Artifical Intelligence

Introduction

In the contemporary landscape of technological advancement, Artificial Intelligence (AI) has emerged as a pivotal force, catalyzing innovation and enhancing operational efficiency across a multitude of sectors. Artificial Intelligence Program represents a pioneering development in this domain, offering a sophisticated solution that integrates seamlessly into diverse fields, including healthcare, finance, education, and beyond. The inception of this program was driven by the increasing demand for intelligent, adaptive, and user-centric AI systems. Grounded in extensive research and development within the realms of machine learning, natural language processing, and neural network architectures, this program is meticulously designed to bridge the divide between human cognitive processes and machine capabilities. It embodies the collective expertise of leading researchers, data scientists, and engineers who are committed to advancing the frontiers of AI technology. A key differentiator of the program is its advanced capacity for real-time learning and adaptation, ensuring sustained relevance and efficacy in dynamically changing environments. Through the implementation of cutting-edge algorithms, the program excels in areas such as pattern recognition, predictive analytics, and decision-making processes. These capabilities collectively ensure that users benefit from an unprecedented level of accuracy and dependability, whether the application involves automating routine processes, analyzing extensive datasets, or delivering personalized recommendations. The distinctiveness of Artificial Intelligence Program is rooted in its human-centric design philosophy. In contrast to conventional AI systems, which can often be perceived as impersonal or inflexible, our program emphasizes user experience by offering intuitive interfaces and interactive features that render it accessible to users irrespective of their technical proficiency. Moreover, this program is constructed with a foundational commitment to ethical considerations, ensuring transparency, fairness, and accountability throughout its operations. This ethical orientation not only cultivates user trust but also positions of this program as a leader within the domain of responsible AI development.

Vision

A world class study program by providing excellent educational experiences in Computer Science, which focuses on developing creative technology solutions, fostering and empowering the society in building and serving the nation.

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

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.

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 implement Artificial Intelligence (AI) to solve existing problems in various industries.

Prospective Career of the Graduates

1. Machine Engineer/Developer
2. Computer Vision Engineer/Developer
3. Natural Language Processing Engineer/Developer
4. Data Engineer
5. Software Engineer/Developer
6. System Analyst/Developer
7. Artificial Intelligence Specialist/Consultant
8. Data Scientist
9. IT Support/Consultant
10. Researcher
11. Lecturer/Trainer
12. Entrepreneur

Curriculum

The curriculum for the Artificial Intelligence Program has been meticulously crafted to align with the Indonesian National Curriculum. Additionally, the program's local content has been developed in accordance with the standards set forth by the Association for Computing Machinery (ACM), as well as the curricular frameworks of various esteemed local and international universities, and prevailing market trends. This alignment is intended to equip graduates of the Computer Science Program with the skills and knowledge necessary to compete effectively on both national and international stages. This program is certified by The Accreditation Agency for Study Programmes in Engineering, Informatics, Natural Sciences and Mathematics (ASIIN) from Germany and The Euro-Inf Quality seal for academic quality assurance. The curriculum is structured to deliver a profound understanding of the foundational principles of AI, complemented by extensive hands-on experience with contemporary tools and technologies. Students will progress through a comprehensive exploration of essential theories, including machine learning, neural networks, natural language processing, and robotics. The curriculum is intentionally sequenced to

allow for cumulative learning, enabling students to build on both theoretical and practical knowledge in a coherent and integrated manner. The curriculum is systematically organized into the following categories of subjects:

Core Artificial Intelligence Group

At the core of the curriculum is an introductory course on artificial intelligence, where students will examine the historical development, ethical implications, and societal impact of AI. This foundational course is followed by specialized modules such as machine and deep learning, where students will engage in the design and implementation of algorithms that empower machines to learn from and adapt to data inputs. Further courses on neural networks and deep learning will provide students with an in-depth understanding of the architectures underlying advanced AI systems, including those employed in image and speech recognition. The curriculum also includes courses on natural language processing and computer vision, equipping students with the skills to develop systems capable of understanding, interpreting, and generating human language and vision—skills applicable in translation, sentiment analysis, affective computing, object recognition and more.

Mathematics Group (Science)

The primary aim of this group is to cultivate a comprehensive understanding of mathematics as a fundamental cornerstone of computer science. Additionally, it seeks to impart a thorough grasp of the scientific methodology—encompassing data collection, hypothesis formulation, research, and analysis—essential for effective problem-solving.

Character Building Group (Professional Practices)

The objective of this group is to foster the development of the student's personal strengths and to cultivate a professional demeanor, encompassing expertise in their respective field. It also aims to equip students with essential management skills, proficiency in both oral and written communication, an understanding of business ethics, and the ability to collaborate effectively within a team. Furthermore, it seeks to instill the distinctive "BINUSIAN" character.

Computer Science Core Group

As a part of Computer Science group, Artificial Intelligence program also imbued Computer Science core courses into this program. The objective of this group