

## 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** (AOL)	4/2	
	MATH6031049	Calculus	4	
	MATH6025049	Discrete Mathematics*	4	
	STAT6152049	Introduction to Data Science**	2	
	COMP6798049	Program Design Methods* (AOL)	2	
	<b>Foreign Language Courses</b>		0	

Sem	Code	Course Name	SCU	Total
2	CHAR6014049	Character Building: Kewarganegaraan	2	20
	COMP6048049	Data Structures*&** (AOL)	4/2	
	MATH6030049	Linear Algebra *	2	
	MATH6191049	Advanced Calculus*	4	
	STAT6171049	Basic Statistics	2	
	ENTR6509001	Entrepreneurship: Ideation	2	
	LANG6027049	Indonesian	2	
	<b>Foreign Language Courses</b>			
3	SCIE6063049	Computational Physics (AOL)	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 (AOL)	4	
	MATH6183049	Scientific Computing (AOL)	2/1	
	STAT6157049	Data Mining and Visualization * & ** (AOL)	2	
	STAT6037049	Non Parametric Statistics	2	
<b>Foreign Language Courses</b>			0	
4	SCIE6062049	Computational Biology	2/1	24
	CPEN6247049	Computer Networks (AOL)	2/1	
	COMP6799049	Database Technology** (AOL)	2/1	
	STAT6193049	Theory of Statistics II *	4	
	COMP6065049	Artificial Intelligence** (AOL)	4	
	STAT6044049	Categorical Data Analysis * (AOL)	2	
	MATH6187049	Machine Learning * & ** (AOL)	2/1	
	CHAR6015049	Character Building: Agama	2	
<b>Foreign Language Courses</b>			0	
5	COMP6738049	Web Programming	2	24
	COMP6800049	Human and Computer Interaction** (AOL)	2/1	
	COMP6049049	Algorithm Design and Analysis* (AOL)	4	
	STAT6011049	Design and Analysis of Experiments*&** (AOL)	4	
	STAT6162049	Bayesian Data Analysis	2	
	MATH6165049	Deep Learning and Optimization Methods *	4	
	STAT6048049	Regression Analysis* (AOL)	2/1	
	STAT6158049	Data Management and Organization	2	
6	COMP6100049	Software Engineering** (AOL)	4	23
	COMP6697049	Operating System (AOL)	2	
	STAT6053049	Multivariate Statistics*&** (AOL)	4	
	STAT6051049	Time Series Analysis*&**	2/1	
	STAT6036049	Stochastic Process*	4	
	MATH6178049	Text Mining	2	
	STAT6159049	Big Data Infrastructure and Technology	2	
	STAT6196049	Spatial Statistics	2	
7	ENTR6511001	Entrepreneurship: Market Validation	2	21
	COMP6062049	Compilation Techniques	4	
	COMP6696049	Research Methodology in Computer Science* (AOL)	2	
	STAT6197049	Econometrics*&**	2/1	

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

\*) This course is delivered in English

\*\*) 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 BINUS University English proficiency 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 7<sup>th</sup> and/or 8<sup>th</sup> semester by the students who meet the requirements from the Study Program/Program

#### Appendix Foreign Language Courses

Code	Course Name	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

- Students with Binus University English Proficiency Test score less than 437 are required to take English for Frontrunners and English for Independent Users.
- Students with Binus University English Proficiency Test score less than 520 are required to take English for Independent Users and English for Professionals.
- Students with Binus University English Proficiency Test score equal to or greater than 520 are required to take English for Professionals and choose Basic Japanese Language or Basic Chinese Language.
- Students are required to pass the foreign language courses before they take enrichment.
- Students can see the requirements to pass the foreign language courses at BINUSMAYA – Beelingua.

