

PROGRAM STRUCTURE

LEVEL	: Undergraduate
SCHOOL	: School of Science
PROGRAM	: 623110500 : Bachelor of Science Program in Biotechnology
PROGRAM YEAR	: 2562

1 General Education Course MINIMUM CREDIT : 30

1.1 Language Course MINIMUM CREDIT : 15

Course Code	COURSE	CREDIT
<u>1005120</u>	Thai for Communication E2: 1001105 Thai Language Skills 3 (3-0-6) OR E1: 1005121 Thai Language Conversation in Daily Life 3 (2-2-5)	3 (3-0-6)
<u>1006134</u>	English for Communication 1 P: 1006002 Intensive English 0 (3-0-6) OR P: 1006003 Intensive English for English Majors 0 (3-0-6)	3 (3-0-6)
<u>1006135</u>	English for Communication 2 P: 1006134 English for Communication 1 3 (3-0-6)	3 (3-0-6)
<u>2408101</u>	Chinese 1 E2: 2408001 Chinese 1 3 (3-0-6) OR E2: 1007101 Chinese 1 3 (3-0-6)	3 (3-0-6)
<u>2408102</u>	Chinese 2 P: 2408101 Chinese 1 3 (3-0-6) OR P: 2408001 Chinese 1 3 (3-0-6) OR P: 1007101 Chinese 1 3 (3-0-6) ----- E2: 2408002 Chinese 2 3 (3-0-6)	3 (3-0-6)

1.2 Social Science Course MINIMUM CREDIT : 6

Course Code	COURSE	CREDIT
<u>1203102</u>	Managing Organization and Entrepreneurship	3 (3-0-6)
<u>1601104</u>	Global Citizenship E1: 1601103 Know Your Laws 3 (3-0-6) AND E1: 2302102 Man and Society 3 (3-0-6) OR	3 (3-0-6)

E1: 1601103 Know Your Laws 3 (3-0-6) AND
 E1: 2302101 ASEAN Studies 3 (3-0-6)

1.3 Science and Mathematics Course MINIMUM CREDIT : 6

Course Code	COURSE	CREDIT
<u>1101105</u>	Sciences and Mathematics All Around E1: 1101100 Science for Life 3 (3-0-6) AND E1: 1106100 Mathematics for Life 3 (3-0-6)	3 (3-0-6)
<u>1301110</u>	Introduction to Information Technology and Data Science E1: 1301104 Introduction to Information Technology 3 (2-2-5) OR E1: 1301107 Basic Information Technology 3 (2-2-5)	3 (2-2-5)

1.4 Humanities Course MINIMUM CREDIT : 3

Course Code	COURSE	CREDIT
<u>1001127</u>	Psychology in Daily Life E2: 1001141 General Psychology 3 (3-0-6)	3 (3-0-6)

1.5 Integrative Course (non-credit) MINIMUM CREDIT : -

Course Code	COURSE	CREDIT
<u>MFU333</u>	MFU Character	0 (0-6-2)

2 Specific Required Course MINIMUM CREDIT : 91

2.1 Core Course MINIMUM CREDIT : 30

Course Code	COURSE	CREDIT
<u>1100202</u>	Cells Molecular Biology and Genetics P: 1103108 Fundamentals of Biology 4 (3-3-7) OR P: 1103101 General Biology 1 3 (2-3-5) AND P: 1103102 General Biology 2 3 (2-3-5)	4 (3-3-7)
<u>1102100</u>	Principles of Chemistry E1: 1102101 General Chemistry 1 3 (2-3-5)	3 (2-3-5)
<u>1102230</u>	Principles of Organic Chemistry P: 1102100 Principles of Chemistry 3 (2-3-5) OR P: 1102102 General Chemistry 2 3 (2-3-5) OR P: 1102109 Fundamentals of Chemistry 4 (3-3-7)	3 (2-3-5)
<u>1102250</u>	Principles of Biochemistry P: 1102102 General Chemistry 2 3 (2-3-5) AND P: 1103102 General Biology 2 3 (2-3-5) OR P: 1102100 Principles of Chemistry 3 (2-3-5) AND	3 (2-3-5)

