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

Field: Complex Systems Science, Knowledge Science, Evolutionary Linguistics, Evolutionary Economics
Keywords: Language, Communication, Social Institutions, Emergence, Evolution, Micro-Macro, Simulation, Laboratory Experiment

2. 修得が期待される能力 / Competencies expected to be acquired

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。
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.

This laboratory is grounded in complex systems science and pursues research with an inherently interdisciplinary character, spanning knowledge science, evolutionary linguistics, and evolutionary economics. Across these fields, knowledge, language, economy, and society are understood not as static objects, but as **dynamic systems that continuously evolve through interaction**. Accordingly, we emphasize constructive and emergent forms of understanding that go beyond purely analytical or reductionist approaches.

Based on this research perspective, our laboratory places importance not only on research outcomes themselves, but also on the formation of thinking through the research process, including interaction with others, experimentation, and iterative trial and error. We therefore encourage students to **actively engage in intellectually exciting research topics together and to grow through that research process**. Through the entire course of research activities aimed at achieving the important milestone of completing a master's thesis, students are expected to develop their ways of thinking, practical skills, and professional attitudes, and to grow as independent professionals and members of society.

Specifically, students are expected to acquire the following competencies:

- **Problem Identification and Analytical Skills**
  The ability to identify and formulate research problems independently, to obtain and analyze reliable data, and to conduct logical and rigorous analyses based on the results.
- **Logical and Systems Thinking Skills (Systematic and Systemic)**
  The ability not only to organize and analyze individual results and findings in a systematic manner, but also to understand their interrelationships and to view research targets as interconnected systems.
  By moving back and forth between concrete details and abstract structures, students develop the capacity to think in terms of dynamics, emergence, and open-ended processes, and to advance their research in a constructive and generative way.
- **Methodological Skills**
  Practical skills to learn, select, and appropriately apply research methods—such as programming, experimental design, and data analysis—according to the research theme and objectives.
- **Collaborative and Dialogic Skills**
  The ability to present one's research outcomes in a form that is understandable to others, to accept diverse perspectives and critical feedback through discussion, and to deepen one's research by critically reflecting on it.
  In addition, by listening attentively to others' research presentations with the intention of understanding them, and by offering constructive questions and comments to improve those

studies, students cultivate critical and comprehensive perspectives and learn to apply them to their own research.

- **Expression and Integration Skills**
  Through the process of writing a master's thesis, the ability to organize one's thoughts by moving between concrete details and abstract ideas, and to communicate one's ideas to others in a clear and logical manner.

These competencies form not only the foundation for becoming a researcher, but also a basis for identifying problems in society, creating new solutions by effectively utilizing existing knowledge, and working collaboratively with others to address complex challenges.

3. 研究指導方針 / Research Guiding Principle

In this laboratory, we regard knowledge and research not as processes confined within individuals, but as **dynamic processes that are generated and developed through interaction with others**. Based on this view, our guiding principle is to support students' growth through research. Research themes are therefore determined starting from students' own interests and curiosity, with the aim that students and faculty can work together on topics that are intellectually exciting for both. We encourage students to engage proactively in their research and to grow through repeated trial and error, placing importance not only on research outcomes but also on students' attitudes toward research and the deepening of their thinking.

To realize this approach, we position individual supervision by faculty members and discussions within the laboratory as complementary forms of guidance. While one-on-one meetings are effective for advancing research in concrete ways, they are not sufficient on their own for fostering growth as independent professionals and members of society. Therefore, we place at the core of our research guidance **interaction, discussion, and co-creation among laboratory members**. To support this, students are expected to listen attentively to others' research, strive to understand it, think about how it can be improved, and engage in questioning and discussion. Through continuous dialogue with diverse others, we aim to cultivate students' ability to think independently—without relying on a single viewpoint—and to further develop their research on their own initiative.

