VIETNAM NATIONAL UNIVERSITY, HANOI

**VIETNAM - JAPAN UNIVERSITY**

# MASTER'S PROGRAM

## MAJOR: CIVIL ENGINEERING

## ORIENTATION: RESEARCH

**Hanoi - 2023**

VIETNAM NATIONAL UNIVERSITY, HANOI

**VIETNAM - JAPAN UNIVERSITY**

# MASTER'S PROGRAM

## MAJOR: CIVIL ENGINEERING

## ORIENTATION: RESEARCH

## (After editing)

The Master's program in Civil Engineering (after editing) was promulgated under Decision No……/QD-DHVN, dated …..month…. 2021 by Rector of Vietnam - Japan University.

CONFIRMATION OF VIETNAM JAPAN UNIVERSITY

*Hanoi, day month 2023*

**Rector of Vietnam Japan University**

**Furuta Motoo**

VIETNAM NATIONAL UNIVERSITY
**VIETNAM - JAPAN UNIVERSITY**

**SOCIALIST REPUBLIC OF VIETNAM**
**Independence - Freedom - Happiness**

# MASTER'S PROGRAM

MAJOR: CIVIL ENGINEERING

ORIENTATION: RESEARCH

(After editing)

## PART I: GENERAL INTRODUCTION OF THE TRAINING PROGRAM

### 1. Some information about the training program

- The Master's program in Civil Engineering is an interdisciplinary training major between the group of Engineering Mechanics, Construction – Transportation and the group of Construction Management, Architecture and Planning.

- Name of training major:

  + In Vietnamese: Kỹ thuật xây dựng

  + In English Civil Engineering

- Code of training major: 8900201.04QTD

- Training level: Master

- Training duration: 2 years

- Language of training: The program is taught in English, except for the Philosophy subject which is taught in Vietnamese. The graduation thesis is written and defended in English.

- Name of graduation degree:

  + In Vietnamese: Thạc sĩ Kỹ thuật Xây dựng

  + In English: The Degree of Master in Civil Engineering

- Training institution: Civil Engineering Program Vietnam Japan University, Vietnam National University, Hanoi (VNU)

**2.** Objectives of the training program

***2.1.*** General objectives

The Master's program in Civil Engineering of Vietnam Japan University is an international standard program, attracting domestic and foreign students. The objective of the program is to equip students with knowledge of engineering, design, construction, planning, operation and management, repair - maintenance of social infrastructure and modern transportation systems.

Graduates meet the needs of high-quality human resources working in civil engineering construction corporations and enterprises at home and abroad; Working in planning, construction management, in ministries and companies; Doing scientific research and teaching at research institutes, universities and studying for a doctorate at universities at home and abroad.

The program is developed based on the Civil Engineering training program of the University of Tokyo. The program aims to transfer training technology of the University of Tokyo, the training quality is equivalent to that of Japanese universities, and at the same time, forming and improving the capacity of lecturers and experts of Vietnam Japan university as well as forming a number of research projects, science and technology transfer projects and international publications.

***2.2.*** **Specific objectives**

The program provides students with the following knowledge and skills:

***Knowledge***

- The program provides students with basic and advanced knowledge of Civil Engineering such as structural analysis, design, and construction of civil works.
- The program provides advanced knowledge of regional and urban planning, construction management, design, operation, repair - maintenance and quality assessment of civil works;

- The program provides a solid basis of advanced materials, on which students can research and apply new technologies and materials to construction works.

***Skills***

- Equip students with the ability to apply specialized knowledge to social practice, initially forming creative capacity, research ability, and professional capacity development in the field of Civil Engineering. The ability to consider and solve problems in a comprehensive way, associated with the regional studies, factors of culture, geography and sustainable development.

***Moral qualities***

- Students are trained to comply with the provisions of the law, have political qualities, professional, serious, dedicated manner, well fulfill assigned functions and duties.

**3. Admission information**

- According to the regulations on graduate admission of VNU and according to the graduate admission project approved by VNU annually.

## PART II: EXPECTED LEARNING OUTCOMES OF TRAINING PROGRAM

### 1: Knowledge

PLO1: Apply general knowledge of the law, management, environmental protection, and sustainable development in solving problems in the Civil engineering field and social issues;

PLO2: Apply the scientific research methodology in the major of Civil Engineering;

PLO3: Apply the basic knowledge of civil engineering to analyze, calculate, design, and maintain civil engineering projects toward the sustainable development;

PLO4: Calculate and design civil engineering structures (e.g., bridges, roads, high-rise buildings, and underground works) using professional knowledge learned;

PLO5: Participate in urban planning, management, exploitation, and maintenance of civil engineering structures toward the stable and sustainable development.

**2. Skills**

PLO6: Make and implement proposals of scientific projects, course projects; and organize construction work, supervision, and management of construction projects;

PLO7: Creatively apply the scientific and technological advances in the major for solving some specific problems in Civil engineering;

PLO8: Propose optimal technical solutions in the design and management of construction projects;

PLO9: Demonstrate skills in writing reports, presentations, negotiations, and discussions in the field of civil engineering;

PLO10: Demonstrate team working skills;

PLO11: Achieve a minimum English level of 4/6 (following the 6-level English skills applied in Vietnam).

**3. Ethics & Attitude**

PLO12: Be aware of civic responsibility; be responsible to the social community; understand and comply with the policies and laws of the Communist Party and Vietnamese government;

PLO13: Demonstrate decent attitude, decent professional ethics, and professional working style;

PLO14: Be honest and objective with scientific results.

**4. Job position after graduation**

- Technical engineers, construction engineers, project supervisors and project managers in domestic and foreign organizations/ enterprises in the field of civil engineering;
- Managers in state agencies in the field of construction engineering such as agencies under the Ministry of Construction, agencies under the Ministry of Transport, Project Management Boards, Departments of Construction,

Departments of Construction Transport in provinces and cities throughout the country;

- Experts in consulting, supervising, inspecting and examining civil engineering projects; experts in establishing investment projects; experts in planning, designing, constructing, managing and exploring the construction facilities;
- Researchers, lecturers in the field of civil engineering in domestic or international organizations.

## 5. Ability to study and improve after graduation

Be able to continue studying to the doctoral level at domestic training institutions as well as Japanese and international universities in the field of civil engineering such as: construction structure; new materials in construction; construction geotechnics; regional and urban transportation planning; industrial & civil construction engineering and technology; construction engineering and technology of public transportation works; construction engineering and technology of coastal works; management of exploitation and maintenance of construction works; project management, risk forecasting and disaster prevention in construction and exploitation of civil works.

## 6. Reference programs and documents used to develop training program

- Ministry of Education and Training: Consolidated document 15/VBHH-BQDDT dated May 8, 2014 of the Minister of Education and Training on promulgating the List of education and training level IV at college and university level;
- Ministry of Education and Training: Circular No. 07/2015/TT-BGDĐT dated April 16, 2015 of the Minister of Education and Training on promulgating Regulations on the minimum amount of knowledge and capacity requirements that learners can achieve after graduation for each training level of higher education and the process of developing, appraising and promulgating training programs at undergraduate, master's and doctoral levels;
- VNU: Regulation on Master's training at VNU, issued together with Decision No. 4668/QD-DHQGHN dated December 10, 2014 of the President of VNU.

- VNU: Regulations on new opening and adjustment of training programs at VNU issued together with Decision No. 1366/QD-DHQGHN dated April 25, 2012 of the President of VNU.
- Curriculum of the Master's program in Transport construction engineering - University of Transport and Communications.

Link: http://www.utc.edu.vn/khoa-cong-trinh

- Curriculum of the Master's program in Urban Infrastructure Engineering – University of Transport and Communications.

Link: http://www.utc.edu.vn/vien-ky-thuat-xay-dung

- Curriculum of the Master's program in Infrastructure Engineering – National University of Civil Engineering

Link: http://sdh.nuce.edu.vn/Default.aspx?N=24

- Curriculum of the Master's program in Infrastructure – University of Tokyo

Links: http://www.civil.tu-tokyo.ac.jp/curriculum/

- The program is designed with 22/27 subjects completely as in the civil training program of the University of Tokyo.

## PART III: CONTENTS OF THE TRAINING PROGRAM

### 1. Summary of training program requirements

| | |
|---|---|
| **Total number of credits:** | **64 credits** |
| **1. General Knowledge (compulsory):** | **8 credits** |
| **2. Fundamental and specialized knowledge:** | **29 credits** |
| ***2.1. Fundamental knowledge:*** | ***8 credits*** |
| ***2.2. Specialized knowledge:*** | ***21 credits*** |
| - *Compulsory course*: | *12 credits* |
| - *Elective course*: | *9 credits* |
| **3. Scientific research** | **27 credits** |
| ***3.1. Project or research topics*** | ***12 credits*** |
| ***3.2. Master thesis*** | ***15 credits*** |

**2. Program curriculum**

| No. | Subject code | Subject title | Number of credits | Number of credit hours | | | Prerequisite subject code |
|---|---|---|---|---|---|---|---|
| | | | | Theory | Practice | Self-study | |
| **I.** | **Common knowledge** | | **8** | | | | |
| 1. | PHI 5002 | Triết học (Philosophy) | 3 | 45 | 0 | 0 | |
| 2. | FLF1108 | Tiếng Anh B2 (English B2) | 5 | 40 | 35 | 0 | |
| **II** | **Basic and specialized knowledge** | | **29** | | | | |
| ***II.1.*** | ***Basic knowledge*** | | ***8*** | | | | |
| 3. | VJU6001 | Cơ sở Khoa học bền vững<br>*Basic Sustainability Science* | 3 | 40 | 5 | 0 | |
| 4. | VJU6002 | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững *Methodology and Informatics for Sustainable Science* | 3 | 40 | 5 | 0 | |
| 5. | VJU5004 | Tiếng Nhật<br>*Japanese Language* | 2 | 5 | 25 | 0 | |
| ***II.2*** | ***Specialized knowledge*** | | ***21*** | | | | |
| *Compulsory subjects* | | | ***12*** | | | | |
| 6. | MCE6001 | Kỹ thuật kết cấu nâng cao<br>*Advanced Structural Engineering* | 3 | 30 | 15 | 0 | |
| 7. | MCE6002 | Cơ học đất<br>*Principles Soil Mechanic* | 3 | 45 | 0 | 0 | |
| 8. | MCE6003 | Vật liệu tiên tiến trong xây dựng công trình<br>*Advanced Materials in Civil Engineering* | 3 | 45 | 0 | 0 | |
| 9. | MCE6018 | Quy hoạch và chính sách giao thông<br>*Transportation Planning and Policy* | 3 | 30 | 15 | 0 | |

