

《_____》教学大纲

一、课程基本信息

课程名称/英文名称		课程代码	
课程层次 ¹		学分/学时	
主要面向专业 ²		授课语言	
先修课程			
开课单位		课程负责人	

注 1: 课程层次填写“本科生课程”、“研究生课程”或“本研一体课程”

注 2: 主要填写全校 10 个本科专业（或若干个专业的组合）或“全体本科生”或“全校学生”

二、课程简介

三、课程教学目标

四、课程教学方法

五、课程教学内容与安排

（可按教学周或章节名称两种方式进行课程教学内容安排，列出主要知识点和教学方法。）

以教学周方式安排教学内容

教学周	章节名称	主要教学内容 (主要知识点)	学时安排	教学方法 (仅列名称)
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以章节名称方式安排教学内容

章节名称	主要教学内容 (主要知识点)	教学周	学时安排	教学方法 (仅列名称)

六、考核方式和成绩评定方法

(成绩评定方法需符合《上海科技大学课程考核及成绩管理办法(试行)》文件要求。)

七、教材和参考书目

(需符合《上海科技大学教材选用管理办法》文件要求)

(一) 推荐教材(说明:书名、作者、出版社、出版年月、*ISBN*为必填项;译者为选填项)

推荐教材 1:

*书名:	*作者:	译者:	*ISBN:
*出版社:	*出版年月:	*版次:	

推荐教材 2:

*书名:	*作者:	译者:	*ISBN:
*出版社:	*出版年月:	*版次:	

(推荐教材信息可复制以上表格依次添加)

(二) 参考书目

参考书目 1:

书名:	作者:	译者:	ISBN:
出版社:	出版年月:	版次:	

参考书目 2:

书名:	作者:	译者:	ISBN:
出版社:	出版年月:	版次:	

(参考书目信息可复制以上表格依次添加)

八、学术诚信教育

本课程高度重视学术诚信，严禁抄袭、作弊等行为。

“在学习、科研、实习实践等活动中，学生应恪守学术道德，坚守学术诚信，保护知识产权，坚持勇于创新、求真务实的科学精神，努力培养自己严谨求实、诚实自律、真诚协作的科学态度，成为良好学术风气的维护者、严谨治学的力行者、优良学术道德的传承者。”

（具体请参见《上海科技大学学生学术诚信规范与管理办法（试行）》文件要求，如果教师有更具体的要求，请详细列出。）

九、其他说明（可选）

（【建议文字格式】中文：宋体，小四；英文：Times New Roman，小四；1.5倍行间距；首行缩进2字符。）

Commutative Algebra Syllabus

1. Basic Course Information

Course Name	Commutative Algebra	Course Code	
Course Level*	undergraduate	Credit/Contact Hour	4/4*16
Major	Maths	Teaching Language	English
Prerequisite	Linear Algebra I/II and Abstract Algebra		
School/Institute	IMS	Instructor**	Professor Daniel Skodlerack

Notes: *Course level includes undergraduate, graduate, or undergraduate/graduate.

**If multiple instructors are involved, please list the name of team leader.

2. Course Introduction:

Modules over commutative rings occur almost everywhere in Mathematics. The first common examples are groups seen as modules over the ring of integers. Modules behave more richer than vector spaces, for example a module over a ring does not need to have a basis anymore. To understand ring extensions, Dedekind rings and group rings it needs the understanding of modules. As an application of module theory we introduce a connection to geometry: We will study basics on homological algebra and group cohomology.

3. Learning Goal

Course Task : To learn the basic notions and theorems for algebraic objects over commutative rings. The course is about

- * modules (flat, free, projective, injective)
- * tensor products of modules,
- * localization
- * completions and Hensel's Lemma
- * dimension theory (Noether normalization)
- * homological algebra
- * group cohomology

4. Instructional Pedagogy

Most of the time the course will be given via lectures, but according to student performances on homework problems there will be a few of example classes where the students have to present

solutions at the board. Some students can give a talk on the Saturday evening seminar if wanted (no obligation).

5. Course Content and Schedule

Course Structure by Week

Week	Chapter	Teaching Contents	Contact Hours	Teaching Modes
1-2	1. Ch 0.3	Modules first definitions	8	lecture
3-4	1. p.46	Modules over Noethernian rings	8	lecture
5-6	1. Appendix 3	Projective and injective modules	8	lecture
5	1. Ch. 2.2	Tensor products	4	lecture
6	1. Ch. 6	Flat modules	4	lecture
7	1. Ch 2	Localization	4	lecture
8-9		Local-glaobal principle	8	lecture
10		Ring extensions	4	lecture
11	1. Ch. 7	Completions and Hensel's Lemma	4	lecture
12	1. Ch. 8	Dimension theory	4	lecture
13-14	1. Appendix 3	Homological algebra	8	lecture
15-16	2. Ch. 3	Group cohomology first basics	8	lecture

6. Grading Policy

There will be homework (40%), some quizzes (20%) and a final exam (40%).

7. Textbook & Recommended Reading

(1) Textbook:

- David Eisenbud, "Commutative Algebra with the view towards Algebraic Geometry" (Springer 2004) Isbn 978-7-5062-9245-0
- Kenneth Brown, "Cohomology of groups"

(2) Recommended Reading

- Atiyah M.F. and Macdonald I.G. "Introduction to Commutative Algebra"
- Rotmann J., "An Introduction to Homological Algebra"
- Serre J.P., "Galois Cohomology"

8. Academic Integrity

This course highly values academic integrity. Behaviors such as plagiarism and cheating are strictly prohibited. Please list more if you have more specific requirements.

9. Other Information (Optional)