

MINISTRY OF EDUCATION AND TRAINING  
**QUY NHON UNIVERSITY**

**MASTER PROGRAM**

|                |                                  |
|----------------|----------------------------------|
| Level:         | <b>Master</b>                    |
| Major:         | <b>Algebra and number theory</b> |
| Code:          | <b>8460104</b>                   |
| Orientation:   | <b>Research</b>                  |
| Mode of study: | <b>Full-time</b>                 |

*Binh Dinh, 2025*

## MASTER PROGRAM

*(Issued together with Decision No. 1297/QĐ-ĐHQN dated April 29, 2025  
of the Rector of Quy Nhon University)*

|                |                                  |
|----------------|----------------------------------|
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## 1. PROGRAM OBJECTIVES (POs)

### 1.1. General objectives

The program aims to develop learners who possess strong political qualities and professional ethics; demonstrate solid professional competence and mastery of knowledge in Algebra and number theory; and exhibit critical thinking along with the capacity for independent, in-depth research to acquire new knowledge. Graduates will be prepared to pursue doctoral studies and will have the ability to apply mathematics to solve practical issues arising from teaching and mathematical research activities.

### 1.2. Specific objectives

The program trains master students in Algebra and number theory (research-oriented) gained the following knowledge, skills, and qualities:

- **PO1:** Acquire solid knowledge of political science and Marxist-Leninist Philosophy to apply effectively in professional activities and daily life.
- **PO2:** Gain advanced knowledge of fundamental mathematics within the field of Algebra and Number Theory as a foundation for specialized study and higher-level education.
- **PO3:** Possess deep and broad specialized knowledge in specific areas of Algebra and Number Theory to solve problems in mathematics teaching at universities, colleges, and high schools in alignment with the new general education curriculum in Mathematics.
- **PO4:** Demonstrate skills in applying advanced mathematical knowledge to address practical issues arising from mathematics pedagogy.

- **PO5:** Develop skills in critical thinking, analysis, and synthesis; maintain the capacity for self-study and in-depth research to acquire new knowledge.
- **PO6:** Master skills for independent work, teamwork, and team leadership; demonstrate proficiency in self-study and literature review to identify and resolve problems through lifelong learning.
- **PO7:** Exhibit self-awareness regarding the vital role of autonomous study and research in problem-solving, professional development, and continuous academic growth.
- **PO8:** Uphold professional ethics; demonstrate personal and collective responsibility, as well as accountability towards the community, society, professional tasks, and the environment.

## **2. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT**

Students who have graduated this Research-oriented Master's program in Algebra and Number Theory are eligible for various job positions below:

- Teachers at high schools, middle schools, universities, and colleges nationwide.
- Serve as specialized officers or academic managers at educational and training institutions, as well as education management agencies.
- Work as mathematical researchers at research institutes, specialized centers, universities, and colleges.
- Pursue further education in Doctoral (Ph.D.) programs.
- Continue advanced studies abroad through international postgraduate programs.

## **3. LEARNING OUTCOMES**

The program is designed to ensure that graduates achieve the following learning outcomes:

- **PLO1:** Understand and apply knowledge of political science and Marxist-Leninist Philosophy to professional activities and daily life.
- **PLO2:** Demonstrate broad understanding and application of fundamental knowledge in Mathematical Analysis, Algebra, Number Theory, Geometry, Optimization, and Probability to support in-depth study and adapt to frequent changes in the new general education curriculum in Mathematics, teaching, and mathematical research.
- **PLO3:** Master and gain a comprehensive understanding of Algebra and Number Theory; apply specialized knowledge to solve problems in mathematics teaching at universities, colleges, and high schools following the new general education curriculum.
- **PLO4:** Synthesize foundational and specialized knowledge with personal expertise to perform professional tasks: coaching gifted students, teaching specialized mathematics classes, conducting in-depth research on school and elementary mathematics, and participating in continuing professional development and seminars for teachers.