| No. | Subject code | Subject title | Number of credits | Number of credit hours | | | Prerequisite subject code |
|---|---|---|---|---|---|---|---|
| | | | | Theory | Practice | Self-study | |
| *Elective subjects* | | | ***9*** | | | | |
| 10. | VJU5005 | Tiếng Nhật<br>*Japanese Language* | 4 | 10 | 50 | 0 | |
| 11. | MCE6004 | Quy hoạch đô thị, vùng và sử dụng đất<br>*Urban Planning & Land Use* | 2 | 25 | 5 | 0 | |
| 12. | MCE6006 | Quản lý dự án và tài chính<br>*Project Management and Finance* | 3 | 45 | 0 | 0 | |
| 13. | MCE6007 | Những vấn đề hiện đại trong kỹ thuật xây dựng<br>*Advanced topics in Civil Engineering* | 3 | 45 | 0 | 0 | |
| 14. | MCE6008 | Công nghệ tiên tiến trong xây dựng công trình<br>*Advanced technologies in Civil Engineering* | 3 | 30 | 15 | 0 | |
| 15. | MCE6009 | Kết cấu và kỹ thuật gió<br>*Wind Engineering and Structures* | 3 | 30 | 15 | 0 | |
| 16. | MCE6010 | Kỹ thuật nền móng<br>*Foundation Engineering* | 3 | 30 | 15 | 0 | MCE6002 |
| 17. | MCE6011 | Quản lý khai thác và bảo trì công trình cầu, đường ô tô<br>*Management and Maintenance of Bridges and Highways* | 3 | 45 | 0 | 0 | |
| 18. | MCE6012 | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng<br>*Inspection and Quality Evaluation of Civil Works* | 2 | 25 | 5 | 0 | |
| 19. | MCE6013 | Kỹ thuật bê tông nâng cao<br>*Advanced Concrete Engineering* | 3 | 30 | 15 | 0 | |
| 20. | MCE6014 | Phương pháp tính toán trong xây dựng công trình<br>*Computational Methods in Civil Engineering* | 3 | 40 | 5 | 0 | |

| No. | Subject code | Subject title | Number of credits | Number of credit hours | | | Prerequisite subject code |
|---|---|---|---|---|---|---|---|
| | | | | Theory | Practice | Self-study | |
| 21. | MCE6015 | Động lực học, điều khiển và quan trắc kết cấu<br>*Dynamics, Control and Monitoring of Structures* | 3 | 40 | 5 | 0 | |
| 22. | MCE6016 | Địa kỹ thuật nâng cao<br>*Advanced Geotechnical Engineering* | 3 | 35 | 10 | 0 | MCE6002 |
| 23. | MCE6017 | Nguyên lý và phương pháp đánh giá hoạt động<br>*Principle and Method of Performance Evaluation* | 3 | 35 | 10 | 0 | |
| 24. | MCE6019 | Quản lý rủi ro trong xây dựng công trình<br>*Risk Management in Civil Engineering* | 3 | 45 | 0 | 0 | |
| 25. | MCE6020 | Thiết kế cảnh quan và đô thị *Advanced Landscape and Civic Design* | 2 | 25 | 5 | 0 | |
| 26. | MCE6021 | Kỹ thuật bờ biển nâng cao *Advanced Coastal Engineering* | 2 | 25 | 5 | 0 | |
| 27. | MCE6022 | Phương pháp phân tích định tính và thực nghiệm<br>*Qualitative Analysis and Empirical Methods* | 3 | 45 | 0 | 0 | |
| 28. | MCE6023 | Kỹ thuật giao thông vận tải nâng cao<br>*Advanced Transportation Engineering* | 2 | 30 | 0 | 0 | |
| 29. | MCE6024 | Công trình nền-mặt đường-thiết kế và xây dựng<br>*Highway Roadbed and Pavement Construction – Design and Construction* | 3 | 40 | 5 | 0 | |
| 30. | MCE6025 | Công trình ngầm trong đô thị *Underground Civil Works in Urban Areas* | 2 | 25 | 5 | 0 | |
| 31. | MCE6026 | BIM in Civil Engineering | 3 | 15 | 30 | 0 | |
| **III.** | **Nghiên cứu khoa học/ Scientific Research** | | **27** | | | | |
| **3.1** | **Đồ án/Dự án/Chuyên đề nghiên cứu** | | **12** | | | | |

| No. | Subject code | Subject title | Number of credits | Number of credit hours | | | Prerequisite subject code |
|---|---|---|---|---|---|---|---|
| | | | | Theory | Practice | Self-study | |
| 32. | MCE6027 | Academic Research in Civil Engineering 1 | 4 | 25 | 15 | 20 | |
| 33. | MCE6028 | Academic Research in Civil Engineering 2 | 4 | 25 | 15 | 20 | |
| 34. | MCE6005 | Internship | 4 | 20 | 40 | 0 | |
| **3.2** | **Luận văn thạc sỹ/ Master thesis** | | **15** | | | | |
| 35. | MCE7001 | Luận văn thạc sỹ/ Master thesis | 15 | | | | |
| | | **Tổng cộng/ Total** | **64** | | | | |

## 3. Matrix of Epected learning putcome

| EXPECTED LEARNING OUTCOMES OF COURSES IN THE MCE PROGRAM (CLOs) | EXPECTED LEARNING OUTCOMES OF THE MCE PROGRAM (PLOS) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| 1. Philosophy | | 2 | | | | | | | | | | 2 | | |
| 2. Basic English | | | | | | | | | 2 | | 3 | | | |
| 3. Basic Sustainability Science | 2 | | | | | | | | | | | | | |
| 4. Methodology and Informatics for Sustainable Science | 2 | 3 | | | | | | | | | | | | |
| 5. Japanese Language (VJU5004) | | | | | | | | | 2 | | 2 | | | |
| 6. Advanced Structural Engineering | | | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 7. Principles Soil Mechanic | | | | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | 2 | 2 |
| 8. Advanced Materials in Civil Engineering | | 2 | 1 | | | | 3 | | 2 | 2 | | | 1 | |
| 9. Transportation Planning and Policy | 2 | 2 | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 10. Civil Engineering Internship | | | | | | | | | 3 | 3 | | 2 | 2 | |
| 11. Japanese Language (VJU5005) | | | | | | | | | 2 | | 2 | | | |
| 12. Urban Planning & Land Use | | | 2 | | 3 | | | 3 | | | | | | |
| 13. Project Management and Finance | 2 | 2 | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 14. Advanced Topics in Civil Engineering | | 2 | 3 | 3 | | | 2 | | 2 | 2 | | | | |

| EXPECTED LEARNING OUTCOMES OF COURSES IN THE MCE PROGRAM (CLOs) | EXPECTED LEARNING OUTCOMES OF THE MCE PROGRAM (PLOS) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| 15. Advanced technologies in Civil Engineering | | 3 | 1 | | | | | | 2 | 2 | | | | |
| 16. Wind Engineering and Structures | | | 3 | 3 | | | 3 | | | 1 | | | | |
| 17. Foundation Engineering | | | | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | 2 | 2 |
| 18. Management and Maintenance of Bridges and Highways | 3 | | 1 | | 2 | | | | | | | | 3 | 1 |
| 19. Inspection and Quality Evaluation of Civil Works | | 2 | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 20. Advanced Concrete Engineering | | | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 21. Computational Methods in Civil Engineering | | | 3 | 2 | | | | | | | | | | |
| 22. Dynamics, Control and Monitoring of Structures | | | 2 | 3 | 2 | | 2 | | | 2 | | | | |
| 23. Advanced Geotechnical Engineering | | | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 24. Principle and Method of Performance Evaluation | 3 | 3 | | | | | | | | 2 | | | 2 | |
| 25. Risk Management in Civil Engineering | 2 | | 3 | | 2 | | | | | 2 | | | 1 | |
| 26. Advanced Landscape and Civic Design | | | 3 | 3 | | | | | 2 | | | | | |
| 27. Advanced Coastal Engineering | | | 3 | 3 | | | | | | | | | | |

| EXPECTED LEARNING OUTCOMES OF COURSES IN THE MCE PROGRAM (CLOs) | EXPECTED LEARNING OUTCOMES OF THE MCE PROGRAM (PLOS) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| 28. Qualitative Analysis and Empirical Methods | 2 | 2 | 1 | | | | | | 2 | 2 | | | | |
| 29. Advanced Transportation Engineering | | | 3 | 3 | | | 2 | | 2 | 2 | | | | |
| 30. Highway Roadbed and Pavement Construction – Design and Construction | | | 3 | 3 | | | | | | 2 | | | | 2 |
| 31. Underground Civil Works in Urban Areas | | | 2 | 2 | | | 2 | | | | | | 1 | |
| 32. Academic Research in Civil Engineering 1 | | 3 | 2 | | | 3 | 2 | 3 | 3 | | 3 | | 2 | 3 |
| 33. Academic Research in Civil Engineering 2 | | 3 | 2 | | | 3 | 2 | | 2 | 2 | | | | |
| 34. BIM for Civil Engineering | | | 2 | 3 | | | 3 | 3 | 2 | 2 | | | | 1 |
| 35. Master thesis | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | | 3 |

Note:

Level 1: Low

Level 2: Average

Level 3: High

**4. List of references**

| No. | Subject code | Subject title | Number of credits | References |
|---|---|---|---|---|
| **I.** | **Common knowledge** | | **8** | |
| 1. | PHI 5002 | Triết học (Philosophy) | 3 | As the common program of VNU |
| 2. | FLF1108 | Tiếng Anh B2 (English B2) | 5 | As the common program of VNU |
| **II** | **Basic and specialized knowledge** | | **29** | |
| ***II.1.*** | ***Basic knowledge*** | | ***8*** | |
| 3. | VJU6001 | Cơ sở Khoa học bền vững (Basic Sustainability Science) | 3 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Sustainability Science Series, Vol. 1-5, United Nations University Press.<br>2. AR Edwards (2010), Thriving beyond Sustainability: Pathways to a Resilient Society, New Society Publishers.<br>3. J Diamond (2005), Collapse: How societies choose to fail or succeed, Penguin. |

