

Computer Science

Introduction

In the new millennium and the global era, the role of information and automation in the various domains and activities of the business industry are becoming more important. The successes of the activities are determined by its information system. Information must be up-to-date, accurate and comprehensive to allow decision makers to determine the enterprise's strategy. Furthermore, automation can facilitate human activity, accelerate the pace of work and make it more effective and efficient, while also increasing productivity in various activities. The development of communication and computer technology has made it possible to get information that is rapid, exact, and accurate, while increasing the application of automation in various fields such as Industry, business, office affairs and in the development of science and technology.

The Computer Science study program was founded in September 1987, under STMIK BINA NUSANTARA; it became one of the programs under the coordination of the Faculty of Computer Science, BINA NUSANTARA UNIVERSITY in December 1998.

The study of computer science at BINA NUSANTARA UNIVERSITY puts emphasis on the process, techniques, and tools that go into developing computer based systems, with specialities in object oriented software engineering, multimedia, web, database and computer network orientation.

Vision

A study program of choice in Computer Science which focuses in developing creative software solutions for industry, is recognized internationally, champions innovation and delivers graduates with international qualification.

Mission

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

1. Educating students with fundamental and advance knowledge, skill and practice in software development specialized in database technology, intelligence system, networking or multimedia and game development by providing an excellent learning environment and promoting research and collaboration with global industry.
2. Providing IT professional services with emphasis in application of knowledge in terms of society development.
3. Sharing application of knowledge related to computer science for Indonesian and international community quality of life improvement.
4. Promoting students & lecturers to be creative and value-addings talents in computer science by creating suitable environment in order to be able to compete in international level.
5. Preparing students for becoming smart and good ICT professionals, leaders and entrepreneurs in global market or for continuing in advanced studies.

Program Objective

The objectives of the program are :

1. To provide students with a solid foundation of mathematical, algorithm principles, computer science knowledge and ethical that will be needed in IT practice.
2. To provide students with skills to apply design and development principles in the construction of software system applied in database technology, intelligence system, networking and multimedia development.
3. To prepare students with abilities to keep up-to-date with the latest Information Technology trends, developments and industries.
4. To prepare students with abilities in problem solving and good communication skills to be able to work as an individual or in a team in an IT environment.

Graduate Competency

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

1. Able to apply knowledge and understanding of mathematical concepts, principles and theories relating to computer science knowledge.
2. Able to demonstrate knowledge and understanding of algorithm concepts, principles and theories relating to computer science knowledge.
3. Able to classify problems and to apply design and development principles for specific problems.
4. Able to classify criteria and specifications appropriate to specific problems, plan strategies for their solution and construct software system development.
5. Able to construct a solution by applying current technologies.
6. Able to depict trend technologies in the future.

Prospective Career of the Graduates

After finishing the program, the graduate of Computer Science Study Program could follow a career as:

1. Software Engineer/Developer
2. System Analyst/Developer
3. Web Engineer/Developer
4. Computer Network Specialist
5. Database Specialist
6. IT Support/Consultant
7. Multimedia Programmer
8. Lecturer/Trainer

Curriculum

The present curriculum used in the Computer Science study program has been developed in line with the National Curriculum. Also, the local content has been developed in line with the Computer Science Curriculum standard of ACM (Association for Computing Machineries), several local and foreign universities, and market trends, so that the graduates of the Computer Science study program are expected to be able to face competition at both a national and international level.

Generally, the subjects of the curriculum 2014 are divided into these following groups of subjects:

Mathematics Group (Science)

The objective of this group is to provide an understanding of mathematics as one of the principal foundations in computer science. Another objective is to give an understanding of scientific methodology (data collection, hypothesis, research, analysis) in problem solving.

Character Building Group (Professional Practices)

The objective of this group is to develop the personal strengths of the student and to provide him or her with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethic, ability to work as a team, and to develop a "Binusian" Character.

Core Group

The objective of this group is to provide a grounding in Computer Science through practice as well as applied theory which are required by business both now and in the future. The subjects that are included in this group are programming, algorithm design and analysis, software engineering, databases, computer graphs, multimedia, computer and human interaction, operation system, computer architecture, and computer network.

Concentration Subject (Stream)

The objective of this group is to give students the opportunity to obtain a deep understanding of a range of disciplines in computer science. The students are expected to develop their skills and master the techniques which will allow them to conduct research for both their thesis and/or to continue their studies.

