

- 1. フロンティア精神 Frontier Spirit **DP1 DP3**
- 2. 国際性の涵養 Global Perspectives **DP4 DP7 DP8**
- 3. 全人教育 All-round Education **DP2 DP3 DP5**
- 4. 実学の重視 Practical Learning **DP6 DP9**

【知識と教養】【Knowledge and education】

DP1 最先端科学および技術に関する高度な専門知識を身につけている。
Students have acquired a high level of expertise in cutting-edge science and technology.

DP2 俯瞰的に学問体系をとらえる能力を示すことができる。
Students are capable of viewing academic disciplines comprehensively with a broad perspective.

【研究力】【Research capabilities】

DP3 問題発見力、技術力、洞察力、情報収集・分析能力、問題解決力、コミュニケーション能力を身につけ、高い研究遂行能力を示すことができる。
Students have acquired the ability to identify problems, technical skills, insight, information gathering and analysis abilities, problem-solving ability and communication skills, and display a high ability to carry out research.

DP4 語学力、コミュニケーション能力、論文作成能力、プレゼンテーション能力を身につけ、成果を有効に国際的に発信することができる。
Students have acquired language, communication and academic writing/presentation skills, and are able to convey research achievements effectively in the international arena.

DP5 学際・境界領域で独創的かつ総合的な研究・開発を行うことのできるリーダーシップを示すことができる。
Students exhibit the leadership qualities necessary to conduct creative and comprehensive research and development in interdisciplinary/boundary areas.

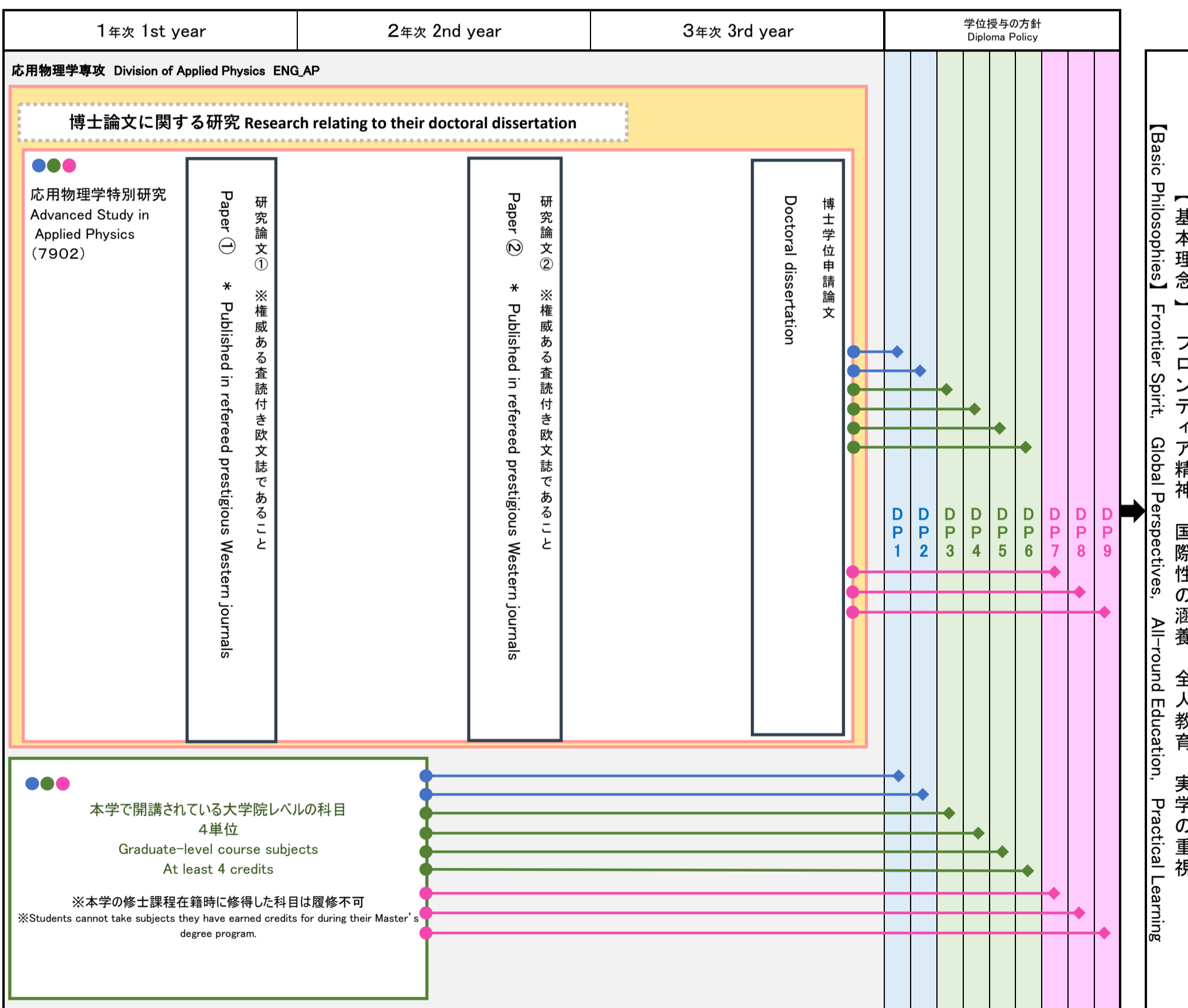
DP6 科学・技術的実践の場における安全知識とリスク回避能力を身につけている。
Students have acquired the knowledge necessary for safety management and the ability to avoid risks in the practice of science and technology.

【社会性、国際性、コミュニケーション力】【Social skills, global perspective and communication skills】

DP7 自国および他国の文化や価値観に対する知識を持ち理解している。
Students have a knowledge and understanding of their own culture and values, as well as those of other countries.

DP8 国際社会に対応できる教養、対話力と語学力を身につけている。
Students are sophisticated and have acquired the communication and language skills necessary to thrive in the international community.