- **PLO5:** Apply skills in critical thinking, analysis, synthesis, and evaluation of data and information using advanced scientific methods; demonstrate effective teamwork to achieve common goals.
- **PLO6:** Apply skills to identify and utilize mathematical knowledge for teaching and conducting in-depth research in the field of Algebra and Number Theory.
- **PLO7:** Utilize skills in mathematical research, innovation, and creativity, while effectively employing relevant technologies in the field of Mathematics.
- **PLO8:** Proficiently and creatively apply skills to disseminate mathematical knowledge to learners and guide students in completing academic tasks.
- **PLO9:** Work competently, either independently or in teams, under changing conditions; take personal and collective responsibility; and effectively instruct and supervise learners in their academic duties.
- **PLO10:** Demonstrate self-orientation and adaptability to changing educational environments; draw professional conclusions and defend personal perspectives; possess the ability to plan, coordinate, and manage resources, as well as evaluate and improve professional efficiency; maintain the capacity for lifelong learning through self-study or by pursuing Doctoral programs at domestic and international institutions.

#### 4. ADMISSION REQUIREMENTS

Applicants must meet the following criteria:

- Academic Qualifications: Have graduated or be eligible for graduation from a Bachelor's degree program (or equivalent or higher) with a Minimum classification of "Good" (Upper Second Class) or above; or possess published scientific research related to the field of Mathematics.
- Language Proficiency: Demonstrate a foreign language proficiency of Level 3 or higher according to the 6-level Foreign Language Proficiency Framework for Vietnam (VSTEP).

##### List of eligible undergraduate majors

| No | Target Master's Major     | Eligible Undergraduate Majors                                                                                                                                                                                                                                                               | Note |
|----|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1  | Algebra and number theory | <ul style="list-style-type: none"> <li>- Mathematics Education (7140209)</li> <li>- Mathematics (7460101)</li> <li>- Applied Mathematics (7460112)</li> <li>- Computational Science (7460107)</li> <li>- Data Science (7460108)</li> <li>- Mathematics and Informatics (7460117)</li> </ul> |      |

|  |  |                                       |  |
|--|--|---------------------------------------|--|
|  |  | - Mathematics and Mechanics (7460115) |  |
|--|--|---------------------------------------|--|

***List of undergraduate majors requiring supplemental knowledge and corresponding courses:***

| No | Target Master's Major     | Majors requiring supplemental knowledge                                                                                                                                | Supplemental courses (No. of credits)                                                                                                                                                                                                                                        | Note                                                                                                                                                                                                                                                                                                                                                                                   |
|----|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Algebra and number theory | <ul style="list-style-type: none"> <li>- Statistics (7460201);</li> <li>- Computer Science Education (7140210)</li> <li>- Other majors: Case-by-case review</li> </ul> | <ul style="list-style-type: none"> <li>- Linear algebra (3 credits)</li> <li>- Abstract algebra (3 credits)</li> <li>- Calculus of Several Variables (3 credits)</li> <li>- Measure Theory and Integration (3 credits)</li> <li>- Functional analysis (3 credits)</li> </ul> | Based on the candidate's Bachelor's degree and academic transcripts, the faculty council will review and request the Dean to propose whether the candidate is required to complete supplemental courses and specify the appropriate subjects. Required supplemental courses may be considered for replacement by equivalent certificates issued by reputable educational institutions. |

## **5. ADMISSION TARGETS**

In accordance with the current Regulations on Admission and Master's level training issued by Quy Nhon University and the Ministry of Education and Training.

## 6. PROGRAM DURATION AND TOTAL ACADEMIC WORKLOAD

**6.1. Program duration:** 2 years

**6.2. Total academic workload:** 60 credits, including 12 credits of research topics and 12 credits of the master's thesis.

| Program structure                            | No. of Credits |
|----------------------------------------------|----------------|
| <b>General Knowledge</b>                     | <b>3</b>       |
| <b>Fundamental and specialized knowledge</b> | <b>45</b>      |
| Compulsory courses                           | 27             |
| Elective courses                             | 6              |
| Research topics                              | 12             |
| <b>Master's thesis</b>                       | <b>12</b>      |
| <b>Total</b>                                 | <b>60</b>      |

## 7. TRAINING METHOD, GRADUATION REQUIREMENTS

### 7.1. Training method

Training under the credit system is regulated by the Training Regulations of the Ministry of Education and Training and of Quy Nhon University.