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

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Management	MGMT6400005	Supply Chain Strategy	2	7
2	Business Management	MGMT6459005	Retail Management	4	7
3	Business Management	MGMT6460005	Retail Supply Chain Management	2	7
4	Business Management	MKTG6324005	Retail Marketing Management	2	7
5	Business Management	MGMT6461005	Category Management	2	7
6	Management	MGMT6297005	Operations Management	4	7

No	Course Owner Department	Course Code	Course Name	SCU	Semester
7	Management	FINC6001005	Financial Management	4	7
8	Global Business Marketing	MKTG6321005	Marketing Data Analytics	4	7
9	Global Business Marketing	MKTG6322005	Sales and Customer Relationship Management	4	7
10	Global Business Marketing	MKTG6237005	Global Strategic Marketing : Asia Pasific Perspective	4	7
11	Global Business Marketing	MKTG6270005	Retail and Omni Channel	2	7
12	Global Business Marketing	MKTG6272005	Marketing Research	2/2	7
13	Global Business Marketing	MGMT6358005	Managing Business Information	2/2	7
14	International Business Management	MGMT6357005	Multinational Corporation Management	4	7
15	International Business Management	BUSS6223005	Trade in Asia	2	7
16	International Business Management	BUSS6224005	Special Topics in International Business	4	7
17	Civil Engineering	CIVL6080013	Construction Methods & Heavy Equipment	2	7
18	Civil Engineering	COMP6046013	Computer Applications in Construction Management	2	7
19	Civil Engineering	CIVL6030013	Environmental Engineering	2	7
20	Civil Engineering	CIVL6002013	Case Study in Civil Engineering	2	7
21	Computer Engineering	CPEN6098010	Computer Networks	2/2	7
22	Computer Engineering	CPEN6126010	Cross Platform Application Development	4	7
23	Computer Engineering	CPEN6225010	Telco Network & Switching System	2	7
24	Computer Engineering	CPEN6232010	Cloud Technology Practice	2	7
25	Computer Engineering	CPEN6220010	Computer Networks & Information Security	4/1	7
26	Industrial Engineering	ISYE6067011	Global Supply Chain	2	7
27	Industrial Engineering	ISYE6165011	Supply Chain Risk & Negotiation	2	7
28	Industrial Engineering	ISYE6115011	Transportation Modeling	2	7
29	Industrial Engineering	MKTG6128011	Market Research	2	7
30	Industrial Engineering	ISYE6167011	Decision Support System	2	7
31	Industrial Engineering	ISYE6168011	Financial Engineering	2	7
32	Industrial Engineering	ISYE6130011	Project Management	2	7
33	Industrial Engineering	ISYE6169011	Maintenance Management Systems	2	7
34	Industrial Engineering	ISYE6170011	Sustainable Engineering Systems	2	7
35	Industrial Engineering	ISYE6113011	Leadership & Organizational Behavior	2	7
36	Food Technology	FOOD6092015	Molecular Gastronomy	2	7
37	Food Technology	FOOD6074015	Food Processing Technology II	2	7
38	Food Technology	FOOD6076015	Food Fermentation Technology	2	7
39	Food Technology	FOOD6073015	Current Issues in Food Technology	2	7
40	Food Technology	CPEN6235015	IoT in Food Industry	2	7
41	Food Technology	FOOD6094015	Nutrition & Health	4	7
42	Architecture	ARCH6144014	Digital Construction	4	7
43	Architecture	ARCH6076014	Project Management	2	7