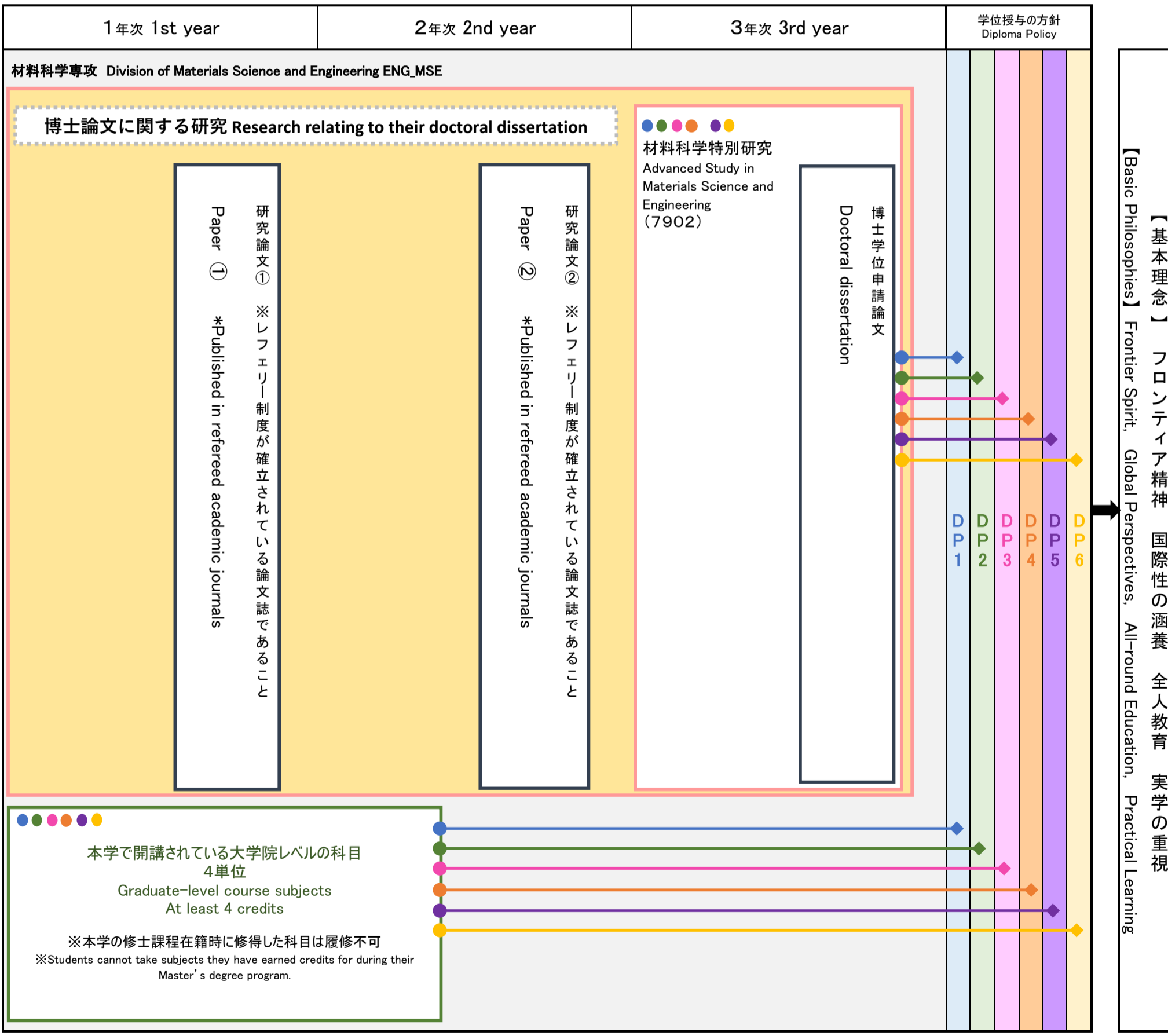
DP9 科学技術と社会との関係に関する倫理感と判断能力を身につけている。
Students have acquired a strong sense of ethics and the ability to make sound judgments regarding relationships between science/technology and society.



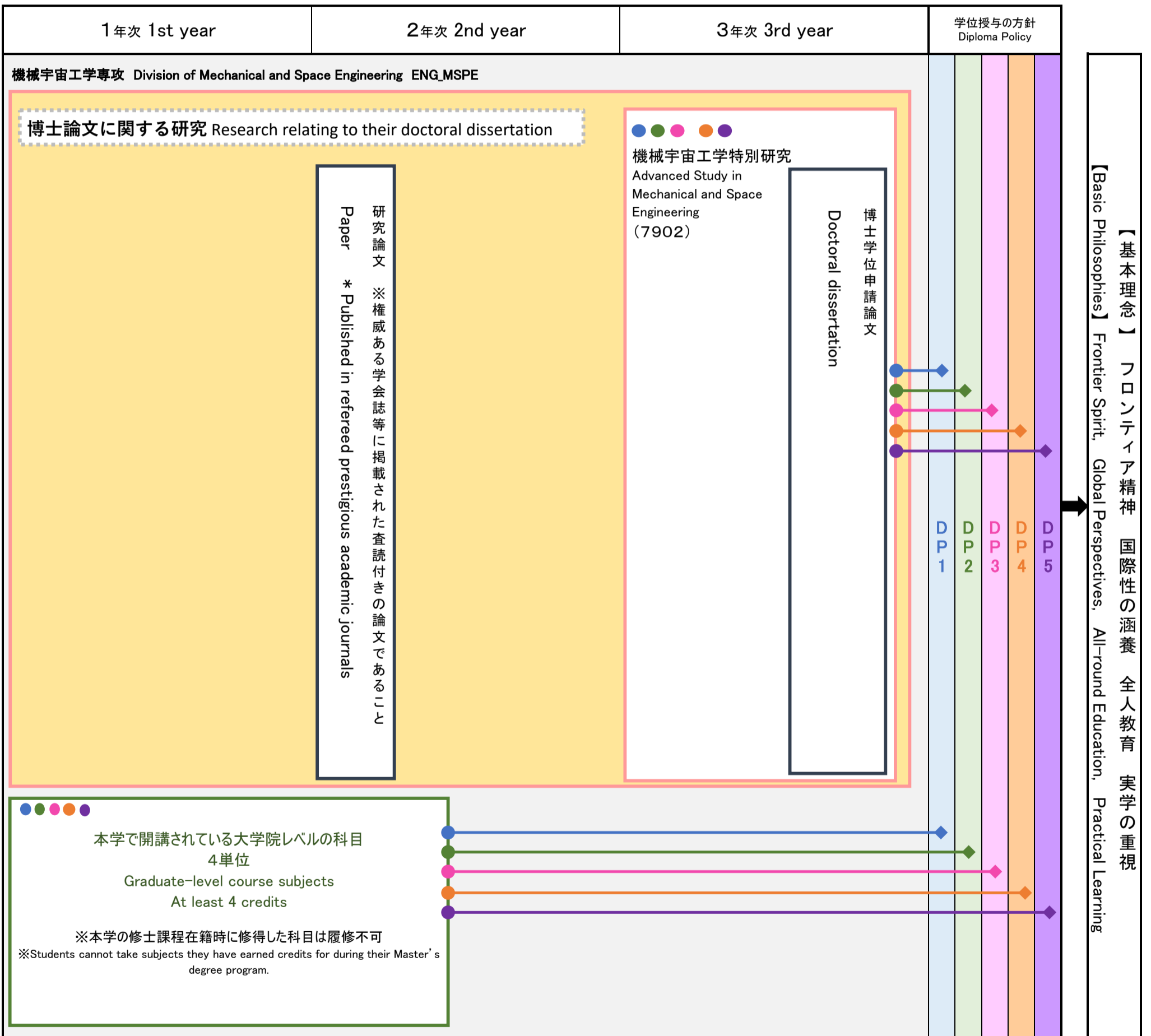
工学院材料科学専攻 博士課程 カリキュラム・マップ Doctoral Course Curriculum Map of Division of Materials Science and Engineering, Graduate School of Engineering

