

## 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**	4/2	
	MATH6031049	Calculus	4	
	MATH6025049	Discrete Mathematics*	4	
	STAT6152049	Introduction to Data Science**	2	
	COMP6798049	Program Design Methods*	2	
2	CHAR6014049	Character Building: Kewarganegaraan	2	20
	COMP6048049	Data Structures*&***	4/2	

Sem	Code	Course Name	SCU	Total	
	MATH6030049	Linear Algebra*	2		
	MATH6191049	Advanced Calculus*	4		
	STAT6171049	Basic Statistics	2		
	ENTR6509001	Entrepreneurship: Ideation	2		
	LANG6027049	Indonesian	2		
3	SCIE6063049	Computational Physics	2/1	24	
	COMP6708049	Object Oriented Programming	2/2		
	STAT6166049	Survey and Sampling Methods*	4		
	MATH6144049	Advanced Linear Algebra*	2		
	STAT6185049	Theory of Statistics I	4		
	MATH6183049	Scientific Computing	2/1		
	STAT6157049	Data Mining and Visualization*&***	2		
	<b>English University Courses</b>				
	ENGL6129049	English Savvy	2		
ENGL6131049	English for Written Business Communication	2			
4	SCIE6062049	Computational Biology	2/1	24	
	CPEN6247049	Computer Networks	2/1		
	COMP6799049	Database Technology**	2/1		
	STAT6193049	Theory of Statistics II*	4		
	COMP6065049	Artificial Intelligence**	4		
	STAT6044049	Categorical Data Analysis*	2		
	MATH6187049	Machine Learning*&***	2/1		
	STAT6037049	Non Parametric Statistics	2		
5	CHAR6015049	Character Building: Agama	2	24	
	COMP6800049	Human and Computer Interaction**	2/1		
	COMP6049049	Algorithm Design and Analysis*	4		
	STAT6011049	Design and Analysis of Experiments*&***	4		
	STAT6162049	Bayesian Data Analysis	2		
	MATH6165049	Deep Learning and Optimization Methods*	4		
	STAT6048049	Regression Analysis*	2/1		
	STAT6158049	Data Management and Organization	2		
6	COMP6100049	Software Engineering**	4	23	
	COMP6697049	Operating System	2		
	STAT6053049	Multivariate Statistics*&***	4		
	STAT6051049	Time Series Analysis*&***	2/1		
	STAT6036049	Stochastic Process*	4		
	MATH6178049	Text Mining	2		
	COMP6738049	Web Programming	2		
	STAT6159049	Big Data Infrastructure and Technology	2		
7	ENTR6511001	Entrepreneurship: Market Validation	2	21	
	COMP6062049	Compilation Techniques	4		
	COMP6696049	Research Methodology in Computer Science*	2		

Sem	Code	Course Name	SCU	Total
	STAT6197049	Econometrics*&***	2/1	
	STAT6181049	Financial and Actuarial Science*	4	
	MATH6166049	Data Security	2	
	<b>Free Elective</b>		4	
8	<b>Enrichment Program</b>		20	20
9	STAT6188049	Pre-Thesis	2	6
	STAT6189049	Thesis	4	
	STAT6030049	Thesis	6	
			<b>Total Credits 182 SCU</b>	

\*) This course is delivered in English

\*\*) Global Learning System Course

#### Free Electives:

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

#### English University Courses:

-) For English University Courses, students with Binus University English Proficiency Test scores less than 500 will take English Savvy, and students with test scores greater than or equal to 500 will take English for Written Business Communication.