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| | | | | 4. B Walker, D Salt (2006), Resilience Thinking: Sustaining Ecosystems and People in a Changing World, Island Press.<br>5. Bell Simon, Stephen Morse (2008), Sustainability Indicators; Measuring the Immeasureable, Earthscan.<br>6. Jurgen Scheffran (2007), Advanced Methods for Decision Making and Risk Management in Sustainability Science, Nova Science Publishers. |
| 4. | VJU6002 | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững (Methodology and Informatics for Sustainable Science) | 3 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Shoichiro Hara (2010), "Area Informatics – Concept and status. Culture and Computing", Lecture Notes in Computer Science, Volume 6259, pp 214 – 228.<br>2. Ishikawa, M., Kaneko, K. (2009), "Design of a Map Annotation System Using a Digital Pen for Field Work". In: Proceeding of Society for Information Technology & Teacher Education (SITE 2009), CD-ROM.<br>3. Hara, S., Yasunaga, H. (2002), "Resource Sharing System for Humanity Researches". In: Proceedings of |

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| | | | | the Third International Conference on Language Resources and Evaluation, pp. 51–58.<br>4. The Electronic Cultural Atlas Initiative (ECAI), http://www.ecai.org/ |
| 5. | VJU5004 | Tiếng Nhật (Japanese Language) | 2 | **Compulsory document**<br>1. . Teaching documents compiled by lecturer.<br>**References**<br>1. 東京: 冬至書房 (2001), 日本語教科書<br>. 第 1, 2, 3 巻.<br>2. 東京: ベレ出版 (2009), 日本語の教科書 .<br>3. 中・上級日本語教科書日本への招待. テキスト, 東京: 東京大学出版会(2008).<br>4. (2008), 中・上級日本語教科書日本への招待. 予習シート・語彙・文型 , 東京 : 東京大学出版会.<br>5. 東京 : 早稲田大学日本語研究教育センター (1996) 日本語教科書分野別用語集 : 外国学生用<br>6. 東京: ゆまに書房 (1995), An English – Japan dictionary of the spoken English. |
| ***II.2*** | ***Specialized knowledge*** | | ***21*** | |

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|---|---|---|---|---|
| *Compulsory subjects* | | | **12** | |
| 6. | MCE6001 | Kỹ thuật kết cấu nâng cao (Advanced Structural Engineering) | 3 | **Compulsory document**<br>1. W.F. Chen, I. Sohal, Plastic Design and Second-Order Analysis of Steel Frames, Springer-Verlag, 1994.<br>**References**<br>1. Hibbeler, R. C., Mechanics of Materials, Prentice Hall, 2010.<br>2. Clive L. Dym, Structural Modeling and Analysis, Cambridge university press, 1997.<br>3. Vũ Đình Lai, Sức Bền Vật Liệu, NXB Giao thông vận tải, 2011.<br>4. Vũ Đình Lai, Lý thuyết đàn hồi, Đại học Giao thông vận tải, 2015.<br>5. Ngô Đăng Quang, Kết cấu bê tông cốt thép, NXB Giao thông vận tải, 2016. |
| 7. | MCE6002 | Cơ học đất (Principles Soil Mechanic) | 3 | **Compulsory documents**<br>1. Das, B.M. and Sobhan, K. (2016). Principles of Geotechnical Engineering, 8th Edition, CENGAGE Learning. |

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|---|---|---|---|---|
| | | | | 2. Budhu, M. (2011). Soil mechanics and foundation, 3rd Edition, John Wiley & Sons, Inc.<br>3. Das, B.M. and Sobhan, K. (2016). Principles of geotechnical engineering (8th ed). CENGAGE Learning. |
| 8. | MCE6003 | Vật liệu tiên tiến trong xây dựng công trình (Advanced Materials in Civil Engineering) | 3 | **Compulsory documents**<br>1. P. Domone & J. Illston (2010), Construction materials, fourth edition, CRC Press.<br>2. M.S.Mamlouk & J.P. Zaniewski (2011), Material for Civil and Construction Engineering, third edition, Prentice Hall.<br>**References**<br>1. H.C.Wu (2006), Advaced Civil Infrastructure Material, Woodhead Publishing.<br>2. R. Jain & L. Lee (2012), Fiber Reinforced Polymer (FRP) Composites for Infrastructure Applications, Springer.<br>3. Nguyễn Hoa Thinh, Nguyễn Đình Đức (2002), Vật liệu composite: Cơ học và Công nghệ, NXB Khoa học và Kỹ thuật, Hà Nội. |

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| | | | | 4. Nguyen Dinh Duc (2014), Nonlinear Static and Dynamic Stability of Functionally Graded Plates and Shells, Vietnam National University Press, Hanoi.<br>5. GS. TS. Vũ Đình Phụng (2005), "Vật<br>liệu và công nghệ mới trong xây dựng đường", tập 1, NXBXD-Hà Nội. |
| 9. | MCE6018 | Quy hoạch và chính sách giao thông (Transportation Planning and Policy) | 3 | **Compulsory document**<br>1. Ortuzar, J. D. and Willumsen, L. G. (2000) Modelling Transport, Wiley.<br>**References**<br>1. Meyer, M. and Miller, E. J. (2001)<br>Urban Transportation Planning, McGraw-Hill Publishing Co<br>2. Train, K. E. (2003), Discrete Choice Methods with Simulation, Cambridge University Press. |
| *Elective subjects* | | | ***9/61*** | |
| 10. | VJU5005 | Tiếng Nhật (Japanese language) | 4 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. 東京: 冬至書房 (2001), 日本語教科書 |

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| | | | | . 第 1, 2, 3 巻.<br>2. 東京: ベレ出版 (2009), 日本語の教科書 .<br>3. 中・上級日本語教科書日本への招待. テキスト, 東京: 東京大学出版会(2008).<br>4. (2008), 中・上級日本語教科書日本への招待. 予習シート・語彙・文型 , 東京 : 東京大学出版会.<br>5. 東京 : 早稲田大学日本語研究教育センター (1996) 日本語教科書分野別用語集 : 外国学生用<br>6. 東京: ゆまに書房 (1995), An English − Japan dictionary of the spoken English. |
| 11. | MCE6004 | Quy hoạch đô thị, vùng và sử dụng đất (Urban Planning & Land Use) | 2 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Lynch, Kevin (1960), The Image of the City, Cambridge, Mass.: MIT Press.<br>2. Gehl, Jan (1987), Life Between Buildings: Using Public Space, New York: Van Nostrand Reihnold.<br>3. Rogers, Walter (2011), The Professional Practice of Landscape Architecture Second Edition, Wiley and |

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| | | | | Sons, Inc,William J. Murtagh. (2006), Keeping Time: The History and Theory of Preservation, Wiley. |
| 12. | MCE6006 | Quản lý dự án và tài chính (Project Management and Finance) | 3 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Baum, Warren C., THE PROJECT CYCLE, the World Bank, 1983.<br>2. Belli P. and others (2001), Economic Analysis of Investment Operations: Analytical Tools and Practical Applications, the World Bank Institute.<br>3. Fujimoto, Koji, Financial Internal Rate of Return, Journal of International Development, International Research Institute of Takushoku University.<br>4. Squire, Lyn, and Herman G. van der Tak (1984), Economic Analysis of Projects, the World Bank.<br>5. Japan Bank for International Cooperation (2001), Operational Guidance on the Preparation for Japan's ODA Loan Project, JBIC.<br>6. The World Bank (1996), Infrastructure Development in East Asia and Pacific ~Towards a New Public-Private Partnership, the World Bank. |

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| 13. | MCE6007 | Những vấn đề hiện đại trong kỹ thuật xây dựng (Advanced topics in Civil Engineering) | 3 | **Compulsory documents**<br>1. Dr. S. Sathish, Advances in Civil Engineering, Akinik Publication, 2023.<br>2. Scott Arthur, Masato Saitoh, Sudip Kumar Pal, Advances in Civil Engineering, Proceedings of ICACE 2020. |
| 14. | MCE6008 | Công nghệ tiên tiến trong xây dựng công trình (Advanced technologies in Civil Engineering) | 3 | **Compulsory document**<br>1. 1. Teaching documents compiled by lecturer.<br>**References**<br>1. Casini, M. (2021). Construction 4.0: Advanced Technology, Tools and Materials for the Digital Transformation of the Construction Industry. Woodhead Publishing. |
| 15. | MCE6009 | Kết cấu và kỹ thuật gió (Wind Engineering and Structures) | 3 | **Compulsory documents**<br>1. Yukio Tamura, Ahsan Kareem (2013), Advanced Structural Wind Engineering, Springer.<br>2. John D. Holmes (2007), Wind Loading of Structures 2nd Edition, Taylor & Francis, New York, USA.<br>**References**<br>Provided and updated by lecturer. |
| 16. | MCE6010 | Kỹ thuật nền móng (Foundation Engineering) | 3 | **Compulsory documents** |

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| | | | | 1. Fellenius, B. H. (2022). Basis of foundation design. Electronic edition.<br>2. Poulos, H.G. (2017). Tall Building foundation design. CRC Press. |
| 17. | MCE6011 | Quản lý khai thác và bảo trì công trình cầu, đường ô tô (Management and Maintenance of Bridges and Highways) | 3 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Kazuyuki Kubo, Pavement management in Japan.<br>2. Kiyoyuki Kaito, Road infrastructure asset management, Kyoto Nodel.<br>3. Vu Dinh Hien (2005), Highway maintenance and repair, Transport Publishing House.<br>4. Technical standards for regular road maintenance work 22TCN 306-03.<br>5. 1994, International Road Maintenance Handbook, PIARC.<br>6. Nguyen Viet Trung (2008), Inspection, exploitation, repair and strengthening of bridges and sewers, University of Transport and Communications<br>7. Nguyen Van Nham et al (2008), Bridge Inspection, Construction Publishing House. |

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| | | | | 8. Federal Highway Administration (2006), Bridge Inspector's Reference Manual.<br>9. Demetrios E. Tonias, Jim J. Zhao (2007), Design, Rehabilitation, and Maintenance of Modern Highway Bridges, Mc – Graw Hill. |
| 18. | MCE6012 | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng (Inspection and Quality Evaluation of Civil Works) | 2 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Vu Dinh Lai (2000), Empirical Methods of Works, University of Transport and Communications.<br>2. Nguyen Viet Trung (2008), Inspection, exploitation, repair and strengthening of bridges and sewers, University of Transport and Communications.<br>3. Nguyen Van Nham et al. (2008), Bridge Inspection, Construction Publishing House.<br>4. Federal Highway Administration (2006), Bridge Inspector's Reference Manual.<br>5. Demetrios E. Tonias, Jim J. Zhao (2007), Design, Rehabilitation, and Maintenance of Modern Highway Bridges, Mc – Graw Hill. |
| 19. | MCE 6013 | Kỹ thuật bê tông nâng cao (Advanced Concrete Engineering) | 3 | **Compulsory document**<br>1. ACI Committee 318. (2008). Building code requirements for structural concrete (ACI 318-05) and |