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| 1. フロンティア精神 DP1 DP2 DP3 DP5 Frontier Spirit | 2. 国際性の涵養 DP2 DP4 DP5 DP6 Global Perspectives | 3. 全人教育 DP1 DP2 All-round Education | 4. 実学の重視 DP1 DP2 DP3 Practical Learning |
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- DP1 先端分野の開拓に必要な幅広く高度な科学・工学に関する知識とそれを生かす応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge fields.
- DP2 先進的な材料科学研究開発に必要な国際的研究動向の情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for advanced research and development in materials science.
- DP3 問題解決のために必要な深い洞察力と柔軟な発想力及び高度かつ緻密な研究能力
Students have acquired the profound insight, inventive thinking and ability to conduct precisely thought-out, high-level research required for solving problems.
- DP4 複数で研究開発を行うために必要な協調性とコミュニケーション力
Students have acquired the teamwork and communication skills required to work together with other researchers in research and development.
- DP5 研究者として自立的に活躍するのに必要な独創性と研究遂行能力及びリーダーシップ
Students have acquired creativity, the ability to carry out research and the leadership qualities required to work independently as a researcher.
- DP6 研究開発の成果を発信するのに必要なプレゼンテーション力及び論理的な文章作成力
Students have acquired the presentation and logical writing skills required to effectively convey the achievements they make in their research and development activities.

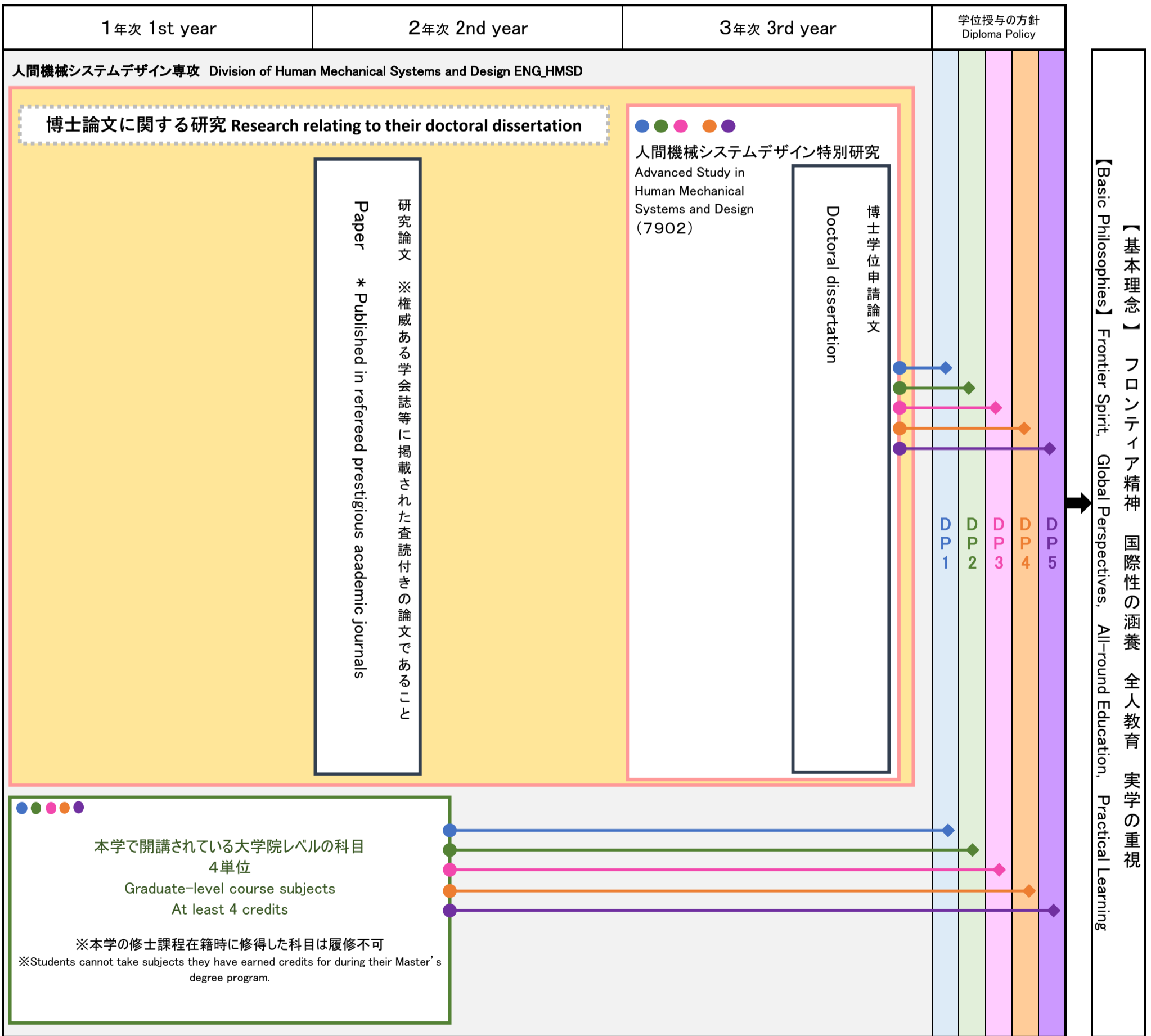


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| 1. フロンティア精神 Frontier Spirit : DP1 DP3 DP4 | 2. 国際性の涵養 Global Perspectives : DP2 | 3. 全人教育 All-round Education : DP2 DP4 | 4. 実学の重視 Practical Learning : DP1 DP3 DP5 |
| <p>● DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力 Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.</p> | | | |
| <p>● DP2 機械宇宙工学の研究開発に必要な国際的研究動向に関する情報収集力と分析力 Students have acquired the ability to gather and analyze information on international research trends as required for research and development in mechanical and space engineering.</p> | | | |
| <p>● DP3 自立した研究者に必要な独自の研究課題を発見する力、困難な問題解決を可能とする洞察力と柔軟な発想力 Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.</p> | | | |
| <p>● DP4 国際的に活躍できる技術者・研究者に必要な高度の研究能力 Students have acquired the high-level research skills required to become world-class engineers and researchers.</p> | | | |
| <p>● DP5 機械宇宙工学の研究開発に必要なプロジェクト遂行能力とリーダーシップ Students have acquired the ability to implement projects and the leadership qualities necessary for research and development in mechanical and space engineering.</p> | | | |



