

Computer Science & Mathematics

Introduction

The contribution of Computer Science and Applied Mathematics 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 year in national and international companies besides 4 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-Mathematics Department is to contribute to the global community through the provision of world-class education by :

1. Educating students with fundamental knowledge & skills of to apply Computational Mathematics using ICT in developing innovative algorithm and software for a career as an applied mathematician or system analyst.
2. Providing a solid learning experience through creating the most creative and value-added talents of leaders for the 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 modelling to solve problem in related fields and to be successful applied mathematics career.
3. To prepare students with the necessary techniques & skills in developing innovative algorithm and software to be excellence system analyst.

Graduate Competency

At the end of the program, graduates will be able to :

1. Apply knowledge and understanding of mathematical concepts, principles and theories relating to computer science knowledge.
2. Demonstrate knowledge and understanding of algorithm concepts, principles and theories relating to computer science knowledge.
3. Classify problems and to apply design and development principles for specific problems.

4. Classify criteria and specifications appropriate to specific problems, plan strategies for their solution and construct software system development.
5. Apply, analyze and solve problems using Fundamental Mathematics.
6. Interpret, analyze and create mathematical solution in form of algorithm.
7. Recognize, apply, appraise various Mathematics.
8. Analyze, compose, and assess innovative algorithm in order to solve real problems in many related fields.
9. Apply, analyze, formulate and evaluate using advanced Computational Mathematics.
10. Use and analyze current techniques and skills in order to design and evaluate recent software.

Prospective Career of the Graduates

The graduates of the double study program Computer Science and Applied Mathematics 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, business analyst)
5. Management (DSS manager, actuary)

Curriculum

With reference to the Vision and Mission of UBINUS, the role of Computer Science and Applied Mathematics 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 students 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 Computer Science and Applied Mathematics.

Furthermore, besides this department provides the means and expertise in Computer Science and Applied Mathematics to prepare students for a career as a Applied Mathematician or Software Engineer who be 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 | 20 | |
| | MATH6015 | Applied Linear Algebra | 4 | | |
| | MATH6016 | Calculus II | 4 | | |
| | COMP6048 | Data Structures | 4/2 | | |
| | STAT6026 | Probability and Statistics | 2 | | |
| | English University Courses II | | | | |
| | ENGL6129 | English Savvy | 2 | | |
| | ENGL6131 | English for Written Business Communication | 2 | | |
| 3 | CHAR6015 | Character Building: Agama | 2 | 24 | |
| | COMP6175 | Object Oriented Programming | 2/2 | | |
| | COMP6056 | Program Design Methods | 4 | | |
| | MATH6056 | Scientific Computing Lab | 2 | | |
| | MATH6008 | Mathematical Statistics I | 4 | | |
| | MATH6019 | Calculus III | 4 | | |
| | MATH6057 | Ordinary Differential Equations | 2/2 | | |
| 4 | COMP6176 | Human and Computer Interaction | 2/2 | 24 | |
| | ISYS6169 | Database Systems | 4/2 | | |
| | MATH6068 | Partial Differential Equations | 2 | | |
| | MATH6009 | Mathematical Statistics II | 4 | | |
| | MATH6018 | Modern Algebra | 4 | | |
| | MATH6023 | Complex Variable Function | 4 | | |
| 5 | MATH6026 | Mathematics Programming | 4 | 24 | |
| | CPEN6098 | Computer Networks | 2/2 | | |
| | COMP6153 | Operating System | 2/2 | | |
| | ENTR6003 | Entrepreneurship I | 2 | | |
| | MATH6059 | Geometric Algebra | 4 | | |
| | COMP6049 | Algorithm Design and Analysis | 4 | | |
| | MATH6058 | Numerical Methods I | 2 | | |

