

北陸先端科学技術大学院大学研究室教育指針
Laboratory Education Guideline

研究室教育指針は、学則第30条の3に基づき、研究指導の方法及び内容並びに修了までの研究指導の計画をあらかじめ明示するものです。

Based on the Article 30-3 of the general academic rules, the Laboratory Education Guideline is intended to clearly outline the methods and content of research guidance, as well as the plan for research guidance until completion.

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1. 研究テーマ / Research Theme
<p>Carbohydrates play crucial roles in a variety of biological events such as cell-cell communications. For example, many proteins in the living system are decorated with carbohydrates, which mediate molecular recognition processes. In addition, recent evidence has demonstrated that carbohydrates are deeply involved in viral infections, cancer metastasis, and serious diseases including Alzheimer's disease. Furthermore, carbohydrates are attracting attention as critical factors in the properties of many biopharmaceuticals.</p> <p>Thus, carbohydrates are in the spotlight as targets for drug discovery and medical treatment. However, despite the widespread recognition of their importance, research into carbohydrates themselves is still developing. Our research seeks the underlying molecular basis for the function of carbohydrates by fusing chemistry and biology. We aim to open new scientific horizons and contribute to society through various approaches, such as developing novel analytical methods based on chemical techniques and elucidating glycan structures using molecular spectroscopy and simulation. We are also challenging ourselves to synthesize model compounds mimicking cell-surface glycans and to control cell functions using these applied technologies.</p> <p>Keywords: Carbohydrate, Protein, Molecular recognition, Organic chemistry, Computational chemistry</p>
2. 修得が期待される能力 / Competencies expected to be acquired
<p>研究室教育は必修 A 科目 (先端) 又は研究支援科目 (融合) の一部として単位化されており、この欄はそれら科目のシラバス上の達成目標の一部となります。</p> <p>Laboratory Education is accredited as a part of the Required courses A (Division of Advanced Science and Technology) or Research Support Courses (Division of Transdisciplinary Sciences), and this section constitutes a part of the course goals stated in the syllabus for such subjects.</p> <p>Students will acquire knowledge and techniques for material creation based on synthetic organic chemistry and biotechnology, as well as physicochemical measurement skills centered on NMR spectroscopy and molecular simulation.</p> <p>In addition to these technical skills, the Master's program emphasizes the improvement of communication skills through research activities, such as discussing experimental data and ideas within the laboratory and presenting research results at academic conferences. In the Doctoral program, we further aim to cultivate the ability to drive projects forward and solve problems through logical thinking, without being bound by conventional methods.</p>
3. 研究指導方針 / Research Guiding Principle
<p>Based on a foundation of organic and physical chemistry, we aim to pioneer new research in biofunctional engineering by applying supramolecular chemistry and biophysics. Our primary research targets, carbohydrates, are garnering significant attention as key targets for drug discovery and medical applications. However, research directly addressing carbohydrates remains limited due to the inherent difficulties in handling them. We address this challenge by advancing next-generation life sciences through the fusion of chemistry and biology.</p> <p>Furthermore, we cherish the enthusiasm for creation and aim to develop unique functional molecules inspired by biological systems. Our guiding principle emphasizes the importance of learning science broadly across disciplines while deeply cultivating one's own core expertise—building a strong "trunk" of knowledge that allows you to confidently say,</p>

"This is my strength."
4. 研究室活動の内容及び方法 / Content and Methods of Laboratory Activities
<input type="checkbox"/> 日次活動 / Daily Activities : Core time <input type="checkbox"/> 週次活動 / Weekly Activities : Individual meetings <input type="checkbox"/> 月次活動 / Monthly Activities : Progress report meetings, seminars (one time per month) <input type="checkbox"/> 不定期活動 / Occasional Activities : Technical study sessions, conference presentations
5. 年間スケジュール / Annual Schedule 本学の全学共通の年間スケジュールは「履修案内」の「学位取得に至るスケジュール」を参照してください。(本学HP 参照：ホーム>教育>履修関係>履修案内) Please refer to the “Degree conferment schedule for the master’s program/doctoral program” in the “Degree Completion Guide” for university-wide common schedule (JAIST website: Home >Education>Taking Courses>Degree Completion Guide)
Laboratory Orientation for New Students (July) Research Design (August) Participation in Autumn Conferences (September – October) The Japanese Society of Carbohydrate Research, The Biophysical Society of Japan, Symposium on Bio-functional Chemistry, etc. Note: Participation is recommended for M1 students; only presenters attend for M2 students. External Training for Young Researchers (November) Participation in Spring Conferences (February – March) The Chemical Society of Japan, The Pharmaceutical Society of Japan, etc. Note: Presentations are recommended for M1 students; only presenters attend for M2 students.