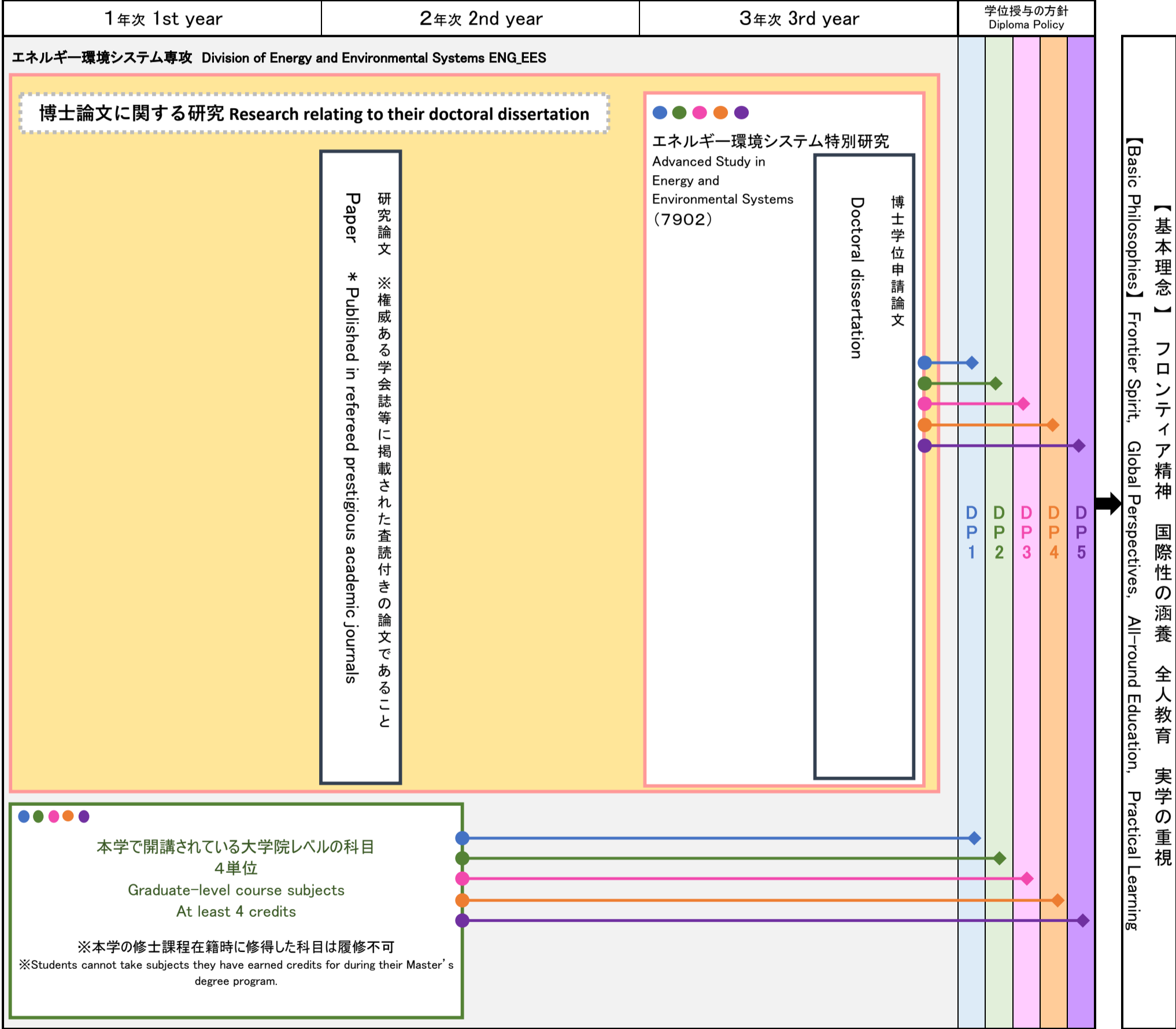
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| 1. フロンティア精神 Frontier Spirit DP1 DP3 | 2. 国際性の涵養 Global Perspectives DP2 DP4 | 3. 全人教育 All-round Education DP3 DP5 | 4. 実学の重視 Practical Learning DP1 DP3 DP5 |
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- DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- DP2 人間機械システムの研究開発に必要な国際的研究動向に関する情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for the research and development of man-machine systems.
- DP3 自立した研究者に必要なとなる独創的な研究課題を発見する力、困難な問題解決を可能とする洞察力と柔軟な発想力
Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.
- DP4 国際的に活躍できる技術者・研究者に必要な高度の研究能力
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- DP5 人間機械システムの研究開発に必要なプロジェクト遂行能力とリーダーシップ
Students have acquired the ability to implement projects and the leadership qualities necessary for the research and development of man-machine systems.



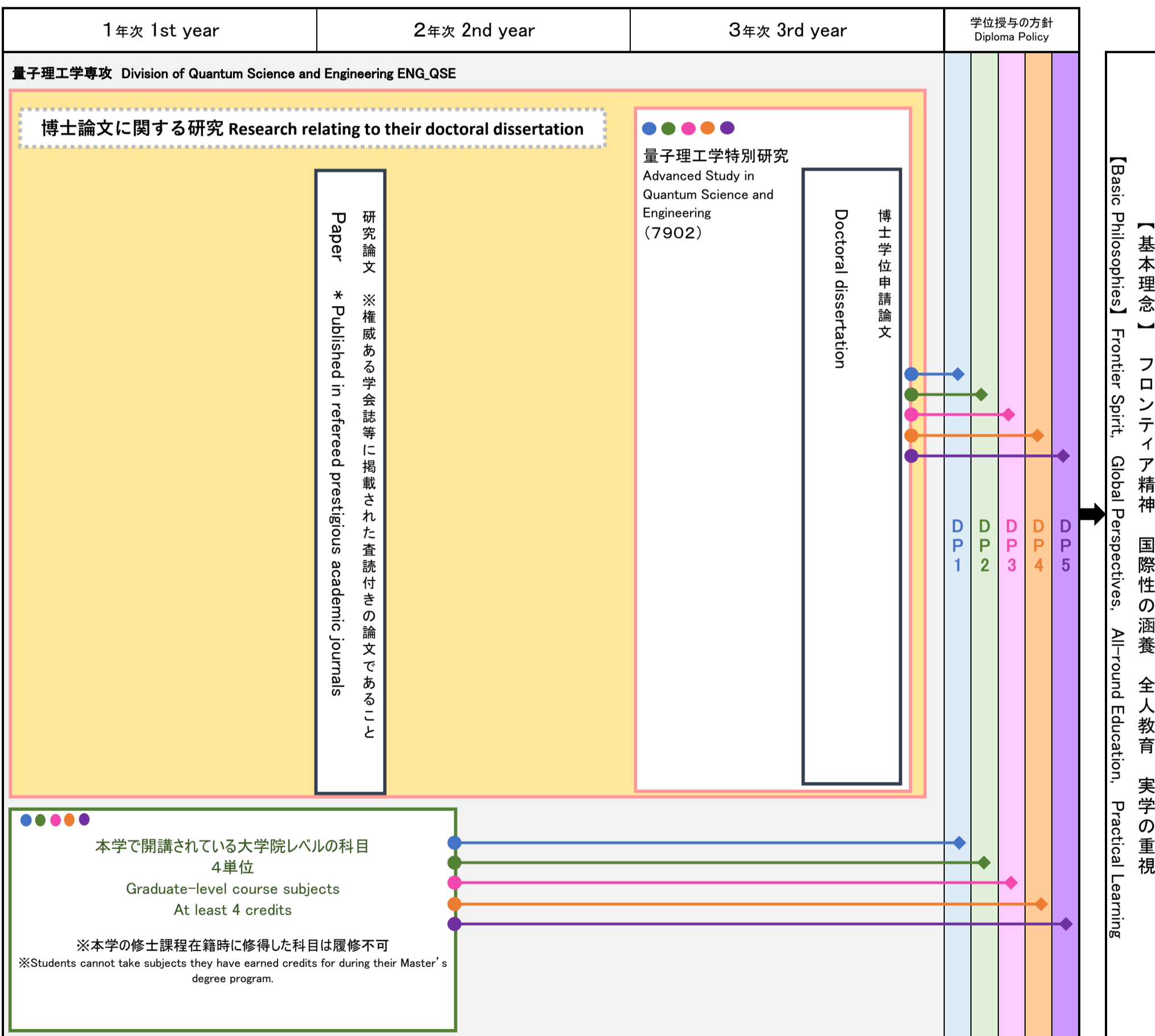
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| 1. フロンティア精神 Frontier Spirit DP1 DP3 | 2. 国際性の涵養 Global Perspectives DP2 DP4 | 3. 全人教育 All-round Education DP2 DP4 DP5 | 4. 実学の重視 Practical Learning DP1 DP3 DP5 |
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- **DP1** 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- **DP2** エネルギー環境システムの研究開発に必要な国際的研究動向に関する情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for the research and development of energy and environmental systems.
- **DP3** 自立した研究者に必要なとなる独創的な研究課題を発見する力、困難な問題の解決を可能とする洞察力と柔軟な発想力
Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.
- **DP4** 国際的に活躍できる技術者・研究者に必要な高度な研究能力
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- **DP5** エネルギー環境システムの研究開発に必要なプロジェクト遂行能力とリーダーシップ
Students have acquired the ability to implement projects and the leadership qualities necessary for the research and development of energy and environmental systems.



