Continuous Assessments |
| | Assessment 4 | 16 th Week Final Written Exam |

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| c- Weighing of Assessment: | 7 th Week Examination | 30% |
| | 12 th Week Examination | 20% |
| | Final-term Examination | 40% |
| | Oral Examination | 0% |
| | Practical Examination | 0% |
| | Semester Work | 10% |
| | Total | 100% |

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| 8- List of References: | C. Hubert, "Electric Machines" Maxwell Macmillan, 1991 |
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| a- Course Notes | |
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| b- Required Books (Textbooks) | B. S. Guru, "Electric Machinery and Transformers", Oxford Uni. Press, latest edition |
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| c- Recommended Books | |
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| d- Periodicals, Web Sites, ..., etc. | |
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Course Instructor:

Head of Department:

Program Manager: