| 北海道大学シラバス | | | | | |
|---|---|---|---|---|---|
| 科目名 | | | | | |
| 幾何学続論 | | | | | |
| 講義題目 | | | | | |
| 超曲面の射影微分幾何学入門 | | | | | |
| 責任教員(所属) | | | | | |
| 古畑　仁(大学院理学研究院) | | | | | |
| 担当教員(所属) | | | | | |
| 古畑　仁(大学院理学研究院) | | | | | |
| 科目種別 | 理学部専門科目 | | | 他学部履修等の可否 | |
| 開講年度 | 2016 | 期間 | 2学期 | 時間割番号 | 013050 |
| 授業形態 | 講義 | 単位数 | 2 | 対象年次 | 4～4 |
| 対象学科・クラス | 数学科 | | | 補足事項 | |
| ナンバリングコード | SCI_MATH 4442 | | | | |
| 大分類コード | 大分類名称 | | | | |
| SCI_MATH | 理学部(数学科) | | | | |
| レベルコード | レベル | | | | |
| 4 | 学部専門科目(卒業論文・卒業研究関連科目、医・歯・薬・獣5～6年科目) | | | | |
| 中分類コード | 中分類名称 | | | | |
| 4 | 幾何系科目 | | | | |
| 小分類コード | 小分類名称 | | | | |
| 4 | 幾何学続論 | | | | |
| 言語コード | 言語 | | | | |
| 2 | 日本語及び英語のバイリンガル授業、受講者決定後に使用言語(日本語又は英語)を決定する授業 | | | | |

## キーワード

微分幾何学, 射影空間, アファイン接続, 部分多様体, 曲面, Pick-Berwaldの定理

## 授業の目標

射影空間内の(超)曲面の射影変換で不変な性質を微分幾何学的に調べる. そのために必要となる等積アファイン幾何学, 中心アファイン幾何学などの基礎概念を合わせて学ぶ.

## 到達目標

(超)曲面の射影幾何学的な不変量とは何かを理解する.

## 授業計画

1. アファイン接続と多様体論の復習
2. 等積アファイン幾何学, 中心アファイン幾何学における超曲面
3. 余次元2のはめ込み
4. 射影幾何学における超曲面
5. 射影極小曲面

## 準備学習(予習・復習)等の内容と分量

理学部専門科目「幾何学基礎」「幾何学A」で学ぶ内容を講義に合わせて復習しておくこと.

## 成績評価の基準と方法

レポートによる.

## テキスト・教科書

## 講義指定図書

Affine differential geometry : geometry of affine immersions / Katsumi Nomizu, Takeshi Sasaki : Cambridge University Press, ISBN:0521441773
Projective differential geometry of submanifolds / M.A. Akivis, V.V. Goldberg : North-Holland, ISBN:0444897712
Backlund and Darboux transformations : geometry and modern applications in soliton theory / C. Rogers, W.K. Schief : Cambridge University Press, ISBN:052181331X

## 参照ホームページ

## 研究室のホームページ

http://www.math.sci.hokudai.ac.jp/ ~furuhata/

## 備考

学習の仕方, 評価の方法等の詳細は第1回の授業において説明する.

## 更新日時

2016/02/01 16:23:51

| Hokkaido University Syllabus | | | | | |
|---|---|---|---|---|---|
| Course Title | | | | | |
| Advanced Geometry | | | | | |
| Subtitle | | | | | |
| Introduction to projective differential geometry of hypersurfaces | | | | | |
| Instructor (Institution) | | | | | |
| Hitoshi FURUHATA(Faculty of Science) | | | | | |
| Other Instructors (Institution) | | | | | |
| Hitoshi FURUHATA(Faculty of Science) | | | | | |
| Course Type | | | | Open To Other Faculties / Schools | |
| Year | 2016 | Semester | 2nd Semester | Course Number | 013050 |
| Type of Class | Lecture | Number of Credits | 2 | Year of Eligible Students | 4～4 |
| Eligible Department / Class | | | | Other Information | |
| Numbering Code | SCI_MATH 4442 | | | | |
| Major Category Code | Major Category Title | | | | |
| SCI_MATH | Science_Mathematics | | | | |
| Level Code | Level | | | | |
| 4 | General Education Courses offered in upper years; Specialized Subjects (advanced: Graduation Thesis, etc.) | | | | |
| Middle Category Code | Middle Category Title | | | | |
| 4 | | | | | |
| Small Category Code | Small Category Title | | | | |
| 4 | | | | | |
| Language Code | Language Type | | | | |
| 2 | Classes are in Japanese and English (bilingual, or language is decided once the student composition has been finalized. | | | | |

## Key Words

differential geometry, projective space, affine connection, submanifold, surface, the Pick-Berwald theorem

## Course Objectives

The objectives of this course are to introduce the basic notions of:
[1] differential geometry with a quick review of the elementary manifold theory,
[2] equi-affine geometry and centro-affine geometry,
[3] projective geometry and the theory of hypersurfaces in the projective space,
[4] rigidity aspects for projective hypersurfaces.

## Course Goals

On completion of this course, students should be able:
[1] to understand the difference between Euclidean geometry and projective geometry,
[2] to explain what an affine connection is,
[3] to comprehend what projective invariants of hypersurfaces mean.

## Course Schedule

1. Vector fields, Connections, Metrics, Volume forms
2. Equi-affine hypersurfaces, Centro-affine hypersurfaces
3. Equi-centro-affine immersions of codimension two
4. Projective hypersurfaces, Quadratic hypersurfaces
5. Projective minimal surfaces

## Homework

Students are expected to complement the standard of geometry given in basic courses to comprehend the lecture.

## Grading System

Evaluation will be based on the level of submitted reports.

## Textbooks

## Reading List

Affine differential geometry : geometry of affine immersions / Katsumi Nomizu, Takeshi Sasaki : Cambridge University Press, ISBN:0521441773
Projective differential geometry of submanifolds / M.A. Akivis, V.V. Goldberg : North-Holland, ISBN:0444897712
Backlund and Darboux transformations : geometry and modern applications in soliton theory / C. Rogers, W.K. Schief : Cambridge University Press, ISBN:052181331X

## Websites

## Website of Laboratory

http://www.math.sci.hokudai.ac.jp/ ~furuhata/

## Additional Information

The guidance is given in the first time of the course.

## Update

2016/02/01 16:23:51