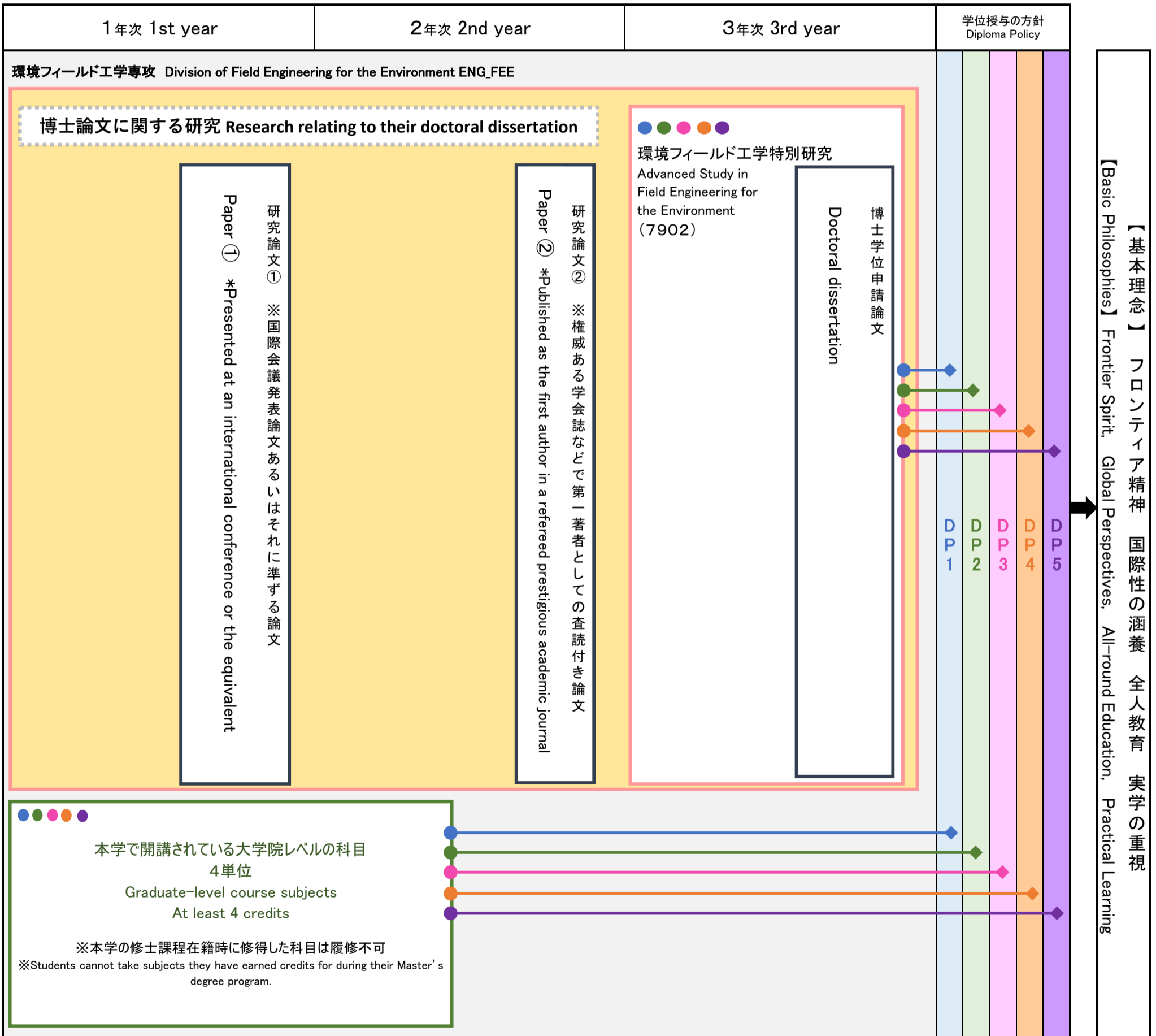
- 1. フロンティア精神 Frontier Spirit DP1 DP3 DP4
- 2. 国際性の涵養 Global Perspectives DP2 DP5
- 3. 全人教育 All-round Education DP2 DP4
- 4. 実学の重視 Practical Learning DP3 DP5

- DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- DP2 量子理工学の研究開発に必要な国際的研究動向に関する情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for research and development in quantum science and engineering.
- DP3 自立した研究者に必要なとなる独創的な研究課題を発見する力、困難な問題解決を可能とする洞察力と柔軟な発想力
Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.
- DP4 国際的に活躍できる技術者・研究者に必要な高度の研究能力
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- DP5 量子理工学の研究開発に必要なプロジェクト遂行能力とリーダーシップ
Students have acquired the ability to implement projects and the leadership qualities necessary for research and development in quantum science and engineering.



