

UNDERGRADUATE PROGRAMME IN BIOENGINEERING 2017

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| Name of the programme: | Bioengineering |
| Major: | Bioengineering |
| Code: | 7420202 |
| Final award: | Bachelor /Engineer in Bioengineering |

(Issued in Decision No. 201A/QD-DHBK-DTĐH dated December 22, 2017 by President of Hanoi University of Science and Technology)

I. Objective of program

1. General objectives

- 1) Ensure students' health; professional responsibility and adaptation to the work environment.
- 2) Train students with moral, bachelor's degree knowledge, comprehensive professional knowledge and master the natural and social principles. Ensuring students have professional skills, capable of participating in research and development of science and technology applications in the field of Biotechnology.

2. Detailed objectives

Graduates of the Bachelor of Bio-engineering program are Equiped with:

- 1) Extensive knowledge to adapt well to various jobs such as research, development and production in the wide field of Biotechnology
- 2) Professional skills and personal qualities needed to succeed in careers
- 3) Social skills needed to work effectively in multidisciplinary teams and in the international environment
- 4) Competence in project planning, design, implementation and operation of biotechnology equipment

II. Time of program and number of credits

Regular program

- Time of education: 4-5 years.
- Number of credits: 131/160 credits

III. Admissions subjects

- 3.1 High school graduates who pass the university entrance exam into a suitable group of Hanoi University of Technology will attend a 4-year program or 4 + 1 year program.
- 3.2 Graduates of the Bachelor of Bioengineering at Hanoi University of Technology are admitted directly to the 1-year transfer program. Graduated with a Bachelor of Food Engineering from Hanoi University of Science and Technology, will be admitted directly to the program for 1 year but must supplement some corresponding modules prescribed for each program to meet the requirements equivalent to the Bachelor of Bioengineering.
- 3.3 Those who are studying for a Bachelor or Engineer in other fields at Hanoi University of Science and Technology can study a dual degree program according to the Regulation on the second major of a regular university system of Hanoi University of Technology.
- 3.4 University graduates from other Hanoi University of Technology or other universities can study the second program according to the general regulations of the Ministry of Education and Training and follow the specific regulations of Hanoi University of Science and Technology.

IV. Training process and graduation conditions

The training process and conditions for graduation apply the Regulation on regular university and college training according to the credit system of Hanoi University of Technology. Students pursuing a degree program must also follow the Regulation on the second major of a regular university system of Hanoi University of Technology.

V. Grade point scale

The letter grade (A, B, C, D, F) and the corresponding 4-point scale are used to evaluate official academic results. The scale of 10 is used for component points (utility points) of the module.

| | 10 scale (component points) | 4 scale | |
|-------------------|--------------------------------|--------------|--------------|
| | | Letter grade | Number grade |
| Passing point | from 9,5 to 10 | A+ | 4,0 |
| | from 8,5 to 9,4 | A | 4,0 |
| | from 8,0 to 8,4 | B+ | 3,5 |
| | from 7,0 to 7,9 | B | 3,0 |
| | from 6,5 to 6,9 | C+ | 2,5 |
| | from 5,5 to 6,4 | C | 2,0 |
| | from 5,0 to 5,4 | D+ | 1,5 |
| | from 4,0 to 4,9 | D | 1.0 |
| Non passing point | Under 4,0 | F | 0 |

* For graduation internship and graduation project: The final grade of C or higher is considered to be passed.