### 7.2. Graduation requirements

In accordance with the current Regulations on Admission and Master's level training of Quy Nhon University and the Ministry of Education and Training:

a) Successfully complete all courses within the training program and achieve a passing grade on the Master's thesis defense;

b) Meet the foreign language proficiency requirements as specified in the program's learning outcomes prior to graduation. This must be evidenced by one of the following:

- A diploma or certificate equivalent to Level 4 according to the 6-level Foreign Language Proficiency Framework for Vietnam (as prescribed in the Appendix of the current Regulations of Quy Nhon University) or other equivalent certificates recognized by the Ministry of Education and Training.

- A Bachelor's degree (or higher) in a foreign language major.

- A Bachelor's degree (or higher) in another major where the medium of instruction was entirely in a foreign language.

c) Fulfill all administrative and financial obligations as per Quy Nhon University regulations; not be under criminal investigation or subject to disciplinary action or academic suspension.

### 7.3. Degree Awarded

Vietnamese: BẰNG THẠC SĨ ĐẠI SỐ VÀ LÝ THUYẾT SỐ

English: THE DEGREE OF MASTER IN ALGEBRA AND NUMBER THEORY

## 8. ASSESSMENT METHODS, GRADING SCALE

### 8.1. Grading scale

A 10-point grading scale is used for all assessment components of the course.

### 8.2. Format, evaluation criteria, and scoring system

#### - Assessment of theoretical courses

| No | Assessment Methods   | Evaluation criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Weighting groups     |
|----|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1  | Formative Assessment | <p>Attendance: Required attendance time for all classes; absences should not exceed 20% of the total class time.</p> <p>Discussions: Proactiveness, level of enthusiasm in preparing lessons and participating in classroom activities.</p> <p>Homeworks: Students complete one or more assignments at home. The instructor assigns specific assignments to individual students or groups of students.</p> <p>Midterm Exam: choose one of the following assessment methods and criteria:</p> <ul style="list-style-type: none"><li>- Students take the test in class; the lecturer specifies the criteria for evaluating the test.</li><li>- Students conduct seminars or complete major assignments as required by the lecturer teaching the course; the criteria for evaluating reports, seminars, and major assignments will be specified by the lecturer.</li></ul> | 40% (or 30%, or 50%) |
| 2  | Summative Assessment | <p>The evaluation criteria are based on the choice of final exam format as follows:</p> <ul style="list-style-type: none"><li>- Students take a final written exam: The instructor specifies the content and evaluation criteria in the answer key for the final exam.</li><li>- Students take an oral exam: The evaluation criteria are determined by the instructors in charge of the exam, based on the students' attitude and the content of their answers to the questions.</li><li>- Students complete an essay exam: Evaluation criteria are based on the content and quality of the report.</li></ul>                                                                                                                                                                                                                                                           | 60% (or 70% or 50%)  |

#### - Assessment of Research topics

Evaluation criteria are specified in the **detailed syllabus** of each research topic.

### **- Assessment of Master's Thesis**

Conducted in accordance with the current Regulations on Admission and Master's Level Training of Quy Nhon University.

### **8.3. Assessment methods**

The assessment methods used in the Master's program in Algebra and Number Theory are divided into two main types: Formative Assessment (Progress assessment) and Summative Assessment (Final assessment). Specific assessment methods are prescribed in the Program Specification for Algebra and Number Theory.

The following table details the description of these assessment methods:

#### **Mapping of Assessment Methods and Program Learning Outcomes (PLOs)**

| Assessment methods              | Program learning outcomes (PLOs) |   |   |   |   |   |   |   |   |    |
|---------------------------------|----------------------------------|---|---|---|---|---|---|---|---|----|
|                                 | 1                                | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <b>I. Progress assessments</b>  |                                  |   |   |   |   |   |   |   |   |    |
| 1. Attendance Assessment        |                                  |   |   |   |   |   |   |   | x | x  |
| 2. Assignment assessment        |                                  | x | x | x | x | x | x |   | x | x  |
| 3. Presentation Assessment      | x                                | x | x | x |   | x |   | x | x | x  |
| <b>II. Summative assessment</b> |                                  |   |   |   |   |   |   |   |   |    |
| 4. Written examination          | x                                | x | x | x | x | x | x | x | x | x  |
| 5. Defense and Oral Examination | x                                | x | x | x | x | x | x | x | x | x  |
| 6. Report                       | x                                | x | x | x | x | x | x | x | x | x  |