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| | | | | commentary (ACI 318R-08). American Concrete Institute.<br>2. Priestley, M. J. N., and Paulay, T. (1992). Seismic Design of Reinforced Concrete and Masonry Buildings. John Wiley & Sons, Inc.<br>3. Wight, J. K., and MacGregor, J. G. (2008). Reinforced concrete: mechanics and design. 5th edition, Prentice Hall. |
| 20. | MCE 6014 | Phương pháp tính toán trong xây dựng công trình (Computational Methods in Civil Engineering) | 3 | **Compulsory documents:**<br>1. Steven C. Chapra, Raymond, P. Canale, Numerical Methods for Engineers, 6th Edition, McGraw Hill, 2010<br>2. John H. Mathews and Kurtis D. Fink, Numerical Method using MatLab, 3rd Edition, 1999<br>3. William H. Press, Saul A. Teukolsky, William T. Vetterling, Brian P. Flannery, Numerical Recipes: The Art of Scientific Computing, Cambridge University Press; 3 edition, 2007<br>4. Won Young Yang, Wenwu Cao, Tae-Sang Chung and John Morris, Applied Numerical Methods Using Matlab, John Wiley & Sons, 2005. |

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| 21. | MCE6015 | Động lực học, điều khiển và quan trắc kết cấu (Dynamics, Control and Monitoring of Structures) | 3 | **Compulsory documents**<br>1. R.W. Clough and J. Penzien (1975), Dynamics of Structures, Prentice Hall.<br>2. Geradin, M. and Rixen, D. (1997), Mechanical Vibrations, Theory and Applications to Structural Dynamics, 2nd ed., Wiley, Chichester.<br>**References**<br>1. Connor J.J (2002), Introduction to Structural Motion Control, Prentice Hall, New Jersey.<br>2. A.K. Chopra (2011), Dynamics of Structures. Theory and application to Earthquake Engineering, Prentice- Hall, Upper Saddle River, N.J. |
| 22. | MCE6016 | Địa kỹ thuật nâng cao (Advanced Geotechnical Engineering) | 3 | **Compulsory document**<br>1. Vanicek, M. Vanicek. Earth Structure in Transport (2008), Water anh Enviromental Engineering, Springer.<br>**References**<br>1. Budhu M. (2007), Foundation and Earth Structures, Wiley. |

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| | | | | 2. M. B. Das (2010), Priceples of Foundation Engineering, 3rd edition, PWS-KENT Publishing Company.<br>3. J. E. Bowles (1988), Foundation Analyis and Design, MeGraw-Hill Book Company. |
| 23. | MCE6017 | Phương pháp và nguyên tắc đánh giá hoạt động (Principle and Method of Performance Evaluation) | 3 | **Compulsory document**<br>1. 1998, Public Expenditure Management Handbook, the World Bank.<br>**References**<br>1. "Public Expenditure Management Handbook" The World Bank, 1998<br>2. "Managing Government Expenditure" The Asian Development Bank, 1999<br>3. "Better Criteria for Better Evaluation -Revised Evaluation Criteria Definitions and Principles for Use, OECD, 2020<br>4. "JICA's Project Evaluations" Japan International Cooperation Agency, 2021 |
| 24. | MCE6019 | Quản lý rủi ro trong xây dựng công trình (Risk Management in Civil Engineering) | 3 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References** |

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| | | | | 1. A. H-S. Ang and W. H. Tang (1975), Probability Concepts in Engineering Planning and Design, Wiley. |
| 25. | MCE6020 | Thiết kế cảnh quan và đô thị (Advanced Landscape and Civic Design) | 2 | **Compulsory document**<br>1. Teaching documents compiled by lecturer.<br>**References**<br>1. Lynch, Kevin (1960) The Image of the City (Cambridge, Mass.: MIT Press)<br>2. Gehl, Jan (1987) Life Between Buildings: Using Public Space (New York: Van Nostrand Reihnold)<br>3. Rogers, Walter, The Professional Practice of Landscape Architecture Second Edition, Wiley and Sons, Inc., 2011<br>4. William J. Murtagh(2006)Keeping Time:The History and Theory of Preservation(Wiley). |
| 26. | MCE 6021 | Kỹ thuật bờ biển nâng cao (Advanced Coastal Engineering) | 2 | **Compulsory document**<br>1. R. G. Dean and R. A. Dalrymple (1991), Water Wave Mechanics for Engineers and Scientists, World Scientific.<br>**References** |

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| | | | | Materials provided and updated by the lecturer. |
| 27. | MCE6022 | Phương pháp phân tích định tính và thực nghiệm (Qualitative Analysis and Empirical Methods) | 3 | **Compulsory document**<br>1. Lecture notes prepared by the lecturer<br>**References**<br>2. Julian J. Faraway, "Linear Models with R", Chapman & Hall/CRC, ISBN 978-1584884255, 2004 |
| 28. | MCE6023 | Kỹ thuật giao thông vận tải nâng cao (Advanced Transportation Engineering) | 2 | **Compulsory document**<br>1. Transportation Engineering – James H.Banks – San Diego State University.<br>2. Handbook of Transportation Engineering – Part 1 & 2 - McGraw-Hill. |
| 29. | MCE6024 | Công trình nền-mặt đường-thiết kế và xây dựng (Highway Roadbed and Pavement Construction – Design and Construction) | 3 | **Compulsory document**<br>1. Assoc.Prof. Dr. Nguyen Ngoc Bich, MSc. Le Thanh Binh, Prof. Dr. Vu Dinh Phung (2010), Construction soil-engineering geology and soil improvement techniques in construction, Construction Publishing House-Hanoi.<br>2. Prof. Dr. Vu Dinh Phung, MSc. Vu Quoc Cuong (2005), New technologies and materials in road construction, Volume 1, Construction Publishing House-Hanoi. |

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| | | | | 3. Prof. Dr. Phan Truong Phiet (2003), Soil pressure and earth retaining wall, Construction Publishing House-Hanoi<br>4. Prof. D.Sc Nguyen Xuan Truc, Prof. Dr. Duong Hoc Hai, Prof. Dr. Vu Dinh Phung (2010), Highway design handbook, volume 11, 2nd edition, Publishing House-Hanoi.<br>5. E .J. Yoder, M.W. Mitczak, Principles of Pavement Design, Second Edition, John Wiley, New york.<br>6. Nicholas J. Gaber, Lester A. (2013), Traffic Highway Engineering, Part 1, 2, 3, 4th Edition, CL Engineering.<br>7. Some of the relevant technical standards<br>TCVN, 22TCN (Vietnam); AASHTO (USA); JTG (China). |
| 30. | MCE6025 | Công trình ngầm trong đô thị<br>*Underground Civil Works in Urban Areas* | 2 | **Compulsory document**<br>1. Terzaghi, Peck & Mesri (1996), Soil Mechanics in Engineering Practice 3rd Ed., John Wiley & Sons.<br>**References**<br>1. Materials provided and updated by the lecturer. |
| 31. | MCE6026 | BIM in Civil Engineering | 3 | **Compulsory documents** |

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|---|---|---|---|---|
| | | | | 1. Lecture note prepared by the lecturer<br>2. Rafael Sacks, Chuck Eastman, Ghang Lee, Paul Teicholz (2018). BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers,<br>Engineers, and Contractors, 3rd Edition, John Wiley & Sons, Inc., U.S.A.<br>3. Materials provided and updated by the lecturer.. |
| **III.** | **Nghiên cứu khoa học/ Scientific research** | | **27** | |
| ***3.1*** | ***Đồ án/Dự án/Chuyên đề nghiên cứu*** | | **12** | |
| 32. | MCE6027 | Academic Research in Civil Engineering 1 | 4 | **Compulsory documents**<br>1. Lecture notes prepared by the lecturer.<br>2. Oshima, A. and Hogue, A. (2008). Writing academic English (4th ed). PEARSON Longman.<br>3. Wallwork, A. (2016). English for writing research papers (2nd ed). Springer. |
| 33. | MCE6028 | Academic Research in Civil Engineering 2 | 4 | **Compulsory documents**<br>1. Bradley Jones, Douglas C. Montgomery (2020). Design of Experiments: A Modern Approach 1st Edition, Wiley. |

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| | | | | 2. Timothy Sauer (2017), Numerical approach, Pearson; 3rd edition.<br>3. Charles M Spofford (1915). The theory of structures, McGraw-Hill Company. |
| 34. | MCE6005 | Internship | 4 | |
| ***3.2*** | ***Luận văn thạc sĩ/* Master thesis** | | 15 | |
| 35. | MCE7001 | Luận văn thạc sỹ/ Master thesis | 15 | |
| | | **Tổng cộng/ Total** | **64** | |

## 5. Teaching staff

| No. | Subject code | Subject title | Number of credits | Teaching staff | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Full name** | **Academic rank/ degree** | **Training major** | **Working place** |
| **I.** | **Common knowledge** | | **8** | | | | |
| 1. | PHI 5001 | Triết học (Philosophy) | 3 | Lecturer of University of Social Sciences and Humanities - VNU | | | |
| 2. | FLF1108 | Tiếng Anh B2 (English B2) | 5 | Lecturer of University of Languages and International Studies, VNU | | | |
| **II** | **Basic and specialized knowledge** | | **29** | | | | |
| ***II.1.*** | ***Basic knowledge*** | | ***8*** | | | | |
| 3. | VJU6001 | Cơ sở Khoa học bền vững (Basic Sustainability Science) | 3 | Lecturer of master's programs of Vietnam Japan University and invited lecturers | | | |
| 4. | VJU6002 | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững (Methodology and Informatics for Sustainable Science) | 3 | Lecturer of master's programs of Vietnam Japan University and invited lecturers | | | |
| 5. | VJU5004 | Tiếng Nhật (Japanese Language) | 2 | Lecturer of Japanese language training program of Vietnam Japan University | | | |
| ***II.2*** | ***Specialized knowledge*** | | ***21*** | | | | |