	P: 1103108 Fundamentals of Biology 4 (3-3-7) OR P: 1102100 Principles of Chemistry 3 (2-3-5) AND P: 1103101 General Biology 1 3 (2-3-5) AND P: 1103102 General Biology 2 3 (2-3-5) OR P: 1102102 General Chemistry 2 3 (2-3-5) AND P: 1103108 Fundamentals of Biology 4 (3-3-7) OR P: 1102109 Fundamentals of Chemistry 4 (3-3-7) AND P: 1103108 Fundamentals of Biology 4 (3-3-7)	
<u>1103108</u>	Fundamentals of Biology E1: 1103101 General Biology 1 3 (2-3-5) AND E1: 1103102 General Biology 2 3 (2-3-5)	4 (3-3-7)
<u>1103211</u>	Microbiology P: 1103102 General Biology 2 3 (2-3-5) OR P: 1103108 Fundamentals of Biology 4 (3-3-7)	4 (3-3-7)
<u>1104100</u>	Principles of Physics E1: 1104101 General Physics 1 3 (2-3-5) OR E2: 1806106 Physics for Sports Science 3 (2-2-5)	3 (2-2-5)
<u>1106103</u>	Mathematics 1	3 (3-0-6)
<u>1106283</u>	Statistics and Experimental Design E2: 1106282 Statistics and Experimental Design 3 (3-0-6)	3 (2-3-5)

2.2 Major Required Course MINIMUM CREDIT : 46

Course Code	COURSE	CREDIT
<u>1100304</u>	Bioinformatics P: 1100301 Cell and Molecular Biology 3 (2-3-5) OR P: 1100202 Cells Molecular Biology and Genetics 4 (3-3-7)	3 (3-0-6)
<u>1100305</u>	Gene Technology P: 1100301 Cell and Molecular Biology 3 (2-3-5) AND P: 1103222 Genetics 3 (2-3-5) OR P: 1100202 Cells Molecular Biology and Genetics 4 (3-3-7)	3 (2-3-5)
<u>1101104</u>	Creative Thinking and STEM Education	3 (3-0-6)
<u>1103313</u>	Microbial Physiology P: 1103211 Microbiology 4 (3-3-7)	3 (2-3-5)
<u>1105102</u>	Orientation to Biotechnology	2 (2-0-4)
<u>1105215</u>	Bioprocess Engineering 1 P: 1102250 Principles of Biochemistry 3 (2-3-5)	3 (2-3-5)
<u>1105221</u>	Instrumentation Biotechnology Laboratory P: 1103108 Fundamentals of Biology 4 (3-3-7) OR P: 1103101 General Biology 1 3 (2-3-5) AND P: 1103102 General Biology 2 3 (2-3-5)	3 (1-6-5)

<u>1105315</u>	Bioprocess Engineering 2 P: 1105215 Bioprocess Engineering 1 3 (2-3-5)	3 (2-3-5)
<u>1105326</u>	Quality Control and Assurance in Biotechnology	3 (2-2-5)
<u>1105327</u>	Entrepreneurship for Science	3 (3-0-6)
<u>1105328</u>	Seminar	1 (0-3-6)
<u>1105406</u>	Scientific Writing and Publication P: 1006122 English 1 3 (3-0-6)	3 (3-0-6)
<u>1105407</u>	Ethics in Biotechnology E2: 1101101 Professional Ethics 1 (1-0-2)	1 (1-0-2)
<u>1105481</u>	Senior Project	3 (0-9-3)
<u>1105494</u>	Co-operative Education	6 (0-40-6)
<u>1112101</u>	Engineering Drawing	3 (1-6-4)