VI. Structure of the programme 2017

Bachelor in Bioengineering

| Order | 2017 | Subject title | Number of credit | Semester according to standard program | | | | | | | | | |
|--|---------|--|------------------|--|---|---|---|---|---|---|---|--|--|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| Political theory + General law | | | 12 | | | | | | | | | | |
| 1 | SSH1110 | Basic Principles of Marxist-Leninist I | 2(2-0-0-4) | | 2 | | | | | | | | |
| 2 | SSH1120 | Basic Principles of Marxist-Leninist II | 3(2-1-0-6) | | | 3 | | | | | | | |
| 3 | SSH1050 | Ho Chi Minh Thought | 2(2-0-0-4) | | | | | 2 | | | | | |
| 4 | SSH1130 | Revolutionary path of the Communist Party of Vietnam | 3(2-1-0-6) | | | | | | | 3 | | | |
| 5 | EM1170 | General law | 2(2-0-0-4) | | 2 | | | | | | | | |
| Physical education (5 Credits) | | | 05 | | | | | | | | | | |
| Defense and security education (165 class hour) | | | | | | | | | | | | | |
| English | | | 06 | | | | | | | | | | |
| 14 | FL1100 | English I | 3(0-6-0-6) | 3 | | | | | | | | | |
| 15 | FL1101 | English II | 3(0-6-0-6) | | 3 | | | | | | | | |
| Basic knowledge of Mathematics and Science | | | 32 | | | | | | | | | | |
| 16 | MI1112 | Analytics I | 3(2-2-0-6) | 3 | | | | | | | | | |
| 17 | MI1122 | Analytics II | 3(2-2-0-6) | | 3 | | | | | | | | |
| 18 | MI1132 | Analytics III | 3(2-2-0-6) | | | | 3 | | | | | | |
| 19 | MI1142 | Algebra | 3(2-2-0-6) | 3 | | | | | | | | | |
| 20 | MI3180 | Probability Statistics and Experimental Planning | 3(3-1-0-6) | | | | | 3 | | | | | |
| 21 | PH1111 | General Physics I | 2(2-0-1-4) | | 2 | | | | | | | | |
| 22 | PH1121 | General Physics II | 2(2-0-1-4) | | | 2 | | | | | | | |
| 23 | PH1131 | General Physics III | 2(2-0-1-4) | | | | 2 | | | | | | |
| 24 | IT1140 | General Informatics | 4(3-1-1-8) | | 4 | | | | | | | | |
| 25 | CH1018 | Chemistry I | 2(2-1-0-4) | 2 | | | | | | | | | |
| 26 | CH3224 | Organic Chemistry | 2(2-1-0-4) | | | 2 | | | | | | | |
| 27 | CH3081 | Physical Chemistry | 2(2-1-0-4) | | | | 2 | | | | | | |
| 28 | CH3082 | Experiments in Physical Chemistry | 1(0-0-2-2) | | | | 1 | | | | | | |
| Basic and Major core subjects | | | 48 | | | | | | | | | | |
| 29 | CH3316 | Analytical Chemistry | 2(2-1-0-4) | | | 2 | | | | | | | |
| 30 | CH3318 | Experiments in Analytical Chemistry | 1(0-0-2-2) | | | 1 | | | | | | | |
| 31 | EE2012 | Electrotechniques | 2(2-1-0-4) | | | | 2 | | | | 3 | | |
| 32 | ME2015 | Descriptive Geometry | 3(3-1-0-6) | | | | 3 | | | | | | |
| 33 | BF2701 | Introduction to Bioengineering | 2(1-1-1-4) | | | 2 | | | | | | | |

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| 34 | BF3711 | Process and Equipment in Biotechnology I | 2(1-1-1-4) | | | | | 2 | | | |
| 35 | BF3712 | Process and Equipment in Biotechnology II | 3(2-1-1-6) | | | | | 3 | | | |
| 36 | BF3713 | Process and Equipment in Biotechnology III | 2(2-1-0-4) | | | | | | 2 | | |
| 37 | BF4725 | Techniques for Measuring and Automatic control in Biotechnology | 2(2-0-1-4) | | | | | | | | 2 |
| 38 | BF4726 | Quality Product Management in Biotechnology | 2(2-0-0-4) | | | | | | | | 2 |
| 39 | BF3714 | Project of Processing and Equipments in Bioengineering | 1 (0-2-0-2) | | | | | | 1 | | |
| 40 | BF2702 | Biochemistry | 4 (4-0-0-8) | | | | | 4 | | | |
| 41 | BF2703 | Experiments in Biochemistry | 2 (0-0-4-4) | | | | | 2 | | | |
| 42 | BF3701 | Microbiology I | 3 (3-0-0-6) | | | | | 3 | | | |
| 43 | BF3702 | Experiments in Microbiology | 2 (0-0-4-4) | | | | | 2 | | | |
| 44 | BF3703 | Cell Biology | 2 (2-0-1-4) | | | | | 2 | | | |
| 45 | BF3704 | Immunology | 2 (2-0-0-4) | | | | | | 2 | | |
| 46 | BF3705 | Genetics and Molecular Biology | 3 (2-2-0-6) | | | | | | 3 | | |
| 47 | BF3706 | Genetic Engineering | 2(2-0-1-4) | | | | | | 2 | | |
| 48 | BF3707 | Bioinformatics | 2 (1-0-2-4) | | | | | | 2 | | |
| 49 | BF3708 | Analytical Methods in Biotechnology | 2 (2-0-1-4) | | | | | | 2 | | |
| 50 | BF4727 | Project work in Bioengineering | 2 (0-4-0-4) | | | | | | | 2 | |
| Social knowledge | | | 09 | | | | | | | | |
| 51 | EM1010 | Introduction to Management | 2(2-1-0-4) | | | | | | | | |
| 52 | EM1180 | Business Culture and Entrepreneurship | 2(2-1-0-4) | | | | | | | 2 | |
| 53 | ED3280 | Applied Psychology | 2(1-2-0-4) | | | | | | | | |
| 54 | ED3220 | Soft Skills | 2(1-2-0-4) | | | | | | | | |
| 55 | ET3262 | Technology and Technical Design Thinking | 2(1-2-0-4) | | | | | | | | |
| 56 | TEX3123 | Industrial Design | 2(1-2-0-4) | | | | | | | | |
| 57 | BF2020 | Technical Writing and Presentation | 3(2-2-0-6) | | | | | | | | |
| Selective subjects | | | 16 | | | | | | | | |
| Module 1: Environmental Biotechnology | | | 11 | | | | | | | | |
| 58 | BF4701 | Biological Engineering for Waste Treatment | 3(2-2-0-6) | | | | | | | 3 | |
| 59 | BF4702 | Environmental Toxicology | 2(2-0-0-4) | | | | | | | 2 | |