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|---|---|---|---|---|---|---|---|
| *Compulsory subjects* | | | ***12*** | | | | |
| 6. | MCE6001 | Kỹ thuật kết cấu nâng cao (Advanced Structural Engineering) | 3 | Nguyen Ngoc Vinh | PhD | Infrastructure engineering | Vietnam Japan University -VNU |
| 7. | MCE6002 | Cơ học đất (Principles Soil Mechanic) | 3 | Nguyen Tien Dung | PhD | Geotechnical Engineering | Vietnam Japan University -VNU |
| 8. | MCE6003 | Vật liệu tiên tiến trong xây dựng công trình (Advanced Materials in Civil Engineering) | 3 | Nguyen Dinh Duc | Prof. D.Sc. | Engineering mechanics | VNU |
| 9. | MCE6018 | Quy hoạch và chính sách giao thông (Transportation Planning and Policy) | 3 | 1. Naohisa Okamoto<br>2. Hironori Kato<br>3. Phan Lê Bình | 1. Prof. PhD<br>2. Prof. PhD<br>3. PhD | 1. Infrastructure engineering<br>2. Infrastructure engineering<br>3. Infrastructure engineering | 1. University of Tsukuba<br>2. University of Tokyo<br>3. JICA Vietnam |
| *Elective subjects* | | | ***9/61*** | | | | |
| 10. | VJU5005 | Tiếng Nhật (Japanese language) | 4 | Lecturer of Japanese language training program of Vietnam Japan University | | | |
| 11. | MCE6004 | Quy hoạch đô thị, vùng và sử dụng đất (Urban Planning & Land Use) | 2 | Pham Thuy Loan | Prof. PhD | Urban planning and design | Hanoi Institute of Architecture and Planning |
| 12. | MCE6006 | Quản lý dự án và tài chính (Project Management and Finance) | 3 | 1. Koji Fujimoto<br>2. Nguyen Hoang Tung | 1. Prof. PhD<br>2.Assoc.Prof. PhD | 1. Public Finance<br>2. Project management | 1. University of Takushoku<br>2. University of Transport and Communications |

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| 13. | MCE6007 | Những vấn đề hiện đại trong kỹ thuật xây dựng (Advanced topics in Civil Engineering) | 3 | 1. Nguyen Dinh Duc<br>2. Kato Hirono<br>3. Takeda Shinichi<br>4.Nguyen Tien Dung<br>5.Nguyen Ngoc Vinh | 1. Prof. D.Sc.<br>2. Prof. PhD<br>3. Assoc. Prof. PhD<br>4. PhD<br>5. PhD | 1. Engineering mechanics<br>2. Infrastructure engineering<br>3. Transport engineering<br>4. Geotechnical Engineering<br>5.Infrastructure engineering | 1. VNU<br>2. University of Tokyo<br>3. Vietnam - Japan University – VNU<br>4. Vietnam - Japan University – VNU<br>5. Vietnam - Japan University - VNU |
| 14. | MCE6008 | Công nghệ tiên tiến trong xây dựng công trình (Advanced technologies in Civil Engineering) | 3 | 1. Nguyen Tien Dung | 1. PhD | 1. Geotechnical Engineering | 1. Vietnam - Japan University-VNU |
| 15. | MCE6009 | Kết cấu và kỹ thuật gió (Wind Engineering and Structures) | 3 | 1. Dao Nhu Mai<br>2. Luong Xuan Binh | 1. Assoc. Prof. PhD<br>2.Assoc.Prof. PhD | 1. Solid mechanics<br>2. Infrastructure Engineering | 1. Institute of Mechanics, Vietnam Academy of Science and Technology<br>2. University of Transport and Communications |
| 16. | MCE6010 | Kỹ thuật nền móng (Foundation Engineering) | 3 | 1. Nguyen Tien Dung | 1. PhD | 1. Geotechnical Engineering | 1. Vietnam Japan University-VNU |
| 17. | MCE6011 | Quản lý khai thác và bảo trì công trình cầu, đường ô tô | 3 | 1. Luong Xuan Binh<br>2. Tomonori Nagayama | 1. Assoc. Prof. PhD<br>2.Assoc.Prof. | 1. Infrastructure Engineering<br>2. Infrastructure | 1.University of Transport and Communications |

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| | | (Management and Maintenance of Bridges and Highways) | | | PhD | engineering | 2. University of Tokyo |
| 18. | MCE6012 | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng (Inspection and Quality Evaluation of Civil Works) | 2 | 1. Luong Xuan Binh<br>2. Nguyen Hoang Tung | 1. Assoc. Prof. PhD<br>2.Assoc.Prof. PhD | 1. Infrastructure Engineering<br>2. Infrastructure Engineering | 1. University of Transport and Communications<br>2. University of Construction |
| 19. | MCE6013 | Kỹ thuật bê tông nâng cao (Advanced Concrete Engineering) | 3 | 1. Nguyen Ngoc Vinh | 1. PhD | 1. Infrastructure engineering | 1. Vietnam Japan University-VNU |
| 20. | MCE6014 | Phương pháp tính toán trong xây dựng công trình (Computational Methods in Civil Engineering) | 3 | 1. Dao Nhu Mai | 1. Assoc. Prof. PhD | 1. Solid mechanics | 1. University of Technology-VNU |
| 21. | MCE6015 | Động lực học, điều khiển và quan trắc kết cấu (Dynamics, Control and Monitoring of Structures) | 3 | 1. Nguyen Viet Khoa<br>2. Dao Nhu Mai | 1. Assoc. Prof. PhD<br>2.Assoc.Prof. PhD | 1. Engineering mechanics<br>2. Solid mechanics | 1. University of Technology - VNU<br>2. University of Technology - VNU |
| 22. | MCE6016 | Địa kỹ thuật nâng cao (Advanced Geotechnical Engineering) | 3 | 1. Yasuo Yamada | 1. Prof. PhD | 1. Geotechnical Engineering | 1. University of Tsukuba |
| 23. | MCE6025 | Công trình ngầm trong đô thị (Underground Civil Works in Urban Areas) | 2 | 1. Yasuo Yamada | 1. Prof. PhD | 1. Infrastructure engineering | 1. University of Tsukuba |
| 24. | MCE6019 | Quản lý rủi ro trong xây dựng công trình (Risk | 3 | 1. Gaku Shoji<br>2. Takewaka Satoshi | 1. Assoc. Prof. PhD | 1. Infrastructure engineering | 1. University of Tsukuba |

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| | | Management in Civil Engineering) | | | 1. Prof. PhD | 2. Infrastructure Engineering | 2. University of Tsukuba |
| 25. | MCE6020 | Thiết kế cảnh quan và đô thị (Advanced Landscape and Civic Design) | 2 | 1. Takayuki Kumazawa | 1. Assoc. Prof. PhD | 1. Infrastructure engineering | 1. University of Ibaraki |
| 26. | MCE6017 | Phương pháp và nguyên tắc đánh giá hoạt động (Principle and Method of Performance Evaluation) | 3 | 1. Masami Sugimoto | 1. Prof. PhD | 1. Economics | 1. University of Takushoku |
| 27. | MCE6021 | Kỹ thuật bờ biển nâng cao (Advanced Coastal Engineering) | 2 | 1. John Wells<br>2. Satoshi Takewaka | 1. Prof. PhD<br>2. Prof. PhD | 1. Infrastructure engineering<br>2.Infrastructure engineering | 1. University of Ritsumekan<br>2. University of Tsukuba |
| 28. | MCE6022 | Phương pháp phân tích định tính và thực nghiệm (Qualitative Analysis and Empirical Methods) | 3 | 1. Shinichi Takeda | 1. Assoc. Prof. PhD | 1. Transport engineering | 1. University of Takushoku |
| 29. | MCE6023 | Kỹ thuật giao thông vận tải nâng cao (Advanced Transportation Engineering) | 3 | 1. Nguyen Ngoc Vinh | 1. PhD | 1. Infrastructure engineering | 1. Vietnam Japan University - VNU |
| 30. | MCE6024 | Công trình nền-mặt đường-thiết kế và xây dựng (Highway Roadbed and Pavement Construction – Design and Construction) | 3 | 1. Vu Dinh Phung<br>2. Ngo Tri Thuong | 1. Prof. PhD<br>2. Prof. PhD | 1. Infrastructure Engineering<br>2. Infrastructure Engineering | 1. ThuyLoi University<br>2. ThuyLoi University |

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|---|---|---|---|---|---|---|---|
| 31. | MCE6026 | BIM in Civil Engineering | 3 | Pham Dinh Hai | PhD | Structural Engineering | Hanoi University of Civil Engineering |
| **III.** | **Nghiên cứu khoa học/ Scientific research** | | **27** | | | | |
| **3.1** | **Đồ án/Dự án/Chuyền đề nghiên cứu** | | **12** | | | | |
| 32. | MCE6027 | Academic Research in Civil Engineering 1 | 4 | Nguyen Tien Dung | PhD | Geotechnical Engineering | Vietnam Japan University -VNU |
| 33. | MCE6028 | Academic Research in Civil Engineering 2 | 4 | Nguyen Ngoc Vinh | PhD | Infrastructure engineering | Vietnam Japan University -VNU |
| 34. | MCE6005 | Internship | 4 | Lecturer of master's programs of Vietnam Japan University and Japan Univerisities | | | |
| ***3.2*** | **Luận văn thạc sỹ/Master thesis** | | **15** | | | | |
| 35. | MCE7001 | Master thesis | 15 | Lecturer of master's programs of Vietnam Japan University and Japan Univerisities | | | |
| | | **Tổng cộng/Total** | **64** | | | | |