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

#### Appendix: Free Electives (7<sup>th</sup> Semester)

Because free electives will be implemented on the 7<sup>th</sup> semester, data will be collected from Curriculum 2022

#### 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	IS	etc
1	v						
2		v					
3			v				
4				v			
5					v		
6						v	

#### Note:

IN : Certified Internship

RS : Certified Research

EN : Certified Entrepreneurship

CD : Certified Community Development

SA : Certified Study Abroad

IS : Certified Specific Independent Study

etc : Study Program Special Purposes

#### Description:

Student will take one of enrichment program tracks

#### Certified 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	

### Certified 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	

### Certified Research Track

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

### Certified Community Development 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	

### Certified Study Abroad Track

Code	Course Name	SCU	Total
<b>Elective courses list for study abroad*</b>			20
GLOB6005049	Elective Course for Study Abroad 1	4	
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.

### Certified Specific Independent Study

Code	Course Name	SCU	Total
<b>Elective courses list for certified specific independent study*</b>			20
MICR6033049	Course Certification I	3	
MICR6034049	Technical Skill Enrichment I	4	
MICR6035049	Industrial Project I	9	
MICR6036049	Soft Skill Enrichment I	4	

Code	Course Name	SCU	Total
MICR6001049	Elective Course for Specific Independent Study 1	8	
MICR6002049	Elective Course for Specific Independent Study 2	8	
MICR6003049	Elective Course for Specific Independent Study 3	6	
MICR6004049	Elective Course for Specific Independent Study 4	6	
MICR6005049	Elective Course for Specific Independent Study 5	6	
MICR6006049	Elective Course for Specific Independent Study 6	5	
MICR6007049	Elective Course for Specific Independent Study 7	5	
MICR6008049	Elective Course for Specific Independent Study 8	5	
MICR6009049	Elective Course for Specific Independent Study 9	5	
MICR6010049	Elective Course for Specific Independent Study 10	4	
MICR6011049	Elective Course for Specific Independent Study 11	4	
MICR6012049	Elective Course for Specific Independent Study 12	4	
MICR6013049	Elective Course for Specific Independent Study 13	4	
MICR6014049	Elective Course for Specific Independent Study 14	4	
MICR6015049	Elective Course for Specific Independent Study 15	3	
MICR6016049	Elective Course for Specific Independent Study 16	3	
MICR6017049	Elective Course for Specific Independent Study 17	3	
MICR6018049	Elective Course for Specific Independent Study 18	3	
MICR6019049	Elective Course for Specific Independent Study 19	3	
MICR6020049	Elective Course for Specific Independent Study 20	3	
MICR6021049	Elective Course for Specific Independent Study 21	2	
MICR6022049	Elective Course for Specific Independent Study 22	2	
MICR6023049	Elective Course for Specific Independent Study 23	2	
MICR6024049	Elective Course for Specific Independent Study 24	2	
MICR6025049	Elective Course for Specific Independent Study 25	2	
MICR6026049	Elective Course for Specific Independent Study 26	2	
MICR6027049	Elective Course for Specific Independent Study 27	2	
MICR6028049	Elective Course for Specific Independent Study 28	2	
MICR6029049	Elective Course for Specific Independent Study 29	1	
MICR6030049	Elective Course for Specific Independent Study 30	1	
MICR6031049	Elective Course for Specific Independent Study 31	1	
MICR6032049	Elective Course for Specific Independent Study 32	1	

\*) For students who take BINUS certified 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 certified 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.	ENTR6511001	Entrepreneurship: Market Validation	C
3.	COMP6047049	Algorithm and Programming*	C
4.	COMP6048049	Data Structures*	C

No	Course Code	Course Name	Minimal Grade
5.	COMP6798049	Program Design Methods*	C
6.	COMP6100049	Software Engineering*	C
7.	COMP6799049	Database Technology	C
8.	COMP6697049	Operating System	C
9.	STAT6185049	Theory of Statistics I*	C
10.	STAT6048049	Regression Analysis*	C
11.	STAT6044049	Categorical Data Analysis	C
12.	STAT6053049	Multivariate Statistics*	C
13.	STAT6157049	Data Mining and Visualization	C
14.	MATH6187049	Machine Learning	C

\*) Tutorial & Multipaper