## **9. PROGRAM CONTENT**

| No                   | Course Code |             | Course name | Seme<br>ster | No. of credits |                             |                                                     | Prereq<br>uisite<br>Course<br>Code | Departme<br>nt/Faculty<br>in charge                  | Note |
|----------------------|-------------|-------------|-------------|--------------|----------------|-----------------------------|-----------------------------------------------------|------------------------------------|------------------------------------------------------|------|
|                      | Letters     | Num<br>bers |             |              | Total          | The<br>ory,<br>Prac<br>tise | Experim<br>ental/<br>Practical/<br>Discussi<br>onal |                                    |                                                      |      |
| I. General knowledge |             |             |             |              |                |                             |                                                     |                                    |                                                      |      |
| I.1. Philosophy      |             |             |             |              |                |                             |                                                     |                                    |                                                      |      |
| 1                    | TNTH        | 501         | Philosophy  | 1            | 3              | 3                           |                                                     |                                    | Department<br>of Political<br>Education -<br>Law and |      |

|                                                  |      |      |                                          |   |   |   |  |  |                                                       |  |
|--------------------------------------------------|------|------|------------------------------------------|---|---|---|--|--|-------------------------------------------------------|--|
|                                                  |      |      |                                          |   |   |   |  |  | State<br>Managemen<br>t                               |  |
| <b>II. Fundamental and specialized knowledge</b> |      |      |                                          |   |   |   |  |  |                                                       |  |
| <b>II.1. Compulsory courses</b>                  |      |      |                                          |   |   |   |  |  |                                                       |  |
| 2                                                | CSBB | 502  | Advanced<br>linear algebra               | 1 | 3 | 3 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 3                                                | CSBB | 503N | Modern<br>algebra                        | 1 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 4                                                | CSBB | 504  | Real analysis                            | 1 | 3 | 3 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 5                                                | CSBB | 505N | Probability<br>theory                    | 1 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 6                                                | CSBB | 506N | Introduction<br>to Algebraic<br>geometry | 2 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 7                                                | CSBB | 507N | Applied<br>functional<br>analysis        | 2 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 8                                                | CSBB | 508N | Complex<br>analysis and<br>applications  | 2 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 9                                                | CSBB | 509  | Optimization<br>theory                   | 2 | 3 | 3 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 10                                               | DSBB | 510N | Group theory                             | 2 | 2 | 2 |  |  | Department<br>of<br>Mathematic<br>s and<br>Statistics |  |
| 11                                               | DSBB | 511N | Algebraic                                | 3 | 2 | 2 |  |  | Department                                            |  |

|                                                     |      |      |                             |   |   |   |  |  |                                          |  |
|-----------------------------------------------------|------|------|-----------------------------|---|---|---|--|--|------------------------------------------|--|
|                                                     |      |      | number theory               |   |   |   |  |  | of Mathematics and Statistics            |  |
| 12                                                  | DSBB | 512N | Field and Galois theory     | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 13                                                  | DSBB | 513N | Rings and modules theory    | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| <b>II.2. Elective courses (select 03/9 courses)</b> |      |      |                             |   |   |   |  |  |                                          |  |
| 14                                                  | DSTC | 514  | Groebner basis              | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 15                                                  | DSTC | 515  | Homological algebra         | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 16                                                  | DSTC | 516  | Algebraic topology          | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 17                                                  | DSTC | 517  | Category theory             | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 18                                                  | DSTC | 518  | Matrix computation          | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 19                                                  | DSTC | 519  | Group representation theory | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 20                                                  | DSTC | 520  | Real algebraic geometry     | 3 | 2 | 2 |  |  | Department of Mathematics and Statistics |  |
| 21                                                  | DSTC | 521  | Morse theory                | 3 | 2 | 2 |  |  | Department of                            |  |