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| 60 | BF4703 | Microorganisms II - Environmental Microbiology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | 2 | |
| 61 | EV4241 | Environmental Management | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 62 | BF4704 | Practical work in Biological Engineering for Waste treatment | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | 2 |
| Module 2: Food Biotechnology | | | 11 | | | | | | | | | | | | | | | | | | | |
| 63 | BF4705 | Fermentation Engineering | 3(2-2-0-6) | | | | | | | | | | | | | | | | | | | 3 |
| 64 | BF4706 | Molecular and Immunological Methods in Food Industry | 2(2-0-1-4) | | | | | | | | | | | | | | | | | | | 2 |
| 65 | BF4707 | Microorganisms II - Food Technology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 66 | BF4511 | Enzyme in Food Technology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 67 | BF4708 | Practical work in Fermentation Engineering | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | 2 |
| Module 3: Industrial Biotechnology | | | 11 | | | | | | | | | | | | | | | | | | | |
| 68 | BF4705 | Fermentation Engineering | 3(2-2-0-6) | | | | | | | | | | | | | | | | | | | 3 |
| 69 | BF4709 | Downstream processing | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 70 | BF4711 | Microbiology II - Industrial Microbiology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 71 | BF4712 | Enzymology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 72 | BF4708 | Practical work in Fermentation Engineering | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | 2 |
| Module 4: Molecular Biological and Cell Engineering | | | 11 | | | | | | | | | | | | | | | | | | | |
| 73 | BF4713 | Animal Cell Technology | 3(2-2-0-6) | | | | | | | | | | | | | | | | | | | 3 |
| 74 | BF4714 | Molecular Diagnostics | 2(2-0-1-4) | | | | | | | | | | | | | | | | | | | 2 |
| 75 | BF4715 | Techniques of Virus Cultivation | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 76 | BF4716 | Recombinant DNA Technology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | 2 |
| 77 | BF4717 | Methodology in Recombinant DNA Technology | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | 2 |
| <i>Other selective subjects (5 credits)</i> | | | <i>05</i> | | | | | | | | | | | | | | | | | | | |
| 78 | BF4718 | Techniques for Obtaining Bioactive Compounds from Plant | 2(2-1-0-4) | | | | | | | | | | | | | | | | | | | |
| 79 | BF4719 | Practical work in Techniques for Obtaining Bioactive Compounds from Plant | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | |
| 80 | BF4721 | Genetically Modified Organism and Application | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | |
| 81 | BF4722 | Plant Cell and Tissue Culture Technology | 2(2-0-0-4) | | | | | | | | | | | | | | | | | | | |
| 82 | BF4723 | Practical work in Animal Cell Technology | 2(0-0-4-4) | | | | | | | | | | | | | | | | | | | |