## 6. Instructions of implementing the training program

### 6.1. Training plan

| No. | Subject code | Subject title | Number of credits | Number of Credit hours | | | |
|---|---|---|---|---|---|---|---|
| | | | | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
| **I.** | **Common knowledge** | | **7** | | | | |
| 1. | PHI 5002 | Triết học (*Philosophy*) | 3 | 45 | | | |
| 2. | FLF1108 | Tiếng Anh B2 (*English B2*) | 4 | 60 | | | |
| **II** | **Fundamental and specialized knowledge** | | **41** | | | | |
| ***II.1.*** | ***Fundamental knowledge*** | | ***8*** | | | | |
| 3. | VJU6001 | Cơ sở Khoa học bền vững (*Basic Sustainability Science*) | 3 | 45 | | | |
| 4. | VJU6002 | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững (*Methodology and Informatics for Sustainable Science*) | 3 | | 45 | | |
| 5. | VJU5004 | Tiếng Nhật (*Japanese Language*) | 2 | 30 | | | |
| ***II.2*** | ***Specialized knowledge*** | | ***33*** | | | | |
| *Compulsory subjects* | | | *18* | | | | |
| 6. | MCE6001 | Kỹ thuật kết cấu nâng cao (*Advanced Structural Engineering*) | 3 | 45 | | | |
| 7. | MCE6002 | Cơ học đất (*Principles Soil Mechanic*) | 3 | 45 | | | |

| No. | Subject code | Subject title | Number of credits | Number of Credit hours | | | |
|---|---|---|---|---|---|---|---|
| | | | | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
| 8. | MIE6003 | Vật liệu tiên tiến trong xây dựng công trình (*Advanced Materials in Civil Engineering*) | 3 | 45 | | | |
| 9. | MCE6018 | Quy hoạch và chính sách giao thông (*Transportation Planning and Policy*) | 3 | 45 | | | |
| *Elective subjects* | | | *15/64* | | | | |
| 10. | VJU6005 | Tiếng Nhật (*Japanese language*) | 4 | | 60 | 30 | |
| 11. | MCE6004 | Quy hoạch đô thị, vùng và sử dụng đất (*Urban Planning & Land Use*) | 2 | | 30 | | |
| 12. | MCE6006 | Quản lý dự án và tài chính (*Project Management and Finance*) | 3 | | 45 | | |
| 13. | MCE6007 | Những vấn đề hiện đại trong kỹ thuật hạ tầng (*Advanced topics in Civil Engineering*) | 3 | | 45 | | |
| 14. | MCE6008 | Công nghệ tiên tiến trong xây dựng công trình (Advanced technologies in Civil Engineering) | 3 | | 45 | | |
| 15. | MCE6009 | Kết cấu và kỹ thuật gió (*Wind Engineering and Structures*) | 3 | | 45 | | |
| 16. | MCE6010 | Kỹ thuật nền móng (*Foundation Engineering*) | 3 | | 45 | | |
| 17. | MCE6011 | Quản lý khai thác và bảo trì công trình cầu, đường ô tô (*Management and Maintenance of Bridges and Highways*) | 3 | | 45 | | |

| No. | Subject code | Subject title | Number of credits | Number of Credit hours | | | |
|---|---|---|---|---|---|---|---|
| | | | | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
| 18. | MCE6012 | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng (*Inspection and Quality Evaluation of Civil Works*) | 2 | | 30 | | |
| 19. | MCE6013 | Kỹ thuật bê tông nâng cao (*Advanced Concrete Engineering*) | 3 | | 45 | | |
| 20. | MIE6014 | Phương pháp tính toán trong xây dựng công trình (*Computational Methods in Civil Engineering*) | 3 | | 45 | | |
| 21. | MCE6015 | Động lực học, điều khiển và quan trắc kết cấu (*Dynamics, Control and Monitoring of Structures*) | 3 | | 45 | | |
| 22. | MCE6016 | Địa kỹ thuật nâng cao (*Advanced Geotechnical Engineering*) | 3 | | 45 | | |
| 23. | MCE6017 | Nguyên lý và Phương pháp đánh giá hoạt động (*Principle and Method of Performance Evaluation*) | 3 | | 45 | | |
| 24. | MCE6019 | Quản lý rủi ro trong xây dựng công trình (*Risk Management in Civil Engineering*) | 3 | | 45 | | |
| 25. | MCE6020 | Thiết kế cảnh quan và đô thị (*Advanced Landscape and Civic Design*) | 2 | | 30 | | |
| 26. | MCE6021 | Kỹ thuật bờ biển nâng cao (*Advanced Coastal Engineering*) | 2 | | 30 | | |
| 27. | MCE6022 | Phương pháp phân tích định tính và thực nghiệm (*Qualitative Analysis and Empirical Methods*) | 3 | | 45 | | |
| 28. | MCE6023 | Kỹ thuật giao thông vận tải nâng cao (*Advanced Transportation Engineering*) | 2 | | 30 | | |

| No. | Subject code | Subject title | Number of credits | Number of Credit hours | | | |
|---|---|---|---|---|---|---|---|
| | | | | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
| 29. | MCE6024 | Công trình nền-mặt đường-thiết kế và xây dựng (*Highway Roadbed and Pavement Construction – Design and Construction*) | 3 | | 45 | | |
| 30. | MCE6025 | Công trình ngầm trong đô thị (*Underground Civil Works in Urban Areas*) | 2 | | 30 | | |
| 31. | MCE6026 | BIM in Civil Engineering | 3 | | 45 | | |
| **III.** | **Master thesis** | | **27** | | | | |
| ***3.1*** | | ***Project or research topics*** | **12** | | | | |
| | MCE6027 | Academic research in Civil Engineering 1 | 4 | | 60 | | |
| | MCE6028 | Academic research in Civil Engineering 2 | 4 | | | 60 | |
| | MCE6005 | Internship | 4 | | | 60 | |
| 32 | | ***Master thesis*** | | | | | |
| | MCE7001 | Master thesis | **15** | | | 225 | |
| | | **Total** | **64** | | | | |

### 6.2. Subject selection

The elective subjects in the basic and specialized knowledge are selected by students based on the advice and instruction of lecturers in charge of the Master of Civil Engineering program to ensure that the content is suitable for research subjects. Excellent students are selected for internship in Japan after completing the compulsory and elective subjects in the first year. For the internship, the students have the opportunity to intern at partner universities and Japanese research institutes within 3 months. The content of the internship help students complete the graduation thesis. The curriculum of the training program is divided into four orientations as follows:

- *Structural Engineering*: This orientation includes the following subjects: Advanced Structural Engineering; Internship in Civil Engineering; Advanced Technologies in Civil Engineering; Wind engineering and Structures; Foundation Engineering; Inspection and Quality Evaluation of Civil Works ; Advanced Concrete Engineering; Computational Methods in Civil Engineering; Dynamics, Control and Monitoring of Structures; Underground Civil Works in Urban Areas.
- *Advanced Materials and Geotechnical Engineering*: This orientation includes the following subjects: Advanced Geotechnical Engineering; Advanced Materials in Civil Engineering; Internship in Civil Engineering; Advanced Technologies in Civil Engineering; Principles of Soil Mechanics, Foundation Engineering; Inspection and Quality Evaluation of Civil Works; Advanced Concrete Engineering; Computational Methods in Civil Engineering; Advanced Transportation Engineering.
- *Transportation projects, Bridges, and Project Maintenance*: This orientation includes the following subjects: Advanced Structural Engineering; Internship in Civil Engineering; Advanced Technologies in Civil Engineering; Inspection and Quality Evaluation of Civil Works; Advanced Concrete Engineering; Underground Civil Works in Urban Areas; Highway Roadbed and Pavement Construction – Design and Construction, Management and Maintenance of Bridges and Highways; Risk Management in Civil Engineering;

- *Project Management, Urban and Regional Planning*: This orientation includes the following subjects: Transportation Planning and Policy; Urban Planning & Land Use, Project management and finance; Internship in Civil Engineering; Inspection and Quality Evaluation of Civil Works; Management and Maintenance of Bridges and Highways; Advanced Transportation Engineering; Risk Management in Civil Engineering; Advanced Landscape and Civic Design; Principle and Method of Performance Evaluation; Qualitative Analysis and Empirical Methods.

### 6.3. Assignment of reseach projects, assignment of scientific supervisors, implementation of graduation thesis

The process of assigning scientific research projects and scientific supervisors is carried out after the completion of the first academic year and is based on students' desires. The thesis preparation process is instructed by Japanese and Vietnamese professors. Students can do research in modern and advanced laboratories at the program's affiliated partners in the country and Japan. Students complete their graduation thesis in English. The proposed research directions are as follows:

- Analysis of fatigue and assessment of longevity of marine works taking into account of uncertainty factors.
- Research on design and manufacture of multi-directional piling equipment for construction of waterworks.
- Analyses of random impact for design, construction and evaluation of jack-up rigs operating in the sea of Vietnam.
- Structure health monitoring by non-destructive methods.
- Impact assessment of environment and climatic conditions to the longevity of structures.
- Construction and transporation structures under special loads.
- The safety risk of girder bridges after bearing special loads.
- Application of polymer concrete and composite materials in construction works.
- Research on application of precast solutions in construction of some types of girder bridges in Vietnam.

- Planning for sustainable urban development in Vietnam.
- Management of construction and transport projects.

## 7. Comparison of the developed training program with foreign advanced training programs (used to develop the training program)

a) Introduction to the programs used to develop the training program

- Name of program: Program in Civil Engineering.
- Name of training institution, training country: University of Tokyo, Japan.
- Ranking of training institution, training major/speciality: 39th World University Rankings 2023.
- The objective of the Civil Engineering program of the University of Tokyo is to provide innovative contributions, new techniques and new technologies in areas such as planning, design, construction, maintenance techniques, and management in order to develop a sustainable civil that has a close relationship between people and nature while still being able to meet the diverse needs of society.