|                                    |      |     |                    |   |           |   |    |  |                                          |  |
|------------------------------------|------|-----|--------------------|---|-----------|---|----|--|------------------------------------------|--|
|                                    |      |     |                    |   |           |   |    |  | Mathematics and Statistics               |  |
| 22                                 | ĐSTC | 522 | Singularity theory | 3 | 2         | 2 |    |  | Department of Mathematics and Statistics |  |
| <b>II.3. Other research topics</b> |      |     |                    |   |           |   |    |  |                                          |  |
| 23                                 | ĐSCĐ | 523 | Research topic 1   | 1 | 3         |   | 3  |  | Department of Mathematics and Statistics |  |
| 24                                 | ĐSCĐ | 524 | Research topic 2   | 2 | 3         |   | 3  |  | Department of Mathematics and Statistics |  |
| 25                                 | ĐSCĐ | 525 | Research topic 3   | 3 | 3         |   | 3  |  | Department of Mathematics and Statistics |  |
| 26                                 | ĐSCĐ | 526 | Research topic 4   | 4 | 3         |   | 3  |  | Department of Mathematics and Statistics |  |
| <b>III. Master's thesis</b>        |      |     |                    |   |           |   |    |  |                                          |  |
| 27                                 | ĐSLV | 527 | Master's thesis    | 4 |           |   | 12 |  | Department of Mathematics and Statistics |  |
| <b>Total</b>                       |      |     |                    |   | <b>60</b> |   |    |  |                                          |  |

## 10. TENTATIVE TEACHING PLAN

| No                   | Course code | Course name | No. of credits | Tentative teaching plan (Semester) |   |   |   | Proposed lecturers                                           | Department/Faculty in charge                      |
|----------------------|-------------|-------------|----------------|------------------------------------|---|---|---|--------------------------------------------------------------|---------------------------------------------------|
|                      |             |             |                | 1                                  | 2 | 3 | 4 |                                                              |                                                   |
| I. General knowledge |             |             | 3              | 3                                  | 0 | 0 | 0 |                                                              |                                                   |
| 1                    | TNTH501     | Philosophy  | 3              | 3                                  |   |   |   | Department of Political Education - Law and State Management | Department of Political Education - Law and State |

|                                                  |          |                                    |           |           |           |           |          |                                   |                                          |
|--------------------------------------------------|----------|------------------------------------|-----------|-----------|-----------|-----------|----------|-----------------------------------|------------------------------------------|
|                                                  |          |                                    |           |           |           |           |          |                                   | Management                               |
| <b>II. Fundamental and specialized knowledge</b> |          |                                    | <b>45</b> | <b>13</b> | <b>14</b> | <b>15</b> | <b>3</b> |                                   |                                          |
| <b>II.1. Compulsory courses</b>                  |          |                                    | <b>27</b> | <b>10</b> | <b>11</b> | <b>6</b>  | <b>0</b> |                                   |                                          |
| 2                                                | CSBB502  | Advanced linear algebra            | 3         | 3         |           |           |          | Dr. Lê Thanh Hiếu                 | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Dr. Trần Đình Lương               |                                          |
| 3                                                | CSBB503N | Modern algebra                     | 2         | 2         |           |           |          | Dr. Phạm Thùy Hương               | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Assoc. Prof. Dr. Lê Công Trình    |                                          |
| 4                                                | CSBB504  | Real analysis                      | 3         | 3         |           |           |          | Assoc. Prof. Dr. Lương Đăng Kỳ    | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Dr. Mai Thành Tấn                 |                                          |
| 5                                                | CSBB505N | Probability theory                 | 2         | 2         |           |           |          | Dr. Lâm Thị Thanh Tâm             | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Dr. Cao Tấn Bình                  |                                          |
|                                                  |          |                                    |           |           |           |           |          | Dr. Lê Quang Thuận                |                                          |
|                                                  |          |                                    |           |           |           |           |          | Dr. Nguyễn Đăng Thiên Thư         |                                          |
| 6                                                | CSBB506N | Introduction to Algebraic geometry | 2         |           | 2         |           |          | Assoc. Prof. Dr. Lê Công Trình    | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Dr. Phạm Thùy Hương               |                                          |
|                                                  |          |                                    |           |           |           |           |          | Dr. Nguyễn Bin                    |                                          |
| 7                                                | CSBB507N | Applied functional analysis        | 2         |           | 2         |           |          | Assoc. Prof. Dr. Thái Thuần Quang | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Assoc. Prof. Dr. Huỳnh Minh Hiền  |                                          |
| 8                                                | CSBB508N | Complex analysis and applications  | 2         |           | 2         |           |          | Assoc. Prof. Dr. Thái Thuần Quang | Department of Mathematics and Statistics |
|                                                  |          |                                    |           |           |           |           |          | Dr. Nguyễn Văn Đại                |                                          |

