

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
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| معلومات المادة الدراسية | | | |
| Module Title | Electrical Machines | | Module Delivery |
| Module Type | Core | | <input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar |
| Module Code | EPE206 | | |
| ECTS Credits | 8 | | |
| SWL (hr/sem) | 200 | | |
| Module Level | 3 | Semester of Delivery | |
| Administering Department | Type Dept. Code | College | Type College Code |
| Module Leader | Name: Mayyadah Sahib Ibrahim | e-mail | E-mail: mayyadah.sahib@uodiyala.edu.iq |
| Module Leader's Acad. Title | Asst. Lect. | Module Leader's Qualification | M.Sc. |
| Module Tutor | Name (if available) | e-mail | E-mail |
| Peer Reviewer Name | Name | e-mail | E-mail |
| Scientific Committee Approval Date | 01/06/2023 | Version Number | 1.0 |

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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| Prerequisite module | None | Semester | |
| Co-requisites module | None | Semester | |

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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| <p>Module Objectives</p> <p>أهداف المادة الدراسية</p> | <ul style="list-style-type: none"> • Study the basic principles of DC machines • Qualifying students to be able to become familiar with the theoretical and scientific aspects of direct current machines • Study the types of direct current machines, their types, working principles, properties and applications, and explain the importance of their uses in practical life. • Urging students to benefit from the course in their field of work as engineers in the field of electrical power engineering in the future |
| <p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p> | <ol style="list-style-type: none"> 1. Learn about the basic concepts of electrical machines 2. Learn about construction of DC machines and methods of winding them. 3. Know the types of electric generators 4. Knowing the voltage equations in electric generators. 5. Study the characteristics of electric generators. 6. Know the conditions for operating generators in parallel. 7. identify electric motors, their types, torques, and their equations. 8. Study the characteristics of electric motors and types of losses. 9. Learn to operate electric motors and control their speed. 10. Study of electrical transformers and their types. 11. Knowledge of ideal transformers and how to calculate losses. 12. Study of tests of electrical transformers. 13. Identify three-phase transformers and automatic transformers. |
| <p>Indicative Contents</p> <p>المحتويات الإرشادية</p> | <p>Indicative content includes the following:</p> <p><u>Part A - D.C. GENERATORS</u></p> <p>Introduction, Generator-principle of rotating electrical machines and calculation of induced e.m.f., energy, power and torque in D.C. machines , Construction of D.C. machines and function of commutator, Armature Windings, Types of Generators, Calculation of e.m.f. per pole., Iron Loss in Armature, Total Loss in a D.C. Generator, Armature Reaction, Parallel Operation of DC Generators, Characteristics of D.C. Generators [18 hrs.]</p> <p><u>Part B - D.C. MOTOR</u></p> |

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| | <p>Introduction, Principle of Operation of a D.C. Motor, Calculation of speed, torque, Direction of Rotation of Motor, Significance of Back E.M.F, Types of D.C. Motors, Power Equation of a D.C. Shunt Motor, Torque Equation of a D.C. Motor, starting of D.C. motors characteristic (shunt, series, compound, separately), Losses and Efficiency, Power Stages. [15 hrs.]</p> <p><u>Part C – SINGLE -PHASE TRANSFORMERS</u></p> <p>Introduction, Principle Working of transformers, Construction , Types of Windings, Types of Transformers , E.M.F. Equation of Transformer , Ratio of Transformer, Ideal transformer, Practical Transformer on No Load, Transformer on Load, Equivalent Circuit, Voltage Regulation, Transformer Tests, Losses in a Transformer, Efficiency of a Transformer, All-day Efficiency .[24 hrs]</p> <p><u>Part D - THREE-PHASE TRANSFORMERS</u></p> <p>Introduction, Three-Phase Transformer Connections, connection groups, applications, Advantages of Three-Phase Transformers, Three-Phase Transformation with Two Single-Phase Transformers, Scott Connection , auto transformer , Power Transfer in Autotransformer , Advantages and Disadvantages of Autotransformer , Applications of Autotransformer [6 hrs]</p> |
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| Learning and Teaching Strategies استراتيجيات التعلم والتعليم | |
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| Strategies | <p>1. Behavior management</p> <p>Behavior management strategies foster an atmosphere of mutual respect, reduce disruptive behavior and ensure students have an equal opportunity to fulfill their potential in the classroom. It's crucial to provide them with both a positive and productive learning environment. Examples include establishing a reward system with an interactive chart where students move up or down depending on their performance and behavior in class.</p> <p>2. Blended learning</p> <p>With a blended learning teaching strategy, technology is incorporated with traditional learning. This allows students to work at their own pace, research their ideas and become more physically engaged during lessons. Examples include providing interactive tablets or whiteboards with engaging activities and posting classwork online for easier access.</p> <p>3. Cooperative learning</p> |

Group work is a cooperative learning strategy that allows students with various learning levels to work together. By encouraging them to express their own ideas and listen to others' ideas as a group, you help students develop communication and critical thinking skills. Examples include solving math puzzles together, performing skits as a team or working on group presentations.