b) Table of training program comparison

| **No.** | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| 1. | | Triết học (Philosophy) | 3 | Different |
| 2. | | Tiếng Anh B2 (English B2) | 5 | Different |
| 3. | | Cơ sở Khoa học bền vững (Basic Sustainability Science) | 3 | Different |
| 4. | | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững | 3 | Different |

| No. | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| | | (Methodology and Informatics for Sustainable Science) | | |
| 5. | | Tiếng Nhật (Japanese language) | 6 | Different |
| 6. | Advanced Structural Design | Kỹ thuật kết cấu nâng cao (Advanced Structural Engineering) | 3 | Similar; This subject provides knowledge of bridge structure, new structural design and new technology in construction |
| 7. | Priciples of Soil Mechanics | Cơ học đất (Principles of Soil Mechanics) | 3 | Similar: Provide knowledge about soil mechanics, stress-strain relationship of soil, from which students can apply to foundation design... |
| 8. | | Vật liệu tiên tiến trong xây dựng dân dụng (Advanced Materials in Civil Engineering) | 3 | Different; General introduction to construction materials |
| 9. | 1. Advanced Transport and Regional Study I<br>1. Advanced Transport and Regional Study II | Quy hoạch giao thông vận tải (Advanced Transportation Planning) | 3 | Similar: The subject provides students with knowledge about design and planning of transport models. From there, methods of effective traffic directional distribution and traffic route division are proposed |
| 10. | 1. Advanced Transport and Regional Study I | Quy hoạch đô thị, vùng và sử dụng đất (Urban Planning & Land Use) | 2 | Similar: The subject provides knowledge of regional planning, |

| No. | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| | 2. Advanced Transport and Regional Study II<br>3. Urban Development Policy | | | urban planning, urban space use |
| 11. | Civil Management | Quản lý dự án và tài chính (Project Management and finance) | 3 | Similar: Provide knowledge about project management, finance. |
| 12. | | Những vấn đề hiện đại trong Kỹ thuật Xây dựng (Advanced topics in Civil Engineering) | 3 | Different |
| 13. | Frontier of Civil Engineering I, II | Công nghệ tiên tiến trong xây dựng công trình (Advanced technologies in Civil Engineering) | 3 | Similar: The subject provides new technical technology in civil engineering from transportation, railways, underground works... |
| 14. | Wind Engineering and Structures | Kết cấu và kỹ thuật gió (Wind Engineering and Structures) | 3 | Similar: the subject provides knowledge of wind engineering, the impact of wind on construction structure. |
| 15. | Foundation Engineering | Kỹ thuật nền móng (Foundation Engineering) | 3 | Similar: the subject provides knowledge of foundation engineering. |
| 16. | | Quản lý khai thác và bảo trì công trình cầu, đường ôtô (Management and Maintenance of Bridges and Highways) | 3 | Different |

| No. | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| 17. | | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng (Inspection and Quality Evaluation of Civil Works) | 2 | Different |
| 18. | Advanced Concrete Engineering | Kỹ thuật bê tông nâng cao (Advanced Concrete Engineering) | 3 | Similar: The subject provides students with knowledge of non-linearity of concrete and concrete reinforcement methods... |
| 19. | Computational Earthquake Engineering Nonlinear Analysis in Civil Engineering | Kỹ thuật tính toàn động đất (Computational Methods in Civil Engineering) | 3 | Similar: provide students with computational techniques in the field of infrastructure engineering |
| 20. | Dynamics, Control and Moniroring of Structures | Động lực học, điều khiển và quan trắc kết cấu (Dynamics, Control and Moniroring of Structures) | 2 | Similar |
| 21. | Geotechnical Engineering | Địa kỹ thuật nâng cao (Advanced Geotechnical Engineering) | 3 | Similar: Provide students with knowledge of soil materials, soil improvement, design, limit state of soil |
| 22. | | Phương pháp và nguyên tắc đánh giá công trình (Principle and Method of | 3 | Different |

| No. | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| | | Performance Evaluation) | | |
| 23. | Risk Management of Natural Disasters | Quản lý rủi ro trong xây dựng dân dụng (Risk Management in Civil Engineering) | 3 | Similar: The subject provides an architecture for risk management in civil engineering, focusing on assessing safety and reliability before natural disasters |
| 24. | Advanced Landscape and Civic Design | Thiết kế cảnh quan và đô thị (Advanced Landscape and Civic Design) | 2 | Nearly similar: The subject provides basic theory and the opportunity of landscape design practice. Classes are discussions about specific designs, from which students propose ideas to solve assigned design assignments. |
| 25. | Coastal Hydrodynamics Coastal Sediment and Beach Processes | Kỹ thuật bờ biển nâng cao (Advanced Coastal Engineering) | 2 | Nearly similar: Provide knowledge to maintain and improve the design of coastal areas, harbors and estuarine infrastructure... |
| 26. | Spatial Statistical Analysis | Phân tích định tính và phương pháp thực nghiệm (Qualitative Analysis and Empirical Methods) | 3 | Nearly similar: Provide methods of survey statistics such as the statistics theory of quantitative variables, the method of linear regression... |

| No. | **Name of foreign advanced training program** *(in English and Vietnamese) Civil Engineering- The University of Tokyo* | **Name of the training program of the institution** *(in English and Vietnamese) Civil Engineering- VJU* | **Number of credits of Civil Engineering program** | **Explanation of similarities and differences among subjects of the two training programs** *(insert information, reason for choosing/not choosing)* |
|---|---|---|---|---|
| 27. | Advanced Transportation Engineering | Kỹ thuật giao thông vận tải nâng cao (Advanced Transportation Engineering) | 2 | Similar: Highway design, traffic control signal design |
| 28. | | Highway Roadbed and Pavement Construction – Design and Construction | 2 | Different |
| 29. | | Công trình ngầm trong đô thị (Underground Civil Works in Urban Areas) | 3 | Different: provide knowledge about construction of underground works in urban areas such as submarines, water supply and drainage works... |
| 30. | | BIM in Civil Engineering | 3 | Different: Most updated |
| 31. | | Academic research in Civil Engineering 1,2 | 4 | Different: Add new subject as the requirement |
| 32. | Practice of Civil Engineers | Thực tập Kỹ thuật Xây dựng (Civil Engineering Internship) | 4 | Similar |
| 33. | Individual Research for Master of Engineering Thesis | Luận Văn (Master Thesis) | 15 | Similar |

Comparison results:

- 23/33 subjects in the curriculum of the VJU Civil Engineering (~70%) are developed according to the content of subjects in the Civil program of the University of Tokyo.

