

## 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 department in Computational Statistics based on ICT.

### 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 with fundamental knowledge & skills to apply Computational Statistics using ICT in acquiring business information for a career as a market researcher or business 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 in Indonesia and the international community.

### Program Objective

The objectives of program are:

1. To provide students with a solid knowledge ranging from Fundamental Statistics and Computer Science to Computational Statistics and Database Technology;
2. To provide students with abilities conduct statistical analysis and marketing research to solve problem in related fields to be successful market researcher;
3. To prepare students with necessary skills in developing database and be expert in data mining to be excellence business 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 alternative solution of software development;
4. Able to perform the experimental design, collection and generate data (in survey, experiments or simulations), organizing data, analyzing data using statistical techniques, and valid conclusion by using at least one statistical software;

5. Able to resolve the problem assessment (estimation), testing hypothesis, prediction, and forecasting on several fronts, using data and statistical methodologies (methods and models) and presenting it in a form that easily understood by the description of the user;
6. Able to analyze some alternatives solution in statistical field to solve the problems and able to present the conclusions analysis in order to make the right decision;
7. Able to implement statistical models into software solutions needed.

### 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	CHAR6013	Character Building: Pancasila	2	20	
	COMP6047	Algorithm and Programming	4/2		
	MATH6025	Discrete Mathematics*	4		
	MATH6038	Calculus I	4		
	STAT6152	Introduction to Data Science**	2		
	<b>English University Courses I</b>				
	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		
	MATH6039	Calculus II*	4		

Sem	Code	Course Name	SCU	Total	
	STAT6175	Statistical Method for Data Science <sup>*&amp;**</sup>	2		
	LANG6027	Indonesian	2		
	<b>English University Courses II</b>				
	ENGL6129	English Savvy	2		
	ENGL6131	English for Written Business Communication	2		
3	ENTR6509	Entrepreneurship: Ideation	2	24	
	COMP6056	Program Design Methods	4		
	COMP6708	Object Oriented Programming	2/2		
	STAT6166	Survey and Sampling Methods <sup>*</sup>	4		
	MATH6144	Advanced Linear Algebra <sup>*</sup>	2		
	STAT6185	Theory of Statistics I	4		
	STAT6047	Numerical Methods for Statistics <sup>*&amp;**</sup>	2		
	STAT6157	Data Mining and Visualization <sup>*&amp;**</sup>	2		
4	COMP6049	Algorithm Design and Analysis	4	24	
	ISYS6169	Database Systems	4/2		
	STAT6037	Non Parametric Statistics	2		
	STAT6048	Regression Analysis <sup>*</sup>	2/1		
	STAT6186	Theory of Statistics II <sup>*</sup>	2		
	COMP6639	Artificial Intelligence <sup>***</sup>	5		
	MATH6149	Machine Learning <sup>*&amp;**</sup>	2		
5	CHAR6015	Character Building: Agama	2	24	
	COMP6176	Human and Computer Interaction	2/2		
	CPEN6098	Computer Networks	2/2		
	STAT6011	Design and Analysis of Experiments <sup>*&amp;**</sup>	4		
	STAT6044	Categorical Data Analysis <sup>*</sup>	2		
	STAT6162	Bayesian Data Analysis	2		
	MATH6165	Deep Learning and Optimization Methods <sup>*</sup>	4		
	STAT6158	Data Management and Organization	2		
6	COMP6640	Software Engineering <sup>**&amp;***</sup>	5	24	
	COMP6697	Operating System	2		
	STAT6053	Multivariate Statistics <sup>*&amp;**</sup>	4		
	STAT6051	Time Series Analysis <sup>*&amp;**</sup>	2/1		
	STAT6036	Stochastic Process <sup>*</sup>	4		
	MATH6178	Text Mining	2		
	COMP6738	Web Programming	2		
	STAT6159	Big Data Infrastructure and Technology	2		
7	ENTR6511	Entrepreneurship: Market Validation	2	20	
	COMP6062	Compilation Techniques	4		
	RSCH6483	Research Methodology in Data Science <sup>*</sup>	2		
	STAT6164	Econometrics <sup>*&amp;**</sup>	2		
	STAT6181	Financial and Actuarial Science <sup>*</sup>	4		
	MATH6166	Data Security	2		

Sem	Code	Course Name	SCU	Total
	<b>Free Elective</b>		4	
8	<b>Enrichment Program</b>		20	20
9	STAT6188	Pre-Thesis	2	6
	STAT6189	Thesis	4	
<b>TOTAL CREDITS</b>			<b>182 SCU</b>	

\*) This course is delivered in English

\*\*) Global Learning System Course

\*\*\*) Entrepreneurship Embedded

#### English University Courses:

- ) For 1st Semester: English University Courses I, students with Binus University English Proficiency Test score less than 500 will take English in Focus, and student with test score greater than or equal to 500 will take English for Business Presentation.
- ) For 2nd Semester: English University Courses II, students with Binus University English Proficiency Test score less than 500 will take English Savvy, and students with test score greater than or equal to 500 will take English for Written Business Communication.

#### Enrichment Program (8<sup>th</sup> 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	etc
1	v					
2		v				
3			v			
4				v		
5					v	

#### Notes:

IN : Internship

RS : Research

EN : Entrepreneurship

CD : Community Development

SA : Study Abroad

etc : Study Program Special Purposes

#### Notes:

Student will take one of enrichment program tracks

#### Enrichment Internship Track

Code	Course Name	SCU	Total
STAT6090	Internship	8	20
STAT6191	Data Analysis and Statistical Program in Industry	8	
STAT6093	EES in Statistics Industry	4	

#### Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
ENTR6641	Product Launching in Statistics	8	20
ENTR6642	Business Development in Statistics	8	
ENTR6208	EES in Statistics	4	

### Enrichment Research Track

Code	Course Name	SCU	Total
RSCH6225	Research Experience	8	20
RSCH6531	Scientific Writing in Statistics	8	
RSCH6157	Global EES in Statistics	4	

### Enrichment Community Development Track

Code	Course Name	SCU	Total
CMDV6125	Community Outreach Project Implementation	8	20
CMDV6313	Community Outreach in Statistics Project Design	8	
CMDV6075	Employability and Entrepreneurial Skills in Statistics	4	

### Enrichment Study Abroad Track

Code	Course Name	SCU	Total
<b>Elective courses list for study abroad*</b>			20
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	
GLOB6251	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.

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

No	Course Code	Course Name	Minimal Grade
1.	CHAR6013	Character Building: <i>Pancasila</i>	B
2.	ENTR6511	Entrepreneurship: Market Validation	C
3.	COMP6047	Algorithm and Programming*	C
4.	STAT6152	Introduction to Data Science	C
5.	COMP6048	Data Structures*	C
6.	STAT6185	Theory of Statistics I*	C
7.	STAT6157	Data Mining and Visualization	C
8.	STAT6048	Regression Analysis*	C
9.	COMP6639	Artificial Intelligence	C
10.	MATH6149	Machine Learning	C

No	Course Code	Course Name	Minimal Grade
11.	STAT6044	Categorical Data Analysis	C
12.	MATH6165	Deep Learning and Optimization Methods	C
13.	COMP6640	Software Engineering*	C
14.	STAT6053	Multivariate Statistics*	C

\*) Tutorial & Multipaper