The Concentration subjects (Stream) provide:

1. Software Engineering: to explore the various methodologies and software engineering equipment.
2. Intelligence Systems: to explore the various techniques of computer intelligence that can be applied for problem solving.
3. Database Technology: to explore the various technologies and Database Application.
4. Networking: to explore computer networking which consists of installation, administration, and computer networking management.
5. Applied Networking (CISCO): to explore computer networking technology based on computer network equipment (CISCO equipment).
6. Interactive Multimedia : to explore computer interactive multimedia applications, based on computer programming, design tools, and software engine.
7. Applied Database : to explore computer specialized technology for database application development based on Oracle product.

Entrepreneur and Employability Skill (Internship)

The objective of this group of subject is to prepare students with professional experience, work ethics and to experience working environment. The students are expected to apply and to practice their knowledge in the real working area such as industry, research lab, and also as entrepreneur start up. And give reports as the result of the subjects.

Course Structure

| Sem | Code | Course Name | SCU | Total | |
|------------------------------------|--|--|-----|-------|--|
| 1 | CHAR6013 | Character Building: Pancasila | 2 | 20 | |
| | MATH6025 | Discrete Mathematics | 4 | | |
| | COMP6060 | Programming Language Concepts | 2 | | |
| | COMP6047 | Algorithm and Programming | 4/2 | | |
| | MATH6031 | Calculus | 4 | | |
| | English University Courses I | | | | |
| | ENGL6128 | English in Focus | 2 | | |
| | ENGL6130 | English for Business Presentation | 2 | | |
| 2 | CHAR6014 | Character Building: Kewarganegaraan | 2 | 20 | |
| | COMP6048 | Data Structures | 4/2 | | |
| | MATH6030 | Linear Algebra | 2 | | |
| | COMP6056 | Program Design Methods | 4 | | |
| | COMP6175 | Object Oriented Programming | 2/2 | | |
| | English University Courses II | | | | |
| | ENGL6129 | English Savvy | 2 | | |
| | ENGL6131 | English for Written Business Communication | 2 | | |
| 3 | COMP6049 | Algorithm Design and Analysis | 4 | 22 | |
| | ISYS6169 | Database Systems | 4/2 | | |
| | CPEN6098 | Computer Networks | 2/2 | | |
| | COMP6065 | Artificial Intelligence | 4 | | |
| | ENTR6003 | Entrepreneurship I | 2 | | |
| | CHAR6015 | Character Building: Agama | 2 | | |
| 4 | STAT6021 | Research Methodology | 2 | 23 | |
| | COMP6100 | Software Engineering* | 4 | | |
| | COMP6176 | Human and Computer Interaction | 2/2 | | |
| | COMP7084 | Multimedia Systems | 2/1 | | |
| | Streaming: Software Engineering | | | | |
| | COMP6106 | Code Reengineering | 4 | | |
| | COMP6107 | Agile Software Development | 2 | | |
| | COMP6114 | Pattern Software Design | 2/2 | | |
| | Streaming : Intelligent System | | | | |
| | COMP8108 | Natural Language Processing | 2/1 | | |
| | COMP7066 | Expert Systems | 2/1 | | |
| | COMP7116 | Computer Vision | 2/2 | | |
| | Streaming: Interactive Multimedia | | | | |
| | COMP7128 | Game Design | 2 | | |
| | COMP7110 | Computer Graphic | 2/2 | | |
| | COMP7094 | Multimedia Programming Foundation | 2/2 | | |
| | Streaming: Database Technology | | | | |
| | ISYS6172 | Database Design | 2/1 | | |
| | COMP6225 | Object-Oriented Database | 2/2 | | |
| | COMP6064 | Geographical Information System | 2/1 | | |
| Streaming: Applied Database | | | | | |
| ISYS7155 | Applied Database I | 4 | | | |
| COMP6064 | Geographical Information System | 2/1 | | | |
| ISYS6172 | Database Design | 2/1 | | | |