4. Formative assessment

A formative assessment is used periodically to monitor student learning incrementally. This can more effectively measure the process of learning as opposed to end-of-unit tests and can help you to improve your teaching methods throughout the year. Examples of this teaching strategy include self-evaluation exercises and summarizing a topic in multiple ways.

5. Student-led teaching

The student-led teaching strategy lets students become the teacher. In a classroom with learners at different levels, you can better engage those learning faster by showing them how to teach and give feedback to their peers. They may team-teach or work in groups to teach a new topic. Examples include letting a student teach an entire lesson or having advanced writers lead a peer-editing session as well as provide constructive criticism.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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|--|------------|---|---|
| Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|------------|---------------------------|
| Formative assessment | Quizzes | 2 | 10% (10) | 5 and 12 | LO #1, #4 and #8, #11 |
| | Assignments | 2 | 10% (10) | 3 and 13 | LO #3, #4 and #10, #14 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | All |
| | Report | 1 | 10% (10) | 14 | LO #5, #8 and #10 |
| Summative assessment | Midterm Exam | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|--------|--|
| Week 1 | <ul style="list-style-type: none"> Introduction: Construction of D-C machines |
| Week 2 | <ul style="list-style-type: none"> E.m.f equation, electromagnetic torque, armature reaction, function of commutator, Armature Windings |
| Week 3 | <ul style="list-style-type: none"> Type of excitation of DC generators. Characteristics of D.C. Generators. |
| Week 4 | <ul style="list-style-type: none"> Loss in a D.C. Generator and efficiency Condition for Maximum Efficiency. |
| Week 5 | <ul style="list-style-type: none"> Parallel Operation of Shunt Generators. Connecting Shunt Generators in Parallel. |
| Week 7 | <ul style="list-style-type: none"> Type of excitation of DC motors . D.C. motors characteristic (shunt, series, compound, separately Losses and Efficiency maximum power. condition for maximum efficiency. |
| Week 8 | Mid-term Exam |
| Week 9 | <ul style="list-style-type: none"> Construction of transformers and type of transformers and type winding. |

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| Week 10 | <ul style="list-style-type: none"> • Principle working of transformers. • e.m.f equation of transformers. |
| Week 11 | <ul style="list-style-type: none"> • Ideal transformers Ideal transformers on load and no load. • Practical transformers on no load. |
| Week 12 | <ul style="list-style-type: none"> • Losses in transformers. • Condition for maximum efficiency. • All day efficiency. |
| Week 13 | <ul style="list-style-type: none"> • Three phase transformers and them connection . • Advantages of three transformers. • Three phase with two single phase transformers. |
| Week 14 | <ul style="list-style-type: none"> • Auto transformers . • Power transformers Auto transformers . |
| Week 15 | <ul style="list-style-type: none"> • Advantages and Disadvantages of Autotransformer . • Applications of Autotransformer |
| Week 16 | Preparatory week before the final Exam |

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | Material Covered |
|---------------|---|
| Week 1 | Lab 1: Introduction Measurement Instruments |
| Week 2 | Lab 2: Parts of D.C electrical machines and their types. |
| Week 3 | Lab 3: Load test on a self-excited D.C shunt generator. |
| Week 4 | Lab 4: Load characteristics of separately excited D.C shunt generators. |
| Week 5 | Lab 5: Load test on a D.C series generators. |
| Week 6 | Lab 6: Load characteristics (Load test) of D.C shunt motor. |
| Week 7 | Lab 7: Load characteristics (Load test) of D.C series motor. |

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| Week 8 | Lab 8: Load characteristics (Load test) of D.C compound motor. |
| Week 9 | Lab 9: Load characteristics (Load test) of D.C compound motor. |
| Week 10 | Lab 10: parts of transformers and their type & Reading of wattmeter. |
| Week 11 | Lab 11: Polarity and turn ratio of a single-phase transformer |
| Week 13 | Lab 13: short (S.C) tests on a single-phase transformer. |
| Week 14 | Lab 14: Load test of a single-phase transformer. |
| Week 15 | Final Exam |

Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|--------------------------|---|---------------------------|
| Required Texts | <ul style="list-style-type: none"> Electrical Technology By B.L Theraja. | Yes |
| Recommended Texts | <ul style="list-style-type: none"> Principle of Electrical Machines Machines V.K. MEHTA Electrical Machines U.A. Bakshi V.U. klBakshi | No |
| Websites | <ul style="list-style-type: none"> Peruse scientific websites for recent developments in the prescribed article | |

Grading Scheme

مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|-------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 - 49) | FX – Fail | راسب (قيد المعالجة) | 45-49 | More work required but credit awarded |
| | F – Fail | راسب | 0-44 | Considerable amount of work required |