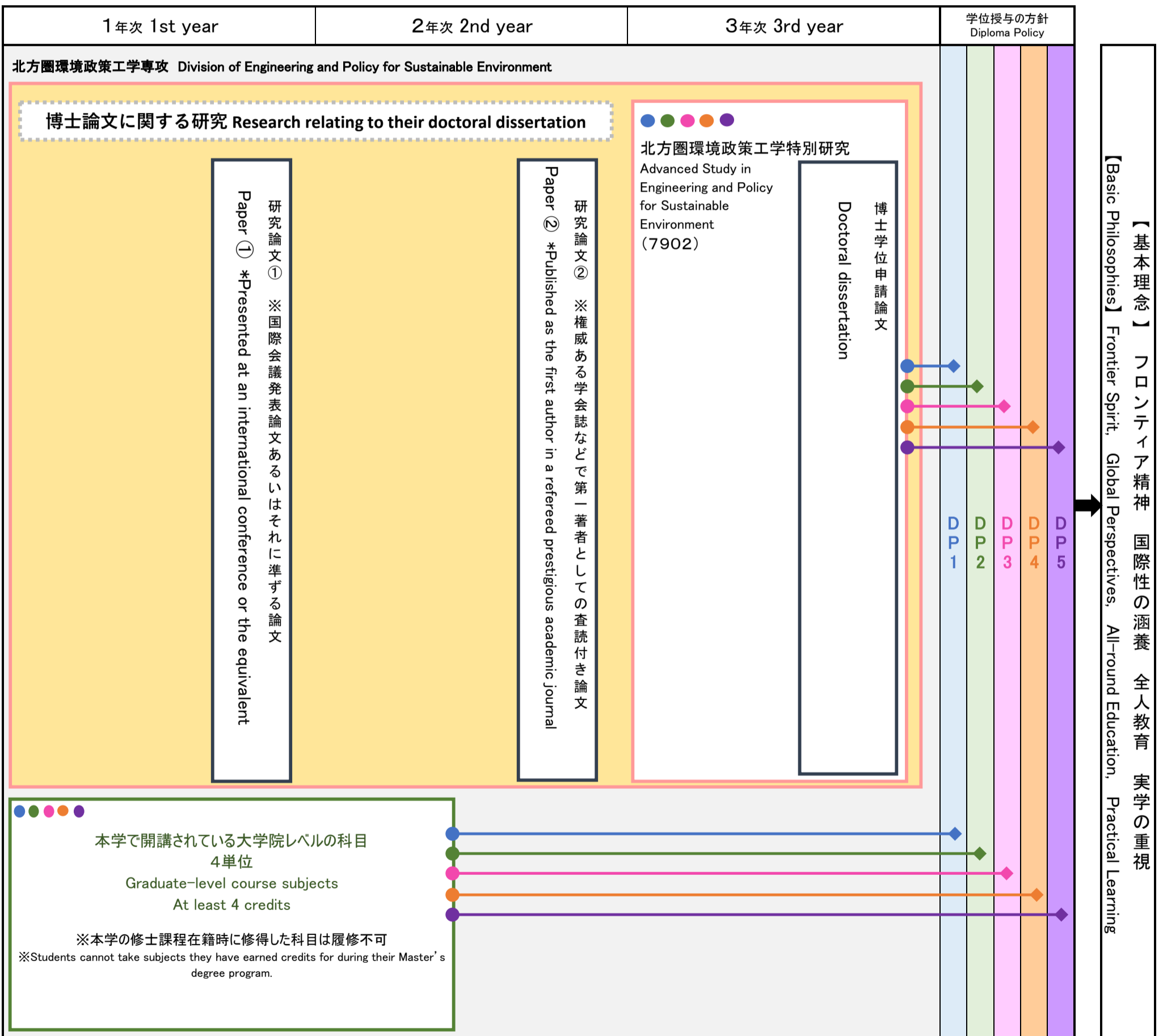
- 1. フロンティア精神 Frontier Spirit DP4 DP5
- 2. 国際性の涵養 Global Perspectives DP2 DP4
- 3. 全人教育 All-round Education DP1 DP2 DP3
- 4. 実学の重視 Practical Learning DP1 DP2

- DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- DP2 環境フィールド工学の研究開発に必要な国際的研究動向に関する情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for research and development in environmental field engineering.
- DP3 自立した研究者に必要なとなる独創的な研究課題を発見する力、困難な問題を解決可能とする洞察力和柔軟な発想力
Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.
- DP4 国際的に活躍できる技術者・研究者に必要な高度の研究能力
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- DP5 環境フィールド工学の研究開発に必要なプロジェクト遂行能力とリーダーシップ
Students have acquired the ability to implement projects and the leadership qualities necessary for research and development in environmental field engineering.



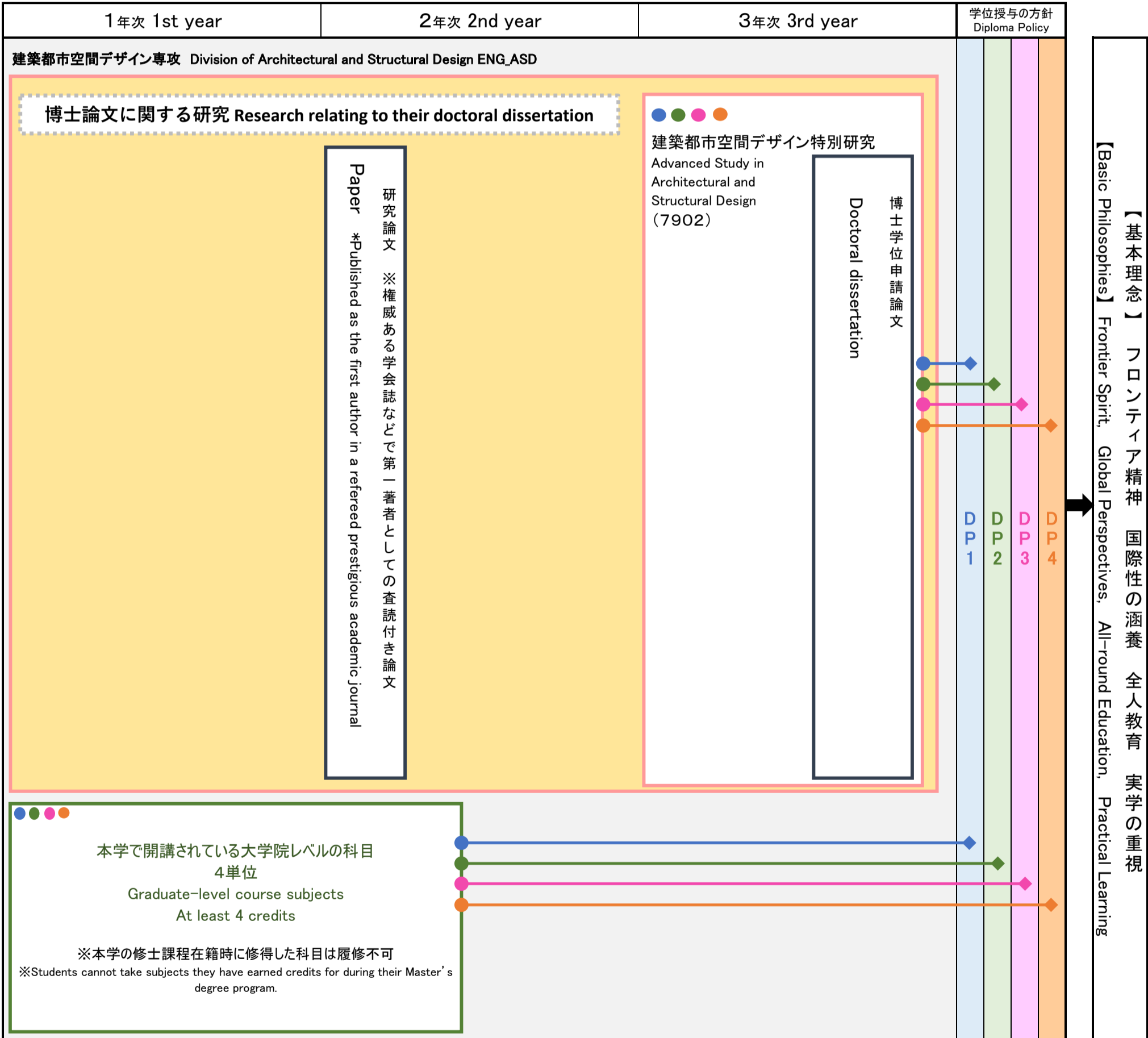
- 1. フロンティア精神 Frontier Spirit DP4 DP5
- 2. 国際性の涵養 Global Perspectives DP2 DP4
- 3. 全人教育 All-round Education DP1 DP2 DP3
- 4. 実学の重視 Practical Learning DP1 DP2

- DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における知識とその知識を活かした応用力
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- DP2 北方圏環境政策工学の研究開発に必要な国際的研究動向に関する情報収集力と分析力
Students have acquired the ability to gather and analyze information on international research trends as required for research and development in the field of engineering and policy for sustainable environment in northern regions.
- DP3 自立した研究者に必要な独自の研究課題を発見する力、困難な問題を解決可能とする洞察力と柔軟な発想力
Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher.
- DP4 国際的に活躍できる技術者・研究者に必要な高度の研究能力
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- DP5 北方圏環境政策工学の研究開発に必要なプロジェクト遂行能力とリーダーシップ
Students have acquired the ability to implement projects and the leadership qualities necessary for research and development in the field of engineering and policy for sustainable environment in northern regions.

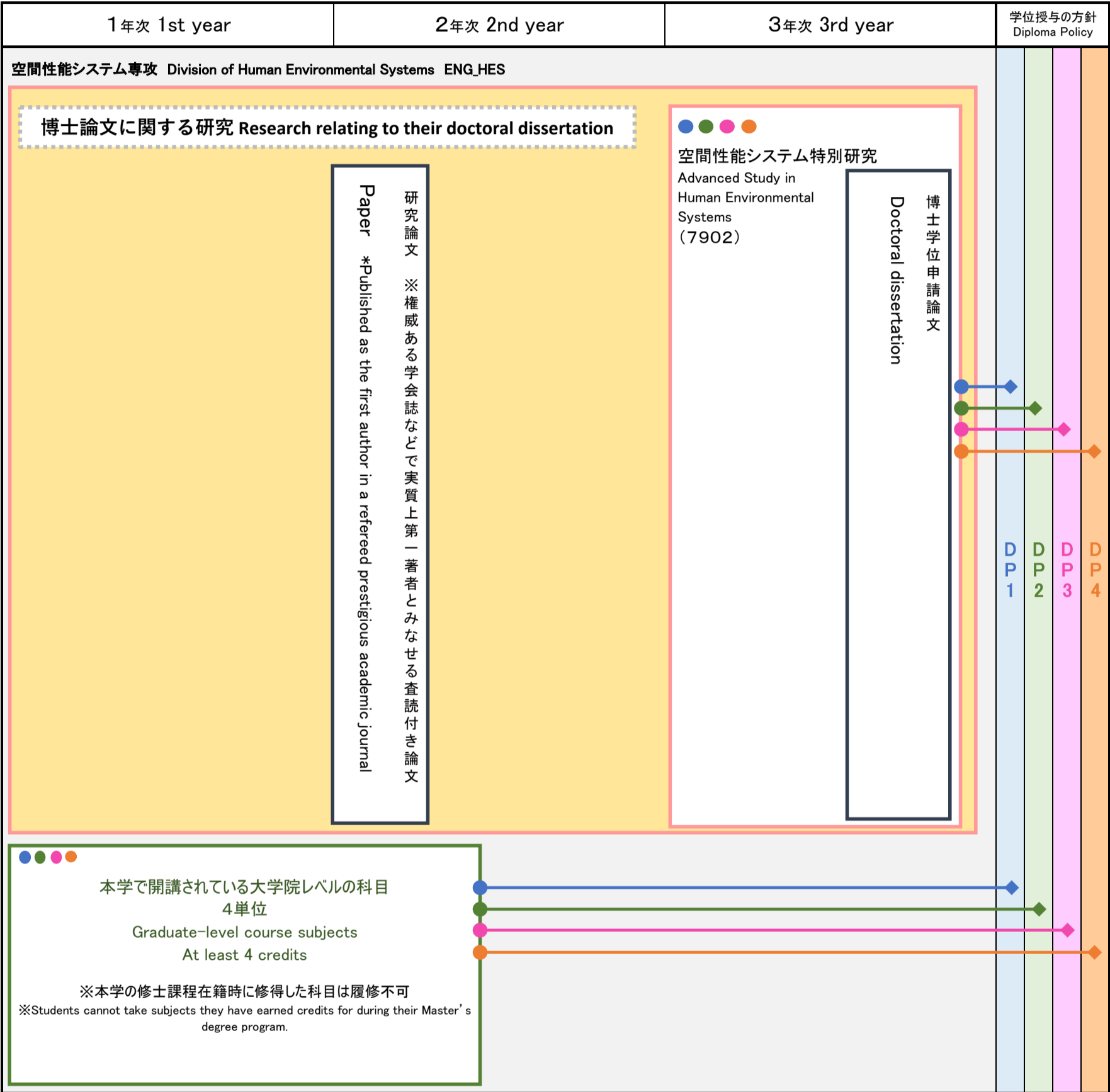


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| 1. フロンティア精神 Frontier Spirit DP1 DP4 | 2. 国際性の涵養 Global Perspectives DP2 DP3 | 3. 全人教育 All-round Education DP2 DP4 | 4. 実学の重視 Practical Learning DP1 DP2 DP4 |
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- DP1** 先端的分野を開拓するために求められる幅広い高度な科学・工学における専門知識を有し、その知識を応用できる。
Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields.
- DP2** 自立した研究者に必要とされる独創的な研究課題を発見する力、困難な問題を解決に導ける洞察力と柔軟な発想力を有する。
Students have acquired the high-level research skills required to become world-class engineers and researchers.
- DP3** 研究者として国際的に活躍できるコミュニケーションスキルと高度な研究推進能力を有する。
Students have acquired the communication skills and high-level capabilities needed to implement research projects and play active roles on the international stage as researchers.
- DP4** 強力なリーダーシップを発揮して研究開発プロジェクトを推進できる。
Students are equipped with the strong leadership qualities needed to implement research and development projects.