| Sem | Code | Course Name | SCU | Total |
|---------------------------------------|--|--|-----------------------------|-------|
| | Streaming: Network | | | |
| | COMP6113 | Network Design | 2 | |
| | COMP6120 | Network Programming | 2/2 | |
| | COMP6132 | Linux Operating System | 2/2 | |
| | Streaming: Applied Networking | | | |
| | CPEN8092 | Applied Networking I | 4 | |
| | COMP6113 | Network Design | 2 | |
| 5 | COMP6144 | Web Programming* | 2/1 | 23 |
| | COMP6062 | Compilation Techniques | 4 | |
| | COMP6153 | Operating System | 2/2 | |
| | ENTR6004 | Entrepreneurship II | 2 | |
| | Elective Course** | | | |
| | COMP6099 | Advanced Object Oriented Programming | 2 | |
| | MOBI6008 | Mobile Game Creative Design | 2 | |
| | COMP6226 | Competitive Programming | 2 | |
| | Streaming: Software Engineering | | | |
| | COMP6115 | Object Oriented Analysis & Design | 2/2 | |
| | COMP6122 | Framework Layer Architecture | 2/2 | |
| | Streaming : Intelligent System | | | |
| | COMP7117 | Artificial Neural Network | 2/2 | |
| | COMP7126 | Artificial Intelligence in Games | 2/2 | |
| | | Streaming: Interactive Multimedia | | |
| COMP8129 | | User Experience | 2/2 | |
| COMP7139 | | Game Programming | 4 | |
| Streaming: Database Technology | | | | |
| COMP6119 | | Database Administration | 2/2 | |
| COMP6140 | | Data Mining | 2/2 | |
| Streaming: Applied Database | | | | |
| ISYS7156 | | Applied Database II | 4 | |
| ISYS7157 | | Applied Database III | 4 | |
| Streaming: Network | | | | |
| COMP6121 | | Server Technology | 4 | |
| COMP7142 | | Popular Network Technology | 2/2 | |
| Streaming: Applied Networking | | | | |
| CPEN8093 | Applied Networking II | 4 | | |
| CPEN8094 | Applied Networking III | 4 | | |
| 6 | Enrichment Program I | | 16 | 16 |
| 7 | Enrichment Program II | | 16 | 16 |
| 8 | COMP8074 | Thesis | 6 | 6 |
| | | | Total Credit 146 SCU | |

*) Entrepreneurship Embedded

**) Elective Course: students choose one of 3 elective courses with 2 credits.

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 I (6th Semester) & Enrichment Program II (7th Semester):

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

Enrichment Track Scheme

| Track | Semester 6 | | | | | | Semester 7 | | | | | |
|-------|------------|----|------|----|----|------|------------|----|------|----|----|------|
| | I | RS | ENTR | CD | SA | *etc | I | RS | ENTR | CD | SA | *etc |
| 1 | v | | | | | | v | | | | | |
| 2 | | v | | | | | | v | | | | |
| 3 | | | v | | | | | | v | | | |
| 4 | | | | v | | | v | | | | | |
| 5 | | | | v | | | | | | v | | |
| 6 | | | | v | | | | | | | v | |
| 7 | | | | | v | | v | | | | | |
| 8 | | | | | v | | | | | v | | |
| 9 | | | | | v | | | | | | v | |
| 10 | | | | | | v | v | | | | | |
| 11 | | | | | | v | | | | v | | |
| 12 | | | | | | v | | | | | v | |

Notes:

- I : Internship
- RS : Research
- ENTR : Entrepreneurship
- CD : Community Development
- SA : Study Abroad
- *etc : Department specific needs

Notes:

Student can choose one of the available tracks.

Enrichment Internship Track

| Code | Course Name | SCU | Total |
|---|----------------------------|-----|-------|
| Enrichment Program I | | | 16 |
| COMP6155 | Industry Experience I | 8 | |
| COMP6156 | EES in Industry I | 4 | |
| COMP6157 | IT Practice in Industry I | 4 | |
| Enrichment Program II | | | 16 |
| Enrichment for students who take track industrial experience in previous semester | | | |
| COMP6161 | Industry Experience II | 8 | |
| COMP6162 | EES in Industry II | 4 | |
| COMP6163 | IT Practice in Industry II | 4 | |
| Enrichment for students who take track Study Abroad and Community Development in previous semester | | | |
| COMP6158 | Industry Experience | 8 | |
| COMP6159 | EES in Industry | 4 | |
| COMP6160 | IT Practice in Industry | 4 | |

