Mathematics and Computer Science

Introduction

The contribution of Mathematics and Computer Science to modern business practice is becoming more important as there are so many related fields such as process and system engineering, quality control, actuaries, product design/model planning, prediction, management and living environment, all of which use the most sophisticated electronics technology, mathematics, and computer software. The combination of two study programs into one study program is intended to maximize the capabilities of the students to solve problems in these many related fields. To give working experience for student, we provide the facilities to practice in industry for 1 semester in national and international companies besides 4.5 years they study in campus. We facilitate student to job training at industry, research with industry and entrepreneurship program.

Vision

A world class department in Computational Mathematics based on ICT.

Mission

The mission of Computer Science and Mathematics Program is to contribute to the global community through the provision of world-class education by:

1. Educating students with fundamental knowledge & skills to apply Computational Mathematics using ICT in developing innovative algorithm and software for a career as an applied mathematician or system analyst;
2. Providing solid learning experience through creating the most creative and value-added talents of leaders for global community as well as conducting professional services to improve the quality of life;
3. Providing high impact research that positively contributing to the quality of life of Indonesians and the international community.

Program Objective

The objectives of the program are:

1. To provide students with a solid knowledge ranging from Fundamental Mathematics and Computer Science to Computational Mathematics and Computing Technology;
2. To provide students with knowledge and abilities in conducting mathematical analysis and modeling to solve problem in related fields to be successful applied mathematics career;
3. To prepare students with necessary techniques & skills in developing innovative algorithm and software to be excellence system analyst.

Student Outcomes

After completing the study, graduates are:

1. Able to create software application design by applying the principles of database system design to solve structured and semi-structured data;
2. Able to design software application solution based on problem analysis which can be solved with structured approach in informatics area;
3. Able to assess technology trend in informatics area to deliver an alternative solution of software development;
4. Able to explore, logical reasoning, generalization abstraction, and formal proof in formulating and model problems with specific variables and assumptions through mathematical approach with or without mathematical software;

5. Able to construct, modify, analyze mathematical models of a system/problems, assess accuracy of the models and make conclusions;

6. Able to analyze various alternative mathematical models that are available and present the conclusions of analysis independently or in groups for making decision;

7. Able to create software by implementing mathematical models.

Prospective Career of the Graduates

The graduates of the double Study Program Mathematics and Computer Science could follow careers in :

1. Information Technology area (Software and Game Developer, IT Consultant)

2. Computer (Network Specialist, Computer Simulation Specialist)

3. Industry (Educator, Quantitative Product Planner, Optimization Analyst)

4. Business (Quantitative Credit Analyst, Actuary Analyst)

5. Management (DSS Manager, Business Analyst)

Curriculum

With reference to the Vision and Mission of UBINUS, the role of Mathematics and Computer Science in the future and its current standing in Indonesia, the Study Program will contain the following elements:

1. Solid education to increase mathematical reasoning capability and ability to solve problems in other fields.

2. The academic atmosphere that will facilitate students' learning in order that student will develop skills in communicating their mathematical reasoning and skill in software engineering.

3. An environment that fosters active learner independence and encourages students to be able to succeed in their professional career and in fields related to Mathematics and Computer Science.

Furthermore, besides this department provides the means and expertise in Mathematics and Computer Science to prepare students for a career as a Applied Mathematician or Software Engineer who is able to create mathematical models to solve problems in many related fields, it also provides capability in developing Computer Science or Applied Mathematics both in Indonesia and among the nations of the world in order to pursue higher degree of education.

Course Structure

Sem	Code	Course Name		SCU	Total
1	CHAR6013	Character Building: *Pancasila*		2	20
	COMP6060	Programming Language Concepts		2	
	COMP6047	Algorithm and Programming		4/2	
	MATH6038	Calculus I*		4	
	MATH6025	Discrete Mathematics*		4	
	English University Courses I				
	ENGL6128	English in Focus		2	
	ENGL6130	English for Business Presentation		2	
2	CHAR6014	Character Building: *Kewarganegaraan*		2	21
	MATH6015	Applied Linear Algebra*&**		4	
	MATH6016	Calculus II		4	
	COMP6048	Data Structures		4/2	
	STAT6026	Probability and Statistics*		2	
	LANG6061	Indonesian		1	