|                                                 |          |                                |   |   |   |   |   |                                            |                                                      |
|-------------------------------------------------|----------|--------------------------------|---|---|---|---|---|--------------------------------------------|------------------------------------------------------|
| 9                                               | CSBB509  | Optimizati<br>on theory        | 3 |   | 3 |   |   | Assoc. Prof. Dr.<br>Sci. Huỳnh Văn<br>Ngãi | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Nguyễn<br>Hữu Trọn                     |                                                      |
|                                                 |          |                                |   |   |   |   |   | Dr. Nguyễn<br>Văn Vũ                       |                                                      |
|                                                 |          |                                |   |   |   |   |   | Assoc. Prof. Dr.<br>Trần Ngọc<br>Nguyên    |                                                      |
| 10                                              | ĐSBB510N | Group<br>theory                | 2 |   | 2 |   |   | Dr. Trần Đình<br>Lương                     | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Lê Thanh<br>Hiếu                       |                                                      |
| 11                                              | ĐSBB511N | Algebraic<br>number<br>theory  | 2 |   |   | 2 |   | Assoc. Prof. Dr.<br>Lê Công Trình          | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Trần Đình<br>Lương                     |                                                      |
| 12                                              | ĐSBB512N | Field and<br>Galois<br>theory  | 2 |   |   | 2 |   | Dr. Lê Thanh<br>Hiếu                       | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Trần Đình<br>Lương                     |                                                      |
| 13                                              | ĐSBB513N | Rings and<br>modules<br>theory | 2 |   |   | 2 |   | Dr. Lê Thanh<br>Hiếu                       | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Phạm Thùy<br>Hương                     |                                                      |
| II.2. Elective courses (select<br>03/9 courses) |          |                                | 6 | 0 | 0 | 6 | 0 |                                            |                                                      |
| 14                                              | ĐSTC514  | Groebner<br>basis              | 2 |   |   | 2 |   | Dr. Nguyễn Bin                             | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Dr. Phạm Thùy<br>Hương                     |                                                      |
| 15                                              | ĐSTC515  | Homologic<br>al algebra        | 2 |   |   | 2 |   | Dr. Trần Đình<br>Lương                     | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Assoc. Prof. Dr.<br>Lê Công Trình          |                                                      |
| 16                                              | ĐSTC516  | Algebraic<br>topology          | 2 |   |   | 2 |   | Dr. Thái Trung<br>Hiếu                     | Department<br>of<br>Mathematics<br>and<br>Statistics |
|                                                 |          |                                |   |   |   |   |   | Assoc. Prof. Dr.<br>Nguyễn Sum             |                                                      |

