Postgraduate Course book

Department of Mathematics

College of Basic Education

Salahaddin University - Erbil

Subject: Measure Theory

Course Book Level: Higher Diploma

Lecturer's name: Assist. Prof. Dr. Rashad Rashid Haji

Academic Year: 2023 – 2024   Second Semester

Course Book

1. Course name	**Measure Theory**
2. Lecturer in charge	**Assist. Prof. Dr. Rashad Rashid Haji**
3. Department/ College	**Mathematics / Basic Education**
4. Contact	**e-mail: rashad.haji@su.edu.krd** **Tel: (07504909486)**
5. Time (in hours) per week	**For example Theory: 3**
6. Office hours	**4**
7. Course code	**Measure Theory**
8. Teacher's academic profile	2014-2015: Ph.D., in Mathematics, at the School of Mathematics, College of Engineering and Physical Science in the University of Birmingham, UK. The title of the thesis is: Harmonic Analysis Using Methods of Nonstandard Analysis. Supervised by Dr. Richard Kaye. 2012-2013: MPhil qual (MASTER OF PHILOSOPHY), in Mathematics, at the School of Mathematics, College of Engineering and Physical Science in the University of Birmingham, UK. The title of the thesis is: A Nonstandard Approach to Fourier Series. Supervised by Dr Richard Kaye. 1999-2000: M.Sc., in Mathematics, at the Department of Mathematics, College of Science in the Salahaddin University-Erbil, Iraq. The title of the thesis is: Nonstandard Approximation and Successive Shadows Development. Supervised by Dr. Tahir Hasan Ismail. 1988-1989: B.Sc., in Mathematics at the Department of Mathematics, College of Education in the Salahaddin University-Erbil, Iraq. I am interesting in the fields of Mathematical analysis, Topology, Algebra and Graph Theory.
9. Keywords	**Lebesgue Measure, Outer Measure, Measurable sets, Measurable functions, Lebesgue integral, σ- algebra.**

10. Course overview:
By the end of this course of this module, the student should be able to know the following subjects: How to find the measure of Finite, infinite, countable, uncountable sets

11. Course objective:
The aim of this course is to find the integration of functions, we cannot find its integral value by using Riemann way.
This should not be less than 100 words

12. Student's obligation:
The attendance of students is very necessary in order to understand the subjects of the module throughout the semester, completion of all example class exercises, tests, and exams.

13. Forms of teaching:
Data show, lecture notes. We use chalk and green boards, white boards as tools of writing to explain the theoretical steps of the module to students.

14. Assessment scheme:
Throughout this Semester there are two Exams, Midterm and Final term.
We set different types of questions such as: Prove or disprove, giving examples, short proves. In addition, four Quizzes during whole the term.

15. Student learning outcome:
Our aim in this module is to teach the students. They will learn the following new topics:

1- Measures
2- Lebesgue Measure on $\mathbb{R}^n$
3- Measurable Functions
4- Integration
5- Product Measures

16. Course Reading List and References:
[1] V. I. Bogachev, Measure Theory, Vol I and II, Springer- Verla, Heidelberg, 2007.
[2] D. L. Cohn, Measure Theory, Birkhauser, Boston, 1980.
[3] L. C. Evans and R. F. Gariepy, Measure Theory and Fine Properties of Functions, CRC Press, Boca Raton, 1992.
[4] E. H. Lieb and M. Loss, Analysis, AMS, 1997.

17. The Topics:	Lecturer's name
Some known Groups such as the symmetric group of n symbols Sn, Graphs and operation on graphs, Graph isomorphism, some Special graphs and graph operations, The adjacency matrix of graphs, The coefficients and roots of a polynomial of graphs, The characteristic polynomial and spectrum of a graph, Cospectral graphs and bipartite graphs, Bounds on the chromatic number, The chromatic polynomial, The Laplacian and signless Laplacian matrices, The matrix tree theorem, Regular graphs and strongly regular graphs, Quotient graphs, Automorphisms and eigenpairs, Equitable partitions of graphs.	Assist. Prof. Dr. Rashad Rashid Haji ex: (3 hrs) ex: 20/02/2024
18. Practical Topics (If there is any)	
In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture.	Assist. Prof. Dr. Rashad Rashid Haji ex: : 20/02/2024

19. Examinations:

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?
With their typical answers
Examples should be provided

2. Prove or disprove the statements:In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3. state and prove the following:
In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

21. Peer review   پێداچوونەوەی هاوەڵ

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.
(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).
ئەم کۆرسبووکە دەبێت لەلایەن هاوەڵێکی ئەکادیمیەوە سەیر بکرێت و ناوەرۆکی بابەتەکانی کۆرسەکە پەسەند بکات و
چەند ووشەیەک بنووسێت لەسەر شیاوی ناوەرۆکی کۆرسەکە و واژووی لەسەر بکات.
هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبێت پلەی زانستی لە مامۆستا کەمتر نەبێت.