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| 83 | BF4724 | Practical work in Enzyme Technology | 2(0-0-4-4) | | | | | | | | | | |
| 84 | BF4701 | Biological Engineering for Waste Treatment | 3(2-2-0-6) | | | | | | | | | | |
| 85 | BF4702 | Environmental Toxicology | 2(2-0-0-4) | | | | | | | | | | |
| 86 | BF4703 | Microbiology II - Environmental Microbiology | 2(2-0-0-4) | | | | | | | | | | |
| 87 | EV4241 | Environmental Management | 2(2-0-0-4) | | | | | | | | | | |
| 88 | BF4704 | Practical work in Biological Engineering for Waste treatment | 2(0-0-4-4) | | | | | | | | | | |
| 89 | BF4705 | Fermentation Engineering | 3(2-2-0-6) | | | | | | | | | | |
| 90 | BF4706 | Molecular and Immunological Methods in Food Industry | 2(2-0-0-4) | | | | | | | | | | |
| 91 | BF4707 | Microbiology II - Food Microbiology | 2(2-0-0-4) | | | | | | | | | | |
| 92 | BF4511 | Enzymes in Food Technology | 2(2-0-0-4) | | | | | | | | | | |
| 93 | BF4708 | Practical work in Fermentation Engineering | 2(0-0-4-4) | | | | | | | | | | |
| 94 | BF4709 | Downstream processing | 2(2-0-0-4) | | | | | | | | | | |
| 95 | BF4711 | Microbiology II - Industrial Microbiology | 2(2-0-0-4) | | | | | | | | | | |
| 96 | BF4712 | Enzymology | 2(2-0-0-4) | | | | | | | | | | |
| 97 | BF4713 | Animal Cell Technology | 3(2-2-0-6) | | | | | | | | | | |
| 98 | BF4714 | Molecular Diagnostics | 2(2-0-0-4) | | | | | | | | | | |
| 99 | BF4715 | Techniques of Virus Cultivation | 2(2-0-0-4) | | | | | | | | | | |
| 100 | BF4716 | Recombinant DNA Technology | 2(2-0-0-4) | | | | | | | | | | |
| 101 | BF4717 | Methodology in Recombinant DNA Technology | 2(0-0-4-4) | | | | | | | | | | |
| Technical practice and Bachelor thesis | | | 08 | | | | | | | | | | |
| 102 | BF4781 | Technical practice in Bioengineering | 2(0-0-6-4) | | | | | | | | | | 2 |
| 103 | BF4791 | Bachelor thesis in Bioengineering | 6(0-0-12-12) | | | | | | | | | | 6 |
| Total: | | | 131 | 13 | 14 | 17 | 16 | 15 | 17 | 16 | 14 | | |

Engineer in Bioengineering

| Order | Subject title | Number of credits | Semester according to standard program | | | | | | | | | | | | |
|-------|---|-------------------|--|---|---|---|---|---|---|---|---|----|----|----|--|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| I | General education program (see Bachelor program) | 50 | | | | | | | | | | | | | |
| II | Basic and Major core subjects (see Bachelor program) | 48 | | | | | | | | | | | | | |
| III | Application-oriented subjects (Bachelor program) | 16 | | | | | | | | | | | | | |
| IV | Technical practice in Bioengineering | 2 | | | | | | | | | | | | | |
| V | Application-oriented subjects (Students choose one compulsory module (15 credits), the remaining 4 credits choose from other elective subjects not in the chosen orientation) | 19 | | | | | | | | | | | 19 | 16 | |
| | Module 1: Environmental Biotechnology | 15 | | | | | | | | | | | 15 | | |
| | Module 2: Food Biotechnology | 15 | | | | | | | | | | | 15 | | |
| | Module 3: Industrial biotechnology | 15 | | | | | | | | | | | 15 | | |
| | Module 4: Molecular and cell biology techniques | 15 | | | | | | | | | | | 15 | | |
| | Other elective subjects (students choose 4 credits) | 4 | | | | | | | | | | | 4 | | |
| VI | Graduation practice in Bioengineering | 4 | | | | | | | | | | | | 4 | |
| VII | Engineer thesis in Bioengineering | 12 | | | | | | | | | | | | 12 | |
| VIII | Social knowledge | 9 | | | | | | | | | | | | | |
| | Total credit of program | 160 | | | | | | | | | | | | | |