| Sem | Code | Course Name | SCU | Total |
|-----------------------------|---------------------------|--------------------------------------|-----|-------|
| 6 | COMP6099 | Advanced Object Oriented Programming | 2 | 24 |
| | COMP6100 | Software Engineering* | 4 | |
| | COMP6065 | Artificial Intelligence | 4 | |
| | MATH6050 | Actuarial Mathematics | 4 | |
| | MATH6092 | Numerical Methods II | 2 | |
| | MATH6064 | Applied Projective Geometry | 2 | |
| | MATH6021 | Real Analysis | 4 | |
| | STAT6021 | Research Methodology | 2 | |
| 7 | ENTR6004 | Entrepreneurship II | 2 | 24 |
| | COMP6062 | Compilation Techniques | 4 | |
| | MATH6043 | Seminar | 2 | |
| | MATH6066 | Computational Geometry | 2/1 | |
| | MATH6095 | Applied Mathematics Modeling* | 2 | |
| | COMP7116 | Computer Vision | 2/2 | |
| | MATH6067 | Cryptography | 2/1 | |
| | MATH6063 | Coding Theory | 4 | |
| 8 | COMP6051 | Web Programming | 2/1 | 20 |
| | MOBI6021 | Mobile Programming | 2/2 | |
| | MATH6061 | Computational Number Theory | 2/1 | |
| | COMP8108 | Natural Language Processing | 2/1 | |
| | MATH6049 | Mathematics of Finance | 4 | |
| | COMP7066 | Expert System | 2/1 | |
| 9 | Enrichment Program | | 16 | 16 |
| 10 | MATH6041 | Thesis/Final Project | 6 | 6 |
| TOTAL CREDIT 202 SCU | | | | |

*) 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

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 | 16 |
| MATH6074 | Mathematical Modeling Solution in Industry | 2 | |
| MATH6075 | Applied Programming in Industry | 2 | |
| MATH6076 | EES in Mathematics Industry | 4 | |

Enrichment Entrepreneurship Track

| Code | Course Name | SCU | Total |
|----------|--|-----|-------|
| ENTR6291 | Business Start Up | 8 | 16 |
| ENTR6203 | Business Model & Validation in Mathematics | 2 | |
| ENTR6204 | Launching New Venture in Mathematics | 2 | |
| ENTR6205 | EES in New Mathematical Business | 4 | |

Enrichment Research Track

| Code | Course Name | SCU | Total |
|----------|------------------------------------|-----|-------|
| RSCH6224 | Research Experience | 8 | 16 |
| RSCH6154 | Scientific Writing in Mathematics | 4 | |
| RSCH6155 | Global EES in Mathematics Research | 4 | |

Enrichment Community Development Track

| Code | Course Name | SCU | Total |
|----------|---|-----|-------|
| CMDV6124 | Community Outreach Project Implementation | 8 | 16 |
| CMDV6072 | Community Outreach in Mathematics Project Design | 4 | |
| CMDV6073 | Employability and Entrepreneurial Skills in Mathematics | 4 | |

Enrichment Study Abroad Track*

| Course Name | SCU | Total | |
|-----------------------------|-------------------------------------|-------|----|
| Enrichment Program I | | | |
| GLOB6005 | Elective Course for Study Abroad 1 | 4 | 16 |
| 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 | |
| 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 | |

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 16 credits.

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

| No | Code | Course Name | Minimum Grade |
|----|----------|--------------------------------|---------------|
| 1 | CHAR6013 | Character Building: Pancasila | B |
| 2 | ENTR6004 | Entrepreneurship II | 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 | COMP6100 | Software Engineering* | C |
| 9 | MATH6068 | Partial Differential Equations | C |
| 10 | MATH6018 | Modern Algebra | C |
| 11 | MATH6092 | Numerical Methods II* | C |
| 12 | MATH6095 | Applied Mathematics Modeling* | C |
| 13 | COMP6065 | Artificial Intelligence | C |
| 14 | MATH6066 | Computational Geometry | C |

*) Tutorial & Multipaper