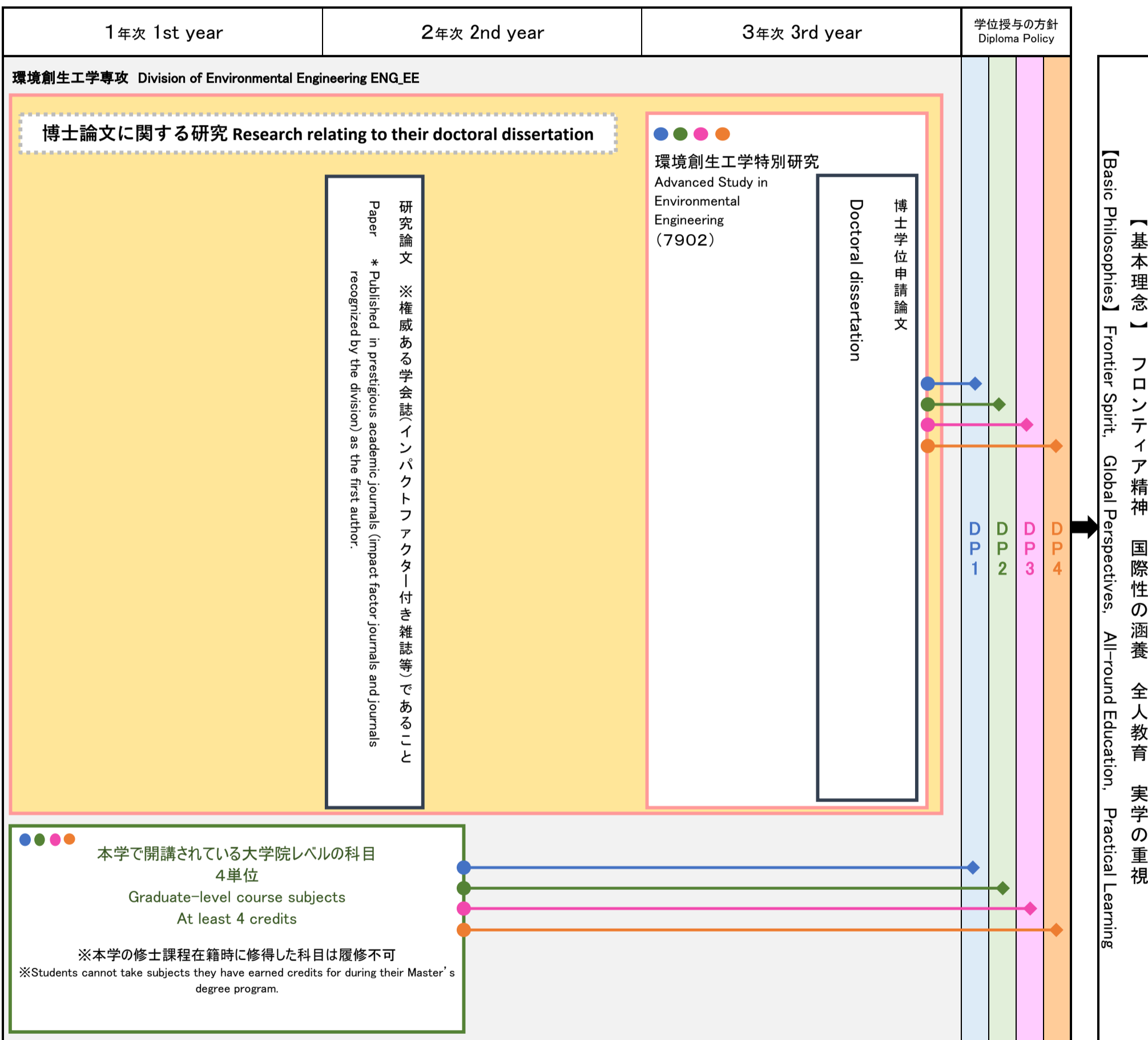


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| 1. フロンティア精神 Frontier Spirit DP1 DP2 DP4 | 2. 国際性の涵養 Global Perspectives DP3 | 3. 全人教育 All-round Education DP1 DP2 DP3 DP4 | 4. 実学の重視 Practical Learning DP1 DP4 |
| ● DP1 先端的分野を開拓するために求められる幅広く高度な科学・工学における専門知識を有し、その知識を応用できる能力を有する Students have developed an extensive and advanced knowledge of science and engineering and the skills required to put this knowledge into practice for the development of cutting-edge research fields. | ● DP2 自立した研究者に必要とされる独創的な研究課題を発見する力、困難な問題を解決に導ける洞察力和柔軟な発想力を有する Students have acquired the ability to discover original research themes and the insight and inventive thinking necessary to approach challenging issues as a self-organized researcher. | ● DP3 研究者として国際的に活躍できるコミュニケーションスキルと高度な研究推進能力を有する Students have acquired the communication skills and high-level capabilities necessary to implement research projects as a researcher and play active roles on the international stage. | ● DP4 強力なリーダーシップを発揮して研究開発プロジェクトを推進できる能力を有する Students are equipped with the strong leadership qualities needed to implement research and development projects. |



【基本理念】 フロンティア精神 国際性の涵養 全人教育 実学の重視
 【Basic Philosophies】 Frontier Spirit, Global Perspectives, All-round Education, Practical Learning

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| 1. フロンティア精神 Frontier Spirit DP2 | 2. 国際性の涵養 Global Perspectives DP3 | 3. 全人教育 All-round Education DP1 | 4. 実学の重視 Practical Learning DP4 |
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- DP1** 幅広く高度な知識に基づいて知を俯瞰し総合的な観点から捉える力
Students have developed the ability to overview a body of knowledge based on extensive and advanced knowledge and understand it from an all-around perspective.
 - DP2** 独創的な課題を見出し、知の開拓に挑戦する力
Students have acquired the ability to discover original research themes and take on the challenge of developing knowledge frontiers.
 - DP3** 世界の学術コミュニティで活躍できる力
Students have acquired the ability to play active roles in the international academic community.
 - DP4** プロジェクトを遂行しリーダーシップをとる力
Students have developed the ability to take on leadership roles and implement projects.



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| 1. フロンティア精神 Frontier Spirit DP1 DP2 DP3 | 2. 国際性の涵養 Global Perspectives DP1 DP5 | 3. 全人教育 All-round Education DP2 DP4 DP5 | 4. 実学の重視 Practical Learning DP3 DP4 |
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- DP1** 世界規模の研究開発動向を迅速かつ的確に把握するための高い情報収集能力と分析力
Students have been equipped with high-level information gathering and analyzing capabilities necessary to be immediately and accurately updated with international trends in research and development.
- DP2** 独創的な研究開発課題を見出すための柔軟な発想力と鋭い洞察力
Students have acquired inventive thinking and keen insight to discover original themes for their research and development activities.
- DP3** 工学に関する高度で広範囲な専門知識とそれを応用した研究開発への展開力
Students have acquired extensive and advanced professional knowledge in engineering and the ability to apply this knowledge to research and development.
- DP4** 資源循環システム分野の技術者・研究者に必要な研究開発に関する遂行能力と自己管理能力
Students have developed the ability to implement research and development projects and the self-management skills necessary for engineers and researchers in the field of resource recycling systems.
- DP5** 国際的に活躍する技術者・研究者に必要な高い倫理観と倫理的諸問題への対応能力
Students have acquired a strong sense of ethics and the ability to deal with ethical issues as required for world-class engineers and researchers.

