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國立高雄科技大學
NATIONAL KAOHSIUNG UNIVERSITY OF SCIENCE AND TECHNOLOGY
授課大綱 Syllabus

部別 : 日間部四技 **112學年度第2學期** 列印日期 : 2024/03/06

中文課程名稱 : 電機應用	英文課程名稱 : Electrical Machinery Application	授課教師 : Elsisi
開 課 班 級 : 四電二乙	學 分 : 3.0	授課時數 : 3.0
合 班 班 級 :		實習時數 : 0.0

1.中文教學目標(Chinese Teaching objectives)

This course focuses on operating principles and modeling of different types of electric machines and their development. The course will cover different aspects including: DC, brushless DC, induction, permanent magnet and conventional synchronous machines; power transformers, control aspects of these machines within modern electric drives for applications such as industry automation, energy conservation through variable speed drives, wind generators and electric vehicles, their prospects, advantages, and limitations Students will be able to analyze, select, and control electric machines and understand modern electric drives that are important in today’s industry. Students will understand the operating principles and modeling of modern machines such as permanent magnet motors, brushless dc motors, stepper and reluctance motors. Students will have a basic understanding of machine control using power electronic converters, and be able to design feedback controllers for simple motion control applications.

2.英文教學目標(English Teaching objectives)

This course focuses on operating principles and modeling of different types of electric machines and their development. The course will cover different aspects including: DC, brushless DC, induction, permanent magnet and conventional synchronous machines; power transformers, control aspects of these machines within modern electric drives for applications such as industry automation, energy conservation through variable speed drives, wind generators and electric vehicles, their prospects, advantages, and limitations Students will be able to analyze, select, and control electric machines and understand modern electric drives that are important in today’s industry. Students will understand the operating principles and modeling of modern machines such as permanent magnet motors, brushless dc motors, stepper and reluctance motors. Students will have a basic understanding of machine control using power electronic converters, and be able to design feedback controllers for simple motion control applications.

3.中文教學綱要(Chinese CourseDescription)

1. Introduction to electric machines 2. Mechanical system requirements and electric drives 3. Review of magnetic circuits 4. Principles of electro mechanical energy conversion 5. DC machines - operating principles, constructional details 6. Transformers - operating principles, important parameters, test methods 7. AC induction and synchronous machines 8. Permanent magnet and brushless dc motors 9. Stepper motors and reluctance motors 10. Modeling and speed control of motors 11. Power electronic converters used in electric drives 12. Applications of modern machines

4.英文教學綱要(English CourseDescription)

1. Introduction to electric machines 2. Mechanical system requirements and electric drives 3. Review of magnetic circuits 4. Principles of electro mechanical energy conversion 5. DC machines - operating principles, constructional details 6. Transformers - operating principles, important parameters, test methods 7. AC induction and synchronous machines 8. Permanent magnet and brushless dc motors 9. Stepper motors and reluctance motors 10. Modeling and speed control of motors 11. Power electronic converters used in electric drives 12. Applications of modern machines

5.中文核心能力

	核心能力名稱	核心能力百分比
1	具備基本的電機工程專業知識	20%

2	具備工程實務歸納、分析、整合之能力	10%
3	具備有效溝通表達自我,團隊合作之能力	20%
4	培養畢業生繼續深造的能力,落實終身學習理念	10%
5	具備專業倫理及社會責任認知,並遵守智慧財產權及職業道德	10%
6	對相關產業之國際發展趨勢有深入了解,並具備接受全球化競爭挑戰的能力	30%

6.英文核心能力

	核心能力名稱	核心能力百分比
1	Professional knowledge in basic electrical engineering	20%
2	Competence in induction, analysis and integration of engineering practices	10%
3	Competence in effective communication and team cooeration	20%
4	Competence of graduates in further study and lifelong learning	10%
5	Professional ethics and social responsibility awareness and compliance with intellectual property rights and ethics	10%
6	Profound knowledge in international development trend of related industries and ability of taking challenges in global competition	30%

7.教科書

1 中文書名： 英文書名:Electric Machines: Principles, Applications, and Control Schemes
中文作者： 英文作者:Dino Zorbas
中文出版社： 英文出版社:Cengage Learning
出版日期 : 2015年 01月 備註:

8.參考書

1 中文書名： 英文書名:Electric machines and drives : principles, control, modeling, and simulation
中文作者： 英文作者:Filizadeh, Shaahin
中文出版社： 英文出版社:CRC Press
出版日期 : 2017年 01月 備註:

9.教學進度表

週次或項目	中文授課內容 Chinese Course Content	英文授課內容 English Course Content	分配節次 Assigned Classes	備註 Note

Week or Items	
Introduction to electric machines	Introduction to electric machines
Mechanical system requirements and electric drives	Mechanical system requirements and electric drives
Review of magnetic circuits	Review of magnetic circuits
Principles of electro mechanical energy conversion	Principles of electro mechanical energy conversion
DC machines – operating principles, constructional details	DC machines – operating principles, constructional details
Continue DC machines – operating principles, constructional details	Continue DC machines – operating principles, constructional details
Transformers – operating principles, important parameters, test methods	Transformers – operating principles, important parameters, test methods
Continue Transformers – operating principles, important parameters, test methods	Continue Transformers – operating principles, important parameters, test methods
Midterm report	Midterm report
AC induction and synchronous machines	AC induction and synchronous machines
Continue AC induction and synchronous machines	Continue AC induction and synchronous machines
Permanent magnet and brushless dc motors	Permanent magnet and brushless dc motors
Stepper motors and reluctance motors	Stepper motors and reluctance motors
Modeling and speed control of motors	Modeling and speed control of motors
Continue Modeling and speed control of motors	Continue Modeling and speed control of motors
Power electronic converters used in electric drives	Power electronic converters used in electric drives

Applications of modern machines	Applications of modern machines
Final Report	Final Report

10.中文成績評定(Chinese Evaluation method)

Midterm report _30_% Final report _30_% Report (homework) _30_% Other (Attendance)__10_____ %

11.英文成績評定(English Evaluation method)

Midterm report _30_% Final report _30_% Report (homework) _30_% Other (Attendance)__10_____ %

12.中文課堂要求(Chinese Classroom requirements)

13.英文課堂要求(English Classroom requirements)

None

14.本課程與SDGs相關項目(This course is relevant to these of SDGs as following)

9.產業創新與基礎設施(Industry Innovation and Infrastructure);