|                      |         |                             |    |   |   |   |   |                                                           |                                          |
|----------------------|---------|-----------------------------|----|---|---|---|---|-----------------------------------------------------------|------------------------------------------|
| 17                   | ĐSTC517 | Category theory             | 2  |   |   | 2 |   | Assoc. Prof. Dr. Lê Công Trình                            | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Dr. Trần Đình Lương                                       |                                          |
| 18                   | ĐSTC518 | Matrix computation          | 2  |   |   | 2 |   | Dr. Lê Thanh Hiếu                                         | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Assoc. Prof. Dr. Lê Công Trình                            |                                          |
| 19                   | ĐSTC519 | Group representation theory | 2  |   |   | 2 |   | Dr. Trần Đình Lương                                       | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Assoc. Prof. Dr. Lê Công Trình                            |                                          |
| 20                   | ĐSTC520 | Real algebraic geometry     | 2  |   |   | 2 |   | Assoc. Prof. Dr. Lê Công Trình                            | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Dr. Lê Thanh Hiếu                                         |                                          |
| 21                   | ĐSTC521 | Morse theory                | 2  |   |   | 2 |   | Assoc. Prof. Dr. Lê Công Trình                            | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Dr. Phạm Thùy Hương                                       |                                          |
| 22                   | DSTC522 | Singularity theory          | 2  |   |   | 2 |   | Dr. Phạm Thùy Hương                                       | Department of Mathematics and Statistics |
|                      |         |                             |    |   |   |   |   | Assoc. Prof. Dr. Lê Công Trình                            |                                          |
| II.3 Research topics |         |                             | 12 | 3 | 3 | 3 | 3 |                                                           |                                          |
| 23                   | ĐSCĐ523 | Research topic 1            |    | 3 |   |   |   | Specialized Group in Algebra, Number Theory, and Geometry | Department of Mathematics and Statistics |
| 24                   | ĐSCĐ524 | Research topic 2            |    |   | 3 |   |   | Specialized Group in Algebra, Number Theory, and Geometry | Department of Mathematics and Statistics |
| 25                   | ĐSCĐ525 | Research topic 3            |    |   |   | 3 |   | Specialized Group in Algebra, Number                      | Department of Mathematics and            |

|                             |         |                     |           |           |           |           |           |                                                                                                                              |                                                      |
|-----------------------------|---------|---------------------|-----------|-----------|-----------|-----------|-----------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
|                             |         |                     |           |           |           |           |           | Theory, and<br>Geometry                                                                                                      | Statistics                                           |
| 26                          | ĐSCĐ526 | Research<br>topic 4 |           |           |           |           | 3         | Specialized<br>Group in<br>Algebra,<br>Number<br>Theory, and<br>Geometry                                                     | Department<br>of<br>Mathematics<br>and<br>Statistics |
| <b>III. MASTER'S THESIS</b> |         |                     | <b>12</b> |           |           |           | <b>12</b> |                                                                                                                              |                                                      |
| 27                          | ĐSLV527 | Master's<br>thesis  | 12        |           |           |           | 12        | Lecturers' from<br>Department of<br>Mathematics<br>and Statistics;<br>Invited lecturers<br>outside of Quy<br>Nhon university | Department<br>of<br>Mathematics<br>and<br>Statistics |
| <b>TOTAL</b>                |         |                     | <b>60</b> | <b>16</b> | <b>14</b> | <b>15</b> | <b>15</b> |                                                                                                                              |                                                      |

## 11. GUIDELINES FOR PROGRAM IMPLEMENTATION

- This training program will be implemented from the 2025-2026 academic year for Master's students majoring in Algebra and Number Theory (Research-oriented curriculum) at Quy Nhon University.
- Certain courses within the program may be delivered via online learning, provided they do not exceed 30% of the total program workload and are proposed by the Managing Faculty.
- The training process is based on the designed curriculum, educational objectives, target learners, human resource requirements, and specific training needs. For elective courses, the Managing Faculty will advise students on selecting appropriate modules based on current trends and societal demands.
- The Dean of the Managing Faculty is responsible for organizing and guiding the principles for program development and detailed course syllabi to ensure that objectives, content, and requirements are met, while satisfying the needs of learners and society.
- The training program shall be reviewed, evaluated, and updated in accordance with the current regulations of the Ministry of Education and Training and Quy Nhon University. This ensures the program remains aligned with the advancements in Algebra and Number Theory and meets socio-economic development needs.

*Binh Dinh, April 29, 2025*

**BY THE DELEGATION  
OF THE RECTOR  
VICE-RECTOR**

**DEAN OF FACULTY**

**HEAD OF TRAINING  
OFFICE**

**Assoc. Prof. Dr. Le Cong Trinh**

**Dr. Le Xuan Vinh**

**Dr. Dinh Anh Tuan**