## 8. Summary of subject outline

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| 1. | PHI 5002 | Triết học (Philosophy) | 3 | As the common program. | |
| 2. | VJU 5004 | Tiếng Nhật (Japanese) Language | 2 | Subjects in Japanese with a total of 02 elective credits and 04 compulsory credits include 2 main sectors: basic Japanese and specialized Japanese. The basic Japanese uses active teaching and learning methods to develop 4 basic language skills (listening, speaking, reading, and writing), and to nurture learners' Japanese ability comprehensively. The specialized Japanese provides scientific terms and expressions in each specialized area (Area Studies, Public Policy, Business Administration, Nanotechnology, Environmental Technology, Infrastructure) by closely combining Japanese skill practice and professional knowledge improvement. | |
| 3. | VJU 6001 | Cơ sở khoa học bền vững (Basic Sustainable Science) | 3 | Sustainability science is an interdisciplinary/multidisciplinary science that uses a comprehensive approach to address complex and long-term global issues facing humanity such as climate change, loss of biodiversity and functional reduction of ecosystems, etc. This subject deals with factors related to sustainability science such as: economy, society, culture, education, life, environment and resources. A comprehensive perspective and the correlation between these factors will be taught, with an emphasis on correlation and significance with sustainable development. By the end of the subject, students | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | will have a basic understanding of sustainability science and how each factor contributes to local and global sustainable development. | |
| 4. | VJU 6002 | Phương pháp luận và Hệ thống thông tin cho Khoa học bền vững (Methodology and Informatics for Sustainable Science) | 3 | By understanding the process of data formation from specific knowledge, the subject equips students with knowledge and theory about acceptable error ranges, large-scale data mining, data integration, data visualization, etc. From there, we can understand the characteristics of the data and can conduct accurate and thorough information processing. Knowledge integration is not an automatic information processing, but needs to ensure a balance between information processing and human interpretation. Through case studies, interdisciplinary approaches and contexts of sustainability science (from local to global) will be discussed. | |
| 5. | MCE 6001 | Kỹ thuật kết cấu nâng cao (Advanced Structural Engineering) | 3 | The subject provides students with advanced topics in structural engineering. It provides modules that focus on basic concepts of elastic and plastic design; Plastic hinges; Tools used in the analysis and design of plastics; Balance method; Working methods; Estimate the deflection of the structure. | |
| 6. | MCE 6016 | Địa kỹ thuật Nâng cao (Advanced Geotechnical Engineering) | 3 | This subject provides students with knowledge of using soil materials, geosynthetic materials, working state of soil and earthworks, forms of selection and design of earthworks in transportation, irrigation and environment. Knowledge of each type of works includes | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | classification, design, handling solutions, and analysis of incident lessons. | |
| 7. | MCE 6003 | Vật liệu tiên tiến trong xây dựng dân dụng (Advanced Materials in Civil Engineering) | 3 | This subject is the compulsory subject in the training program to systematically introduce in an advanced way to new materials; mechanical properties of materials; structure, features, effect, technical requirements and methods of assessing the quality of materials. The subject also equips students with knowledge of methods of determining technical constants of materials. The subject also focuses on introducing new non-traditional materials such as polymer concrete, multi-phase composites, functional materials and their applications in civil engineering. In addition, this subject also provides students with important ideas in the process of creative design and creation of new materials derived from the actual requirements of the project based on the selection and mixing of available material mixtures. | |
| 8. | MCE 6018 | Quy hoạch và chính sách giao thông(Transportation Planning and Policy ) | 3 | The subject introduces general ideas about analysis of travel needs, including the role of the model in the planning process, its features, and basic concepts. In addition, the subject also introduces two approaches to the mobility model: An approach based on analysis of daily activities and history-based analysis, followed by four-step model concept. Then, an introduction to the engineering methods of four sub-models: Traffic volume, distribution, division, and intersection. Finally, the | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | subject introduces empirical applications of this model from many countries and cities. | |
| 9. | MCE 6004 | Quy hoạch đô thị, vùng và sử dụng đất (Urban Planning & Land Use | 2 | The subject gives students the opportunity to learn and research about urban planning and design and land use from four points. After understanding the current urban environmental problems. In Part I, students will be equipped with knowledge of the formation of urban models through specific examples of historical towns. In part II planning and design for city centers, in part III planning and design for peri-urban and in part IV introduction to methods of implementing community-based planning. The document "Create Our Townscape" will be used as a textbook and introduced at the beginning of each part. Students are equipped with basic knowledge of urban planning in the university course. Lectures are given mainly based on Japanese experience, students are required to make reports related to the current situation of Vietnam from the four points mentioned above. | |
| 10. | MCE 6006 | Quản lý dự án và tài chính (Project Management and finance) | 3 | The subject deals with various development issues of civil economy, projects such as roads, highways, bridges, hydroelectric and multi-purpose dams, ports and airports from two specific perspectives: (1) Project cycle management (2) Finance for economic infrastructure projects in general.<br><br>More specifically, infrastructure projects are considered from 6 stages namely: Identification phase, preparation stage, appraisal phase, project | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | presentation, loan agreement negotiation stage, the implementation stage and the post-evaluation stage, with particular attention to how each stage of project infrastructure development is managed. Furthermore, as any project, it cannot be done without finance, government financing, financial support of bilateral aid organizations as well as private sector funding involvement in project infrastructure economy are also considered. | |
| 11. | MCE 6005 | Thực tập Kỹ thuật xây dựng (Civil Engineering Intership) | 4 | | |
| 12. | MCE 6008 | Công nghệ tiên tiến trong xây dựng công trình(Advanced technologies in Civil Engineering) | 3 | This subject is an elective subject in the training program to systematically introduce knowledge of new types of structures and new technologies in the construction of reinforced concrete bridges, steel bridge structure, high-rise building structure and industry ... as well as to provide new information of developed countries in this field. For each type of technology, information and analysis on advantages and disadvantages, scope of use, and special factors of the technology that must be considered in the design process will be provided to students. The knowledge of the subject is related to a number of subjects related to the use of reinforced concrete structure, steel structure, new materials in construction structure, analysis of bridge and house structures... | |
| 13. | MCE 6009 | Kết cấu và kỹ thuật gió (Wind Engineering and Structures) | 3 | Wind loads play an important role in the loads acting on civil works, especially tall and thin ones. The subject focuses on presenting the nature of the | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | wind, simulating the wind field around the works, and calculating the load acting on the works. Response of the works under the influence of wind loads is also considered. The dynamic effect of wind on the works is also analyzed. The subject also introduces experiments in wind tunnel and numerical simulations of wind fields. | |
| 14. | MCE 6010 | Kỹ thuật nền móng (Foundation Engineering) | 3 | This course consists of nine main chapters: (1) Introduction; (2) General procedures and considerations; (3) Characteristics of the soil; (4) Design method; (5) The bearing capacity of the shallow foundation; (6) The settlement of the shallow foundation; (7) The bearing capacity of the pile; and (8) Settlement of pile group; (9) Dig deep and dewater. Detailed topics in each chapter are given in the following sections. | |
| 15. | MCE 6011 | Quản lý khai thác và bảo trì công trình cầu, đường ôtô(Management and Maintenance of Bridges and Highways) | 3 | The subject Management and Maintenance of Bridges and Highways focuses on the following basic contents: introducing models of management and maintenance of bridges and highways in Vietnam and around the world; planning works management and maintenance; Collecting and developing database; Analyzing database, evaluating and forecasting current status of works; deciding and implementing the maintenance work. | |
| 16. | MCE 6012 | Kiểm định, thử tải và đánh giá chất lượng công trình xây dựng(Inspection and Quality Evaluation of Civil Works) | 2 | The subject Inspection and Quality Evaluation of Civil Works focuses on the following basic contents: Introduction to state management on testing and evaluation of civil works quality; Basic methods in testing works; Methods of data | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| | | | | processing and auditing to assess the load-bearing capacity of civil works. | |
| 17. | MCE 6013 | Kỹ thuật bê tông nâng cao (Advanced Concrete Engineering ) | 3 | This course covers a number of topics related to advanced technology and knowledge of concrete engineering. After reviewing the basic knowledge of reinforced concrete structure, the non-linear part of concrete and reinforced concrete materials is taught. Then, mineral admixtures in concrete such as fly ash and slag are provided. Finally, numerical methods for analyzing reinforced concrete structures are given in the lecture. | |
| 18. | MCE 6014 | Phương pháp tính toán trong xây dựng dân dụng (Computational Methods in Civil Engineering) | 3 | The subject presents numerical solutions in construction engineering problems. Focus on mathematical foundations: linear algebra, differential calculus, numerical solutions, texture optimization and finite element methods. Refer to approaches to nonlinear problems: linearization, discretization and numerical methods. | |
| 19. | MCE 6015 | Động lực học, điều khiển và quan trắc kết cấu (Dynamics, Control and Monitoring of Structures) | 3 | The subject presents the problem of works dynamics. The one-degree-of-freedom problem is presented in detail. The system of multiple degrees of freedom is presented in chapter two with different load cases and algorithms to solve the dynamics problem are also presented in detail. Here, the focus is on the response of the structure under the impact of dynamic loads.<br><br>Initially approach the problem of structural control and construction monitoring methods | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
|---|---|---|---|---|---|
| 20. | MCE 6002 | Cơ học đất (Priciples of Soil Mechanics) | 3 | This subject consists of ten main chapters as follows: (1) Introduction; (2) The size and plasticity of the grain; (3) Soil classification; (4) Material relationship; (5) In situ stress of the soil; (6) Stress in the soil mass; (7) Soil permeability; (8) Hardness and compressibility of the soil; (9) shear resistance of the soil; (10) Common soil models in numerical analysis. Detailed topics in each chapter are given in the following sections. | |
| 21. | MCE 6025 | Công trình ngầm trong đô thị(Underground Civil Works in Urban Areas) | 2 | The subject aims to provide students with comprehensive knowledge of civil underground works in urban areas. The first part of the subject equips students with knowledge of the physical and mechanical properties of soil necessary for the design and construction of foundations and underground structures in soil layers. The second part introduces the basic concepts of stability, the analysis used in reality as well as recent concepts of soil mechanics based on constitutive models. The third part of the subject outlines the general concept of the design method in the fields of civil underground works. In addition, typical designs and practices of structural construction used in civil underground works are also introduced. | |
| 22. | MCE 6019 | Quản lý rủi ro trong xây dựng dân dụng (Risk Management in Civil Engineering) | 3 | The subject provides students with advanced knowledge of risk management in civil engineering, focusing on safety and reliability assessment of engineering systems, countermeasures, and physical principles with | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
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| | | | | special natural disasters such as earthquakes, tsunamis, and other hazards. | |
| 23. | MCE 6020 | Thiết kế cảnh quan và đô thị (Advanced Landscape and Civic Design) | 2 | The subject equips students with basic theory and practice of project landscape design, students can propose original ideas for landscape design. After students master the basic theory of the lecture, students work on a specific design project. The design process is the focus of this class, and instructors will work to develop creative problem-solving skills. Most sessions will begin with lectures and discussions on predetermined topics. There will be time for class work and small group interaction. When students propose specific landscape architectures, the CAD system will be operated in the classroom. To create presentations, students should learn CAD systems. | |
| 24. | MCE 6017 | Nguyên lý và phương pháp đánh giá hoạt động (Principle and Method of Performance Evaluation) | 3 | Strengthening governance is an important emerging issue and has become one of the leading issues in the development of developing countries. This is the sector that accounts for nearly a quarter of the World Bank's development support. Public management of development is a cycle management process that includes phases "Plan", "Budget", "Implementation", "Performance Review" and "Feedback" phases. This subject is intended to provide students with the capacity to consider development from a management perspective, with particular emphasis on "evaluating the effectiveness" of projects and their development programs. | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
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| 25. | MCE 6021 | Kỹ thuật bờ biển nâng cao (Advanced Coastal Engineering) | 2 | Vietnam is a low-lying tropical country, and its security and economy will be seriously threatened by rising sea levels and tropical storms. Therefore, maintaining and improving the design of the coastal zone, harbor and estuary infrastructure is urgent. In addition, information technology must be deployed to monitor and predict complex processes such as current formation, wave formation and rise of sea level due to storm, as well as coastal erosion and ecological impacts. This subject provides students with basic and advanced knowledge of coastal waves and currents, which are essential for the management and development of Vietnam's coastlines and the requirements of modern sea port planning and design. | |
| 26. | MCE 6022 | Phân tích định tính và phương pháp thực nghiệm (Qualitative Analysis and Empirical Methods) | 3 | The subject includes the following contents: (1) Research methods and research survey. Micro data visualization (data of concrete samples and traffic volume survey); (2) Statistical theory and quantitative variables. Taking into account the underlying statistical value; (3) Foundation of statistical probability distribution with N&t distribution; (4) Hypothesis testing. Then, through correlations, (5) Regression analysis. Practice with GDP data. (6) Online regression - Selection of solution variables (in step by step regression). Provide knowledge of: Correlation between income level and level of infrastructure for the comparison of East Asian countries. (7) Introduction to other | |

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| | | | | research methods, methods using database systems (mainly World Bank WDI). | |
| 27. | MCE 6023 | Kỹ thuật giao thông vận tải nâng cao (Advanced Transportation Engineering ) | 2 | The subject includes the following contents: (1) Research methods and research survey. Micro data visualization (data of concrete samples and traffic volume survey); (2) Statistical theory and quantitative variables. Taking into account the underlying statistical value; (3) Foundation of statistical probability distribution with N&t distribution; (4) Hypothesis testing. Then, through correlations, (5) Regression analysis. Practice with GDP data. (6) Online regression - Selection of solution variables (in step by step regression). Provide knowledge of: Correlation between income level and level of infrastructure for the comparison of East Asian countries. (7) Introduction to other research methods, methods using database systems (mainly World Bank WDI). | |
| 28. | MCE 6007 | Những vấn đề hiện đại trong kỹ thuật hạ tầng (Advanced topics in Civil Engineering) | 3 | The subject provides students with science and technology for the construction industry in general and bridges and roads in particular, which plays an important role in improving labor productivity and production efficiency, especially contributing to shortening the construction period. degrees, improve energy and reduce building costs. Therefore, updating and applying new technology is essential for every road and bridge construction enterprise if it does not want to be left behind in the 4.0 technology era. | |

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| 29. | MCE 6024 | Công trình nền-mặt đường-thiết kết và xây dựng (Highway Roadbed and Pavement Construction-Design and Construciton) | 3 | The subject clarifies the working conditions of the roadway foundation under the effect of vehicle load and the effects of other environmental factors; thereby clarifying the basic requirements for road design and construction. Clarifying the mechanical characteristics (same deformation) of the pavement and the mechanical characteristics of the pavement material. Deeply clarify the theoretical bases of road pavement calculation Introductory new technologies and new materials in pavement construction. | |
| 30. | MCE 6026 | BIM in Civil Engineering | 3 | BIM (Building Information Modeling) is an emerging technology that employs digital information models in the virtual space to achieve better quality and efficiency of construction and management work throughout the facility's lifecycle. Through lectures, case studies, and hands-on application, this course is designed to teach students not only the knowledge of BIM Technology and its development and application potential but also the practical applications of the BIM technology and tools. | |
| 31. | MCE 6027 | Academic research in Civil Engineering 1 | 4 | The general objectives of this course are to help students understand essential knowledge in academic English and provide students with essential skills and rules in writing academic papers and theses. | |
| 32. | MCE 6028 | Academic research in Civil Engineering 2 | 4 | The course aims to provide in-depth knowledge of research design and methodology and to train the | |

| No. | Subject code | Subject title | Number of credits | Summary | Prerequisite subject |
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| | | | | student in conducting a study plan or a scientific paper in civil engineering. | |