No	Course Owner Department	Course Code	Course Name	SCU	Semester
44	Architecture	ARCH6144014	Property Assessment	2	7
45	Architecture	ARCH6146014	Interior Architecture	4	7
46	Architecture	ARCH6128014	Multimedia in Design Presentation	4	7
47	Architecture	ARCH6129014	Urban Housing	4	7
48	Architecture	ARCH6147014	Behavior in Architecture	4	7
49	Architecture	ARCH6131014	Architectural Conservation	4	7
50	Architecture	ARCH6136014	Tropical Architecture	4	7
51	Game Application and Technology	GAME6085001	Object Oriented Game Programming	2	7
52	Marketing Communication	COMM6635019	Integrated Marketing Communication	2	7
53	Marketing Communication	COMM6637019	Brand Activation	2/2	7
54	Marketing Communication	COMM6638019	Social Media Planning & Engagement	2/2	7
55	Accounting	ACCT6116020	Social and Environmental Accounting	2	7
56	Accounting	ACCT6461020	Accounting Syariah	2	7
57	Accounting	ACCT6462020	Audit Psychology	2	7
58	Accounting	ACCT6313020	Public Sector Accounting	2	7
59	Taxation	TAXN6053020	Regional Tax Systems	2	7
60	Finance	FINC6189020	Introduction to Financial Market and Fin-Tech	2	7
61	Finance	FINC6010020	International Finance	2	7
62	Cyber Security	COMP6542001	Computer Security Fundamental	2	7
63	Mobile Application & Technology	MOBI6068001	Web Design	2	7
64	Mobile Application & Technology	MOBI6070001	Embedded System and Internet of Things	3	7
65	Mobile Application & Technology	MOBI6059001	Mobile Programming	2	7
66	Information Systems	ISYS6196003	Business Analytics	2	7
67	Information Systems	ISYS6199003	Data & Text Mining	4	7
68	Information Systems	ISYS6202003	Social Informatics	4	7
69	Information Systems	ISYS6289003	Collaborative Computing	4	7
70	Information Systems	ISYS6402003	Business Analytics	2/2	7
71	Information Systems	ISYS8066003	Business Process Management	4	7
72	Business Information Technology	ISYS6579003	Knowledge-Based AI: Cognitive Systems	4	7
73	Animation	DSGN6689007	Concept Art & Production Design	2	7
74	Animation	DSGN6690007	Animation Storytelling	2	7
75	Creative Advertising	DSGN6661007	Photography	4	7
76	Creative Advertising	DSGN6732007	Photography	4	7
77	Film	FILM6059009	Global Cinema	4	7
78	Chinese Literature	CHIN6157026	Chinese Business for Etiquette (Beginner)	4	7
79	Chinese Literature	CHIN6158026	Chinese Business in Daily Communication	4	7
80	Chinese Literature	CHIN6159026	Chinese Character Writing	2	7



No	Course Owner Department	Course Code	Course Name	SCU	Semester
81	English Literature	SOCS6021024	Social and Digital Media Writing	2	7
82	English Literature	ENGL6169024	English for Professionals	2	7
83	English Literature	ENGL6244024	Social Media Broadcasting	4	7
84	English Literature	EDUC6054024	Classroom Communication and Learning	4	7
85	Business Law	LAWS6017028	Intellectual Property Rights	4	7
86	Business Law	LAWS6110028	Cyber Law	2	7
87	Business Law	LAWS6159028	Legal Aspect in Business	2	7
88	Business Law	LAWS6168028	Banking-Financial Law & Islamic Business Law	4	7
89	Business Law	LAWS6169028	Capital Market, Legal Audit, & Due Diligence	4	7
90	Business Law	LAWS6170028	Investment Law	2	7
91	Business Law	LAWS6171028	Business Competition & Consumer Protection Law	2	7
92	Business Law	LAWS6181028	Industrial Relations & Alternative Dispute Resolution	2	7
93	Business Law	LAWS6052028	Bankruptcy Law	2	7
94	Business Law	LAWS6167028	Legal Philosophy & Professional Ethics	2	7
95	Japanese Literature	JAPN6151025	Reflection of Japanese Experience (Nihon Keiken no Han'ei)	2	7
96	Japanese Literature	JAPN6162025	Japanese Literary Criticism (Nihon Bungaku Hyouron)	2	7
97	Japanese Literature	JAPN6148025	Japanese Letter I (Kanji I)	2	7
98	Japanese Literature	JAPN6149025	Reading Comprehension I (Dokkai I)	2	7
99	Japanese Literature	JAPN6116025	Japanese Corporate Culture and Management (Nihon No Kigyou Bunka to Manejimento)	2	7
100	Japanese Literature	JAPN6150025	Ideas and Images of Japanese Culture (Nihon Bunka Aidea to Imeeji)	2	7

**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	SA	: Certified Study Abroad
RS	: Certified Research	IS	: Certified Specific Independent Study
EN	: Certified Entrepreneurship	etc	: Study Program Special Purposes
CD	: Certified Community Development		

**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>			
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	
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	20
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	
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 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.	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.	MATH6187049	Machine Learning	C
8.	COMP6799049	Database Technology	C
9.	STAT6044049	Categorical Data Analysis	C
10.	STAT6048049	Regression Analysis*	C
11.	COMP6100049	Software Engineering*	C
12.	COMP6697049	Operating System	C
13.	STAT6053049	Multivariate Statistics*	C
14.	ENTR6511001	Entrepreneurship: Market Validation	C

\*) Tutorial &amp; Multipaper