- **Collaborative Learning through Regular Seminars**
  In weekly seminars, one student reports on their research progress and another intensively reviews research papers, followed by discussions involving all members. By sharing and discussing research with different topics and methodologies, students develop multifaceted perspectives, the ability to think deeply, and the ability to view research from a broader perspective.
- **Deepening Research through Discussion and Development of Research Skills**
  By engaging with research topics, methodologies, perspectives, and opinions different from their own, students not only consider how to incorporate these elements into their own work, but also jointly explore how each study can be further improved, thereby fostering the ability to advance research through discussion.
- **Individualized Support through One-on-One Meetings**
  Individual meetings are held as needed to discuss research progress, as well as to talk in depth about career paths and job searching.
- **Emphasis on External Dissemination of Research**
  We value experiences in which research results are presented externally and critically evaluated by researchers outside the laboratory. Master's students are expected, as a goal, to give at least one presentation at an academic conference during their program.

4. 研究室活動の内容及び方法 / Content and Methods of Laboratory Activities

Based on the guiding principle of "growth through research," this laboratory provides the following activities to support students in taking initiative in their research and enhancing their thinking and research abilities through discussion and collaboration.

□ **Daily Activities:**

- **Individual Research and Meetings**
  Students conduct daily research based on their individual research themes and hold individual meetings with faculty members as needed. These activities support not only the

examination of research content, but also discussions on research strategies, problem setting, and career development, fostering a proactive approach to research and continuous growth.

□ **Weekly Activities**

- **Lab Meeting for Research Sharing (Early in the Week)**
  At the beginning of the week (usually Monday, or Tuesday if Monday is a holiday), all members gather for a meeting in which approximately half of the members, on a rotating basis, report on their research activities over the previous two weeks. By sharing research progress and challenges, this meeting promotes mutual understanding and helps students develop the ability to plan and manage their research effectively.
- **Seminar for Research Progress Report & Literature Review (Later in the Week)**
  Later in the week (usually Thursday or Friday), a seminar is held in which students report on their research progress and present literature reviews. Each student typically serves as a presenter about once every month, while all members participate every week as contributors to the discussion.

  Presenters are expected to advance their research as much as possible and to prepare their presentations so that their research can be clearly understood by others. These presentations serve as a driving force for advancing research, and through this process students develop the ability to organize and integrate their research and to communicate it effectively.

  For audience members, the seminar is an opportunity to understand others' research and to think about how it can be improved through questions and discussion. By listening attentively to presentations and striving to understand the background, objectives, methods, and significance of the research, students cultivate critical reading skills and a comprehensive perspective. Through offering constructive questions and comments, they also learn to apply these perspectives to their own research and to deepen it through critical reflection.

□ **Monthly Activities**

- **Social and Community-Building Activities**
  Approximately once a month, social gatherings such as post-examination celebrations, welcome and farewell parties, and birthday gatherings are held. By building relationships in a relaxed atmosphere, these activities help activate everyday discussions and foster a supportive research environment with a strong sense of psychological safety.

□ **Occasional Activities**

- **Laboratory Retreats**
  Laboratory retreats are held in summer and winter to deepen relationships among members and to engage in intensive discussions on the research plans of new members and the ongoing work of members approaching thesis evaluation. In an environment different from daily activities, members engage in concentrated discussions and shared activities—including meals and recreational activities—thereby deepening mutual understanding and trust. Through these experiences, students revisit their research from a broader perspective and aim to further deepen their individual studies.
- **Conference Presentations**
  We emphasize opportunities to disseminate research results externally and to receive critical feedback from researchers outside the laboratory. Master's students are expected, as a goal, to present their research at least once at an academic conference during their enrollment, thereby developing skills in organizing research outcomes and communicating them to external audiences.

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)

First Year

- July: Introduction of own preferred research theme
- August: Discussion of research motivations and ambitions at the summer retreat
- September-November: Survey and in-depth exploration of research themes
- December: Intensive discussion of research proposals (RP) at the winter retreat
- January–February: Further development of research methods, conducting preliminary studies, and refinement of RP
- March: Completion of RP

Second Year

- April–July: Conducting pilot experiments, research progress, and conference presentations
- August: Summer retreat
- September–November: Continued research progress
- December: Intensive discussion of master's thesis outlines at the winter retreat
- December–January: Writing and completion of the master's thesis
- February–March: Conference presentations