Enrichment Entrepreneurship Track

| Code | Course Name | SCU | Total |
|------------------------------|----------------------------------|-----|-------|
| Enrichment Program I | | | 16 |
| ENTR6062 | Business Start Up | 8 | |
| ENTR6149 | IT Business Model & Validation | 2 | |
| ENTR6150 | Launching New IT Venture | 2 | |
| ENTR6068 | EES in New Business | 4 | |
| Enrichment Program II | | | 16 |
| ENTR6070 | Growing a Business | 8 | |
| ENTR6151 | Lean IT Start Up & Business Plan | 2 | |
| ENTR6152 | Venture Capital in IT Industry | 2 | |
| ENTR6073 | EES in Business Experience | 4 | |

Enrichment Research Track

| Code | Course Name | SCU | Total |
|------------------------------|---|-----|-------|
| Enrichment Program I | | | 16 |
| RSCH6031 | Research Experience I | 8 | |
| RSCH6111 | Scientific Writing I in Computer Science | 4 | |
| RSCH6033 | Global EES I (Team Work, Communication, Problem Solving & Decision Making) | 4 | |
| Enrichment Program II | | | 16 |
| RSCH6034 | Research Experience II | 8 | |
| RSCH6112 | Scientific Writing II in Computer Science | 4 | |
| RSCH6036 | Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise) | 4 | |

Enrichment Community Development Track

| Code | Course Name | SCU | Total |
|------------------------------|--|-----|-------|
| Enrichment Program I | | | 16 |
| CMDV6001 | Community Outreach Project Implementation | 8 | |
| CMDV6041 | Community Outreach IT Project Design | 4 | |
| CMDV6003 | Employability and Entrepreneurial Skills | 4 | |
| Enrichment Program II | | | 16 |
| CMDV6004 | Community Development Project Implementation | 8 | |
| CMDV6042 | Community Development IT Project Design | 4 | |
| CMDV6006 | Employability and Entrepreneurial Skills | 4 | |

Enrichment Study Abroad Track

| Course Name | | SCU | Total |
|------------------------------|-------------------------------------|-----|-------|
| Enrichment Program I | | | 16 |
| 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 | |
| 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 | |
| Enrichment Program II | | | 16 |
| GLOB6017 | Elective Course for Study Abroad 13 | 4 | |
| GLOB6018 | Elective Course for Study Abroad 14 | 4 | |
| GLOB6019 | Elective Course for Study Abroad 15 | 4 | |
| GLOB6020 | Elective Course for Study Abroad 16 | 4 | |
| GLOB6021 | Elective Course for Study Abroad 17 | 2 | |
| GLOB6022 | Elective Course for Study Abroad 18 | 2 | |
| GLOB6023 | Elective Course for Study Abroad 19 | 2 | |
| GLOB6024 | Elective Course for Study Abroad 20 | 2 | |
| GLOB6025 | Elective Course for Study Abroad 21 | 2 | |
| GLOB6026 | Elective Course for Study Abroad 22 | 2 | |
| GLOB6027 | Elective Course for Study Abroad 23 | 2 | |
| GLOB6028 | Elective Course for Study Abroad 24 | 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 | COMP6056 | Program Design Methods* | C |
| 5 | COMP6048 | Data Structures* | C |
| 6 | COMP6100 | Software Engineering* | C |
| Stream | | | |
| Software Engineering | | | |
| 7 | COMP6107 | Agile Software Development | C |
| 8 | COMP6115 | Object Oriented Analysis & Design | C |
| Database Technology | | | |
| 7 | ISYS6172 | Database Design | C |
| 8 | COMP6119 | Database Administration | C |
| Intelligent System | | | |
| 7 | COMP7116 | Computer Vision | C |
| 8 | COMP7117 | Artificial Neural Network | C |
| Network | | | |
| 7 | COMP6120 | Network Programming | C |
| 8 | COMP6121 | Server Technology | C |
| Applied Networking | | | |
| 7 | COMP6120 | Network Programming | C |
| 8 | CPEN8093 | Applied Networking II | C |
| Interactive Multimedia | | | |
| 7 | COMP7094 | Multimedia Programming Foundation | C |
| 8 | COMP8129 | User Experience | C |
| Applied Database | | | |
| 7 | ISYS6172 | Database Design | C |
| 8 | ISYS7156 | Applied Database II | C |

*) Tutorial dan Multipapper