Sem	Code	Course Name	SCU	Total
	English University Courses II			
	ENGL6129	English Savvy	2	
	ENGL6131	English for Written Business Communication	2	
3	CHAR6015	Character Building: *Agama*	2	24
	MATH6008	Mathematical Statistics I*&***	4	
	MATH6019	Calculus III	4	
	COMP6175	Object Oriented Programming	2/2	
	COMP6056	Program Design Methods	4	
	MATH6056	Scientific Computing Lab*&***	2	
	MATH6133	Numerical Methods*&***	4	
4	COMP6176	Human and Computer Interaction	2/2	24
	ISYS6169	Database Systems	4/2	
	ENTR6509	Entrepreneurship: Ideation	2	
	MATH6009	Mathematical Statistics II	4	
	MATH6023	Complex Variable Function*&***	4	
	MATH6057	Ordinary Differential Equations*&***	2/2	
5	MATH6026	Mathematics Programming*&***	4	23
	CPEN6098	Computer Networks	2/2	
	COMP6153	Operating System	2/2	
	COMP6639	Artificial Intelligence***	5	
	MATH6068	Partial Differential Equations	2	
	COMP6049	Algorithm Design and Analysis	4	
6	COMP6099	Advanced Object Oriented Programming	2	23
	COMP6640	Software Engineering***	5	
	MATH6069	Applied Mathematics Modeling*	2	
	MATH6050	Actuarial Mathematics	4	
	MATH6018	Modern Algebra*	4	
	MATH6064	Applied Projective Geometry	2	
	MATH6021	Real Analysis*	4	
7	ENTR6511	Entrepreneurship: Market Validation	2	24
	COMP6062	Compilation Techniques	4	
	MATH6043	Seminar	2	
	MATH6066	Computational Geometry*	2/1	
	COMP7116	Computer Vision	2/2	
	MATH6067	Cryptography	2/1	
	MATH6063	Coding Theory*	4	
	MATH6134	Geometric Algebra*&***	2	
8	COMP6051	Web Programming	2/1	22
	MOBI6021	Mobile Programming	2/2	
	MATH6061	Computational Number Theory*	2/1	
	COMP8108	Natural Language Processing	2/1	
	MATH6049	Mathematics of Finance*	4	
	COMP7066	Expert Systems	2/1	
	STAT6021	Research Methodology*	2	
9	**Enrichment Program**		15	15
10	MATH6041	Thesis	6	6
			TOTAL CREDITS 202 SCU	

*) This course is delivered in English

**) Global Learning System Course

***) Entrepreneurship Embedded

English University Courses:

-) *For 1st Semester: English University Courses I, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English in Focus, and student with score test greater than or equal to 500 will take English for Business Presentation*

-) *For 2nd Semester: English University Courses II, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English Savvy, and student with score test greater than or equal to 500 will take English for Written Business Communication*

-) *Students must pass English Savvy with a minimum Grade of C.*

Enrichment Program (9th Semester):

-) *Student will take one of enrichment program tracks (off campus).*

Enrichment Internship Track

Code	Course Name	SCU	Total
MATH6073	Internship	8	15
MATH6074	Mathematical Modeling Solution in Industry	2	
MATH6075	Applied Programming in Industry	2	
MATH6114	EES in Mathematics Industry	3	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
ENTR6291	Business Start Up	8	15
ENTR6203	Business Model & Validation in Mathematics	2	
ENTR6204	Launching New Venture in Mathematics	2	
ENTR6235	EES in New Mathematical Business	3	

Enrichment Research Track

Code	Course Name	SCU	Total
RSCH6224	Research Experience	8	15
RSCH6154	Scientific Writing in Mathematics	4	
RSCH6179	Global EES in Mathematics Research	3	

Enrichment Community Development Track

Code	Course Name	SCU	Total
CMDV6124	Community Outreach Project Implementation	8	15
CMDV6072	Community Outreach in Mathematics Project Design	4	
CMDV6095	Employability and Entrepreneurial Skills in Mathematics	3	

Enrichment Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			
GLOB6005	Elective Course for Study Abroad 1	4	
GLOB6006	Elective Course for Study Abroad 2	4	
GLOB6007	Elective Course for Study Abroad 3	4	
GLOB6008	Elective Course for Study Abroad 4	4	
GLOB6009	Elective Course for Study Abroad 5	2	
GLOB6010	Elective Course for Study Abroad 6	2	
GLOB6011	Elective Course for Study Abroad 7	2	15
GLOB6012	Elective Course for Study Abroad 8	2	
GLOB6013	Elective Course for Study Abroad 9	2	
GLOB6014	Elective Course for Study Abroad 10	2	
GLOB6015	Elective Course for Study Abroad 11	2	
GLOB6016	Elective Course for Study Abroad 12	2	
GLOB6041	Elective Course for Study Abroad 25	3	
GLOB6042	Elective Course for Study Abroad 26	1	

*)Transferred courses will be transferred based on credit transfer policies on study program with total of 15 credits

Student should pass all of these quality controlled courses as listed below:

No	Course Code	Course Name	Minimal Grade
1.	CHAR6013	Character Building: *Pancasila*	B
2.	ENTR6511	Entrepreneurship: Market Validation	C
3.	COMP6047	Algorithm and Programming*	C
4.	COMP6048	Data Structures*	C
5.	ISYS6169	Database Systems	C
6.	MATH6019	Calculus III*	C
7.	COMP6153	Operating System	C
8.	COMP6640	Software Engineering*	C
9.	MATH6068	Partial Differential Equations	C
10.	MATH6018	Modern Algebra	C
11.	MATH6133	Numerical Methods*	C
12.	MATH6069	Applied Mathematics Modeling*	C
13.	COMP6639	Artificial Intelligence	C
14.	MATH6066	Computational Geometry	C

*) Tutorial & Multipaper