2.3 Major Elective Course MINIMUM CREDIT : 15

Course Code	COURSE	CREDIT
<u>1100309</u>	Plant Tissue Culture P: 1103102 General Biology 2 3 (2-3-5) OR P: 1103108 Fundamentals of Biology 4 (3-3-7)	3 (2-3-5)
<u>1100311</u>	Plant Physiology P: 1103102 General Biology 2 3 (2-3-5) OR P: 1103108 Fundamentals of Biology 4 (3-3-7)	3 (2-3-5)
<u>1100312</u>	Plant Systematics P: 1103102 General Biology 2 3 (2-3-5) OR P: 1103108 Fundamentals of Biology 4 (3-3-7)	3 (2-3-5)
<u>1100313</u>	Plant Breeding P: 1103222 Genetics 3 (2-3-5) OR P: 1100202 Cells Molecular Biology and Genetics 4 (3-3-7)	3 (2-3-5)
<u>1100315</u>	Bioeconomy	3 (3-0-6)
<u>1100316</u>	Biomass and Biorefinery P: 1105215 Bioprocess Engineering 1 3 (2-3-5)	3 (3-0-6)
<u>1100317</u>	Immunology P: 1103211 Microbiology 4 (3-3-7)	3 (3-0-6)
<u>1100319</u>	Economic Crop Production P: 1103108 Fundamentals of Biology 4 (3-3-7)	3 (2-3-5)
<u>1100405</u>	Plant Genetic Engineering P: 1100305 Gene Technology 3 (2-3-5) OR P: 1100202 Cells Molecular Biology and Genetics 4 (3-3-7)	3 (2-3-5)
<u>1103312</u>	Industrial Microbiology P: 1103211 Microbiology 4 (3-3-7)	3 (2-3-5)
<u>1103314</u>	Microbial Pathogenesis P: 1103211 Microbiology 4 (3-3-7)	3 (3-0-6)

<u>1103315</u>	Agricultural Microbiology P: 1103211 Microbiology 4 (3-3-7)	3 (2-3-5)
<u>1103319</u>	Biodiversity and Conservation P: 1103108 Fundamentals of Biology 4 (3-3-7)	3 (3-0-6)
<u>1105322</u>	Algal Biotechnology P: 1100201 Introduction to Biotechnology 3 (3-0-6) OR P: 1105101 Introduction to Biotechnology 1 (1-0-2) OR P: 1103211 Microbiology 4 (3-3-7)	3 (2-3-5)
<u>1105354</u>	Fungal Biotechnology P: 1103211 Microbiology 4 (3-3-7)	3 (2-3-5)
<u>1105355</u>	Apicultural Biotechnology	3 (2-3-5)
<u>1105356</u>	Current Topics in Biotechnology	3 (3-0-6)
<u>1105357</u>	Waste Treatment and Utilization P: 1105215 Bioprocess Engineering 1 3 (2-3-5)	3 (3-0-6)
<u>1105358</u>	Forensic Science Biotechnology	3 (2-3-5)
<u>1105359</u>	Medical and Pharmaceutical Biotechnology P: 1100317 Immunology 3 (3-0-6)	3 (3-0-6)
<u>1105362</u>	Food Biotechnology P: 1103102 General Biology 2 3 (2-3-5) OR P: 1105102 Orientation to Biotechnology 2 (2-0-4)	3 (2-3-5)

3 Free Elective Course MINIMUM CREDIT : 6

REMARKS

P : Prerequisite Course

E1 : One-way Equivalent

E2 : Two-way Equivalent

รายวิชา 1006393 Principles of Translation 3(3-0-6) ในกรณีที่นักศึกษาไม่สามารถใช้ภาษาไทยได้ ให้เรียนรายวิชา 1006382 Directed Studies แทน

รายวิชา 1006397 Comparative Study of English and Thai 3(3-0-6) ในกรณีที่นักศึกษาไม่สามารถใช้ภาษาไทยได้ ให้เรียน

รายวิชา 1006381 Selected Reading แทน