Statistics and Computer Science

Introduction

Nowadays, all kinds of data are being generated when business processes are conducted or when enterprises interoperate. This vast amount of data is called as Big Data and it can be analysed using process-mining and data-mining techniques to understand how a business is performing and to identify new opportunities. The combination of Statistics and Computer Science into one program is designed to maximize the learning opportunities for the student in of handling Big Data, techniques for analyzing it, and simulation techniques for exploring the new business scenarios. This interdisciplinary study addresses the complexity of manipulating, analysing and using Big Data in business. The program can be completed within 4 - 4.5 years. Furthermore, to provide work experience for students, there are industrial internships, interesting research or entrepreneurship programs for 1 semester.

Vision

A World Class study program by providing excellent educational experiences in Statistical Computing, Fostering and Empowering the Society in Serving and Building the Nation.

Mission

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

1. Educating students to effectively apply their educational experiences in Statistical Computing to solve real-world problems.
2. Preparing our graduates to develop exemplary soft skills & technical skills required as ICT professionals, leaders and entrepreneurs in global market.
3. Promoting high impact research that contributes to the nation.
4. Fostering BINUSIAN as lifelong learners through self-enrichment.
5. Empowering BINUSIAN to continuously improve society's quality of life.

Program Objective

The objectives of the program are:

1. Graduates will become successful professionals in ICT fields;
2. Graduates will obtain employment in global companies or become entrepreneurs;
3. Graduates will obtain professional certification or continue their study to the postgraduate level;
4. Graduate will have ability to pursue higher degree of education.

Student Outcomes

After completing the study, graduates are:

1. Able to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
2. Able to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of computer science
3. Able to communicate effectively in a variety of professional contexts
4. Able to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
5. Able to function effectively as a member or leader of a team engaged in activities appropriate to computer science

6. Able to apply computer science theory and software development fundamentals to produce computing-based solutions
7. Able to conduct data management, including data design and collection in the form of surveys and experiments, data organization, exploration, and analysis based on statistical methods, using statistical software.
8. Able to solve estimation problems and hypothesis testing through data utilization and several methods of estimation and hypothesis testing.
9. Able to conduct data science project flow to solve real business and industry problems
10. Able to develop software by implementing statistical models.
11. Able to apply interdisciplinary knowledge and skills in developing alternative solutions for problem-solving

Prospective Career of the Graduates

The graduates of the double study program Statistics and Computer Science can follow careers in:

1. Business analyst, DSS Manager, or business strategist
2. Actuary analyst, risk analyst, or quantitative credit analyst
3. Strategy consultant or evaluator of company performance
4. Data scientist, market researcher, or researcher of analysis techniques
5. Database designer, database administrator, or system analyst

Curriculum

With reference to the Vision and Mission of Binus University, the role of Statistics 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 statistical analysis capability and ability to extract information from any kind of data that emerge in databases.
2. The academic atmosphere that will facilitate student learning in order that the students will develop skills in communicating their statistical analysis and skills in developing database.
3. An environment that fosters active learner independence and encourages students to be able to succeed in their professional career and in the fields related to Data Science.

Furthermore, besides this department provides the means and expertise in Data Science to prepare students for a career as a Data Scientist who is able to analyze any kind of data that emerges in databases to extract information, it also provides capability in developing Computer Science or Applied Statistics 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	CHAR6013049	Character Building: Pancasila	2	20
	COMP6047049	Algorithm and Programming[2] **(AOL)**	4/2	
	MATH6031049	Calculus	4	
	MATH6025049	Discrete Mathematics[1]	4	
	STAT6152049	Introduction to Data Science[2]	2	
	COMP6798049	Program Design Methods[1] **(AOL)**	2	
	Foreign Language Courses		0	
2	CHAR6014049	Character Building: Kewarganegaraan	2	20

Sem	Code	Course Name	SCU	Total
	COMP6048049	Data Structures[1&2] **(AOL)**	4/2	
	MATH6030049	Linear Algebra[1]	2	
	MATH6191049	Advanced Calculus[1]	4	
	STAT6171049	Basic Statistics	2	
	ENPR6311001	Creativity and Innovation	2	
	LANG6027049	Indonesian	2	
	Foreign Language Courses			
3	SCIE6063049	Computational Physics **(AOL)**	2/1	24
	COMP6708049	Object Oriented Programming	2/2	
	STAT6166049	Survey and Sampling Methods[1]	4	
	MATH6144049	Advanced Linear Algebra[1]	2	
	STAT6185049	Theory of Statistics I **(AOL)**	4	
	MATH6183049	Scientific Computing **(AOL)**	2/1	
	STAT6157049	Data Mining and Visualization[1&2] **(AOL)**	2	
	STAT6037049	Non Parametric Statistics	2	
	Foreign Language Courses			
4	SCIE6062049	Computational Biology	2/1	24
	CPEN6247049	Computer Networks **(AOL)**	2/1	
	COMP6799049	Database Technology[2] **(AOL)**	2/1	
	STAT6193049	Theory of Statistics II[1]	4	
	COMP6065049	Artificial Intelligence[2] **(AOL)**	4	
	MATH6221049	Machine Learning[1&2] **(AOL)**	2	
	CHAR6015049	Character Building: Agama	2	
	STAT6048049	Regression Analysis[1] **(AOL)**	2/1	
	Foreign Language Courses			
5	COMP6738049	Web Programming	2	23
	COMP6800049	Human and Computer Interaction[2] **(AOL)**	2/1	
	COMP6049049	Algorithm Design and Analysis[1] **(AOL)**	4	
	STAT6011049	Design and Analysis of Experiments[1&2] **(AOL)**	4	
	STAT6162049	Bayesian Data Analysis	2	
	MATH6165049	Deep Learning and Optimization Methods[1]	4	
	STAT6044049	Categorical Data Analysis[1] **(AOL)**	2	
	STAT6158049	Data Management and Organization	2	
6	COMP6100049	Software Engineering[2] **(AOL)**	4	24
	COMP6697049	Operating System **(AOL)**	2	
	STAT6053049	Multivariate Statistics[1&2] **(AOL)**	4	
	STAT6215049	Time Series Analysis[1&2]	2/2	
	STAT6036049	Stochastic Process[1]	4	
	MATH6178049	Text Mining	2	
	STAT6159049	Big Data Infrastructure and Technology	2	
	STAT6196049	Spatial Statistics	2	

Sem	Code	Course Name	SCU	Total
7	ENPR6312001	Venture Creation	2	21
	COMP6062049	Compilation Techniques	4	
	COMP6696049	Research Methodology in Computer Science[1] **(AOL)**	2	
	STAT6197049	Econometrics[1&2]	2/1	
	STAT6181049	Financial and Actuarial Science[1]	4	
	MATH6166049	Data Security	2	
	Free Electives		4	
8	**Enrichment Program**			20
9	STAT6188049	Pre-Thesis	2	6
	STAT6189049	Thesis	4	
	STAT6030049	Thesis	6	
				Total Credits 182 SCU

[1]) This course is delivered in English
[2]) Global Learning System Course

-) **(AOL)** *- Assurance of Learning Process System*

Free Electives:
-) For Free Electives, students are required to choose from the list of Free Electives in Appendix.

Foreign Language Courses:
Students will take foreign language courses according to Beelingua Placement Test results. See foreign language courses appendix for the details. Students must pass with a minimum Grade of C.

Pre-thesis (2 SCU) & Thesis (4 SCU) *can be taken in the 7th and/or 8th semester by the students who meet the requirements from the Study Program/Program*

Appendix Foreign Language Courses

Foreign Language Courses		SCU
ENGL6253049	English for Frontrunners	0
ENGL6254049	English for Independent Users	0
ENGL6255049	English for Professionals	0
JAPN6190049	Basic Japanese Language*	0
CHIN6163049	Basic Chinese Language*	0

*) This course is optional for students

1. *Students with Beelingua Placement Test score less than 60 are required to take English for Frontrunners and English for Independent Users.*
2. *Students with Beelingua Placement Test score between 60 and 99 are required to take English for Independent Users and English for Professionals.*
3. *Students with Beelingua Placement Test score greater than 99 are required to take English for Professionals. Additionally, students may choose to take either Basic Japanese Language or Basic Chinese Language.*
4. *Students are required to pass the foreign language courses before they take enrichment.*
5. *Students can see the requirements to pass the foreign language courses at BINUSMAYA – Beelingua.*

Appendix: Free Electives (7th Semester)

Students will receive information about Free Electives during the registration period.

Enrichment Program (8th Semester):
-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

Enrichment Track Scheme

Track	Semester 8						
	IN	RS	EN	CD	SA	IS	etc
1	v						
2		v					
3			v				
4				v			
5					v		
6						v	

Note:

IN : Company Internship
RS : Research Fellowship
EN : Entrepreneurship
CD : Community Impact Internship
SA : Study Abroad
IS : Specific Independent Study
FS : Fast Track
etc : Study Program Special Purposes

Description:
Student will take one of enrichment program tracks

Company Internship Track

Code	Course Name	SCU	Total
STAT6090049	Internship	8	20
STAT6191049	Data Analysis and Statistical Program in Industry	8	
STAT6093049	EES in Statistics Industry	4	

Entrepreneurship Track

Code	Course Name	SCU	Total
ENTR6641049	Product Launching in Statistics	8	20
ENTR6642049	Business Development in Statistics	8	
ENTR6208049	EES in Statistics	4	

Research Fellowship Track

Code	Course Name	SCU	Total
RSCH6225049	Research Experience	8	20
RSCH6531049	Scientific Writing in Statistics	8	
RSCH6157049	Global EES in Statistics	4	

Community Impact Internship Track

Code	Course Name	SCU	Total
CMDV6125049	Community Outreach Project Implementation	8	20
CMDV6313049	Community Outreach in Statistics Project Design	8	
CMDV6075049	Employability and Entrepreneurial Skills in Statistics	4	

Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			20
GLOB6005049	Elective Course for Study Abroad 1	4	

Code	Course Name	SCU	Total
GLOB6006049	Elective Course for Study Abroad 2	4	
GLOB6007049	Elective Course for Study Abroad 3	4	
GLOB6008049	Elective Course for Study Abroad 4	4	
GLOB6009049	Elective Course for Study Abroad 5	2	
GLOB6010049	Elective Course for Study Abroad 6	2	
GLOB6011049	Elective Course for Study Abroad 7	2	
GLOB6012049	Elective Course for Study Abroad 8	2	
GLOB6013049	Elective Course for Study Abroad 9	2	
GLOB6014049	Elective Course for Study Abroad 10	2	
GLOB6015049	Elective Course for Study Abroad 11	2	
GLOB6016049	Elective Course for Study Abroad 12	2	
GLOB6251049	Elective Course for Study Abroad 29	4	

**) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.*

Specific Independent Study

Code	Course Name	SCU	Total
Elective courses list for specific independent study*			
CSIS6001049	Course Certification	3	
CSIS6002049	Technical Skill Enrichment	4	
CSIS6003049	Industrial Project	9	
CSIS6004049	Soft Skill Enrichment	4	
CSIS6005049	Elective Course for Specific Independent Study 1	8	
CSIS6006049	Elective Course for Specific Independent Study 2	8	
CSIS6007049	Elective Course for Specific Independent Study 3	6	
CSIS6008049	Elective Course for Specific Independent Study 4	6	
CSIS6009049	Elective Course for Specific Independent Study 5	6	
CSIS6010049	Elective Course for Specific Independent Study 6	5	
CSIS6011049	Elective Course for Specific Independent Study 7	5	
CSIS6012049	Elective Course for Specific Independent Study 8	5	20
CSIS6013049	Elective Course for Specific Independent Study 9	5	
CSIS6014049	Elective Course for Specific Independent Study 10	4	
CSIS6015049	Elective Course for Specific Independent Study 11	4	
CSIS6016049	Elective Course for Specific Independent Study 12	4	
CSIS6017049	Elective Course for Specific Independent Study 13	4	
CSIS6018049	Elective Course for Specific Independent Study 14	4	
CSIS6019049	Elective Course for Specific Independent Study 15	3	
CSIS6020049	Elective Course for Specific Independent Study 16	3	
CSIS6021049	Elective Course for Specific Independent Study 17	3	
CSIS6022049	Elective Course for Specific Independent Study 18	3	
CSIS6023049	Elective Course for Specific Independent Study 19	3	
CSIS6024049	Elective Course for Specific Independent Study 20	3	
CSIS6025049	Elective Course for Specific Independent Study 21	2	

Code	Course Name	SCU	Total
CSIS6026049	Elective Course for Specific Independent Study 22	2	
CSIS6027049	Elective Course for Specific Independent Study 23	2	
CSIS6028049	Elective Course for Specific Independent Study 24	2	
CSIS6029049	Elective Course for Specific Independent Study 25	2	
CSIS6030049	Elective Course for Specific Independent Study 26	2	
CSIS6031049	Elective Course for Specific Independent Study 27	2	
CSIS6032049	Elective Course for Specific Independent Study 28	2	
CSIS6033049	Elective Course for Specific Independent Study 29	1	
CSIS6034049	Elective Course for Specific Independent Study 30	1	
CSIS6035049	Elective Course for Specific Independent Study 31	1	
CSIS6036049	Elective Course for Specific Independent Study 32	1	

**) For students who take BINUS specific independent study courses, they should take the first 4 courses on the list above (20 credits). Meanwhile, electives courses 1 to 32 are transferred courses for students who take specific independent study outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.*

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

No	Course Code	Course Name	Minimal Grade
1.	CHAR6013049	Character Building: Pancasila	B
2.	COMP6047049	Algorithm and Programming*	C
3.	COMP6798049	Program Design Methods*	C
4.	COMP6048049	Data Structures*	C
5.	STAT6185049	Theory of Statistics I*	C
6.	STAT6157049	Data Mining and Visualization	C
7.	MATH6221049	Machine Learning	C
8.	COMP6799049	Database Technology	C
9.	STAT6048049	Regression Analysis*	C
10.	STAT6044049	Categorical Data Analysis	C
11.	COMP6100049	Software Engineering*	C
12.	COMP6697049	Operating System	C
13.	STAT6053049	Multivariate Statistics*	C
14.	ENPR6312001	Venture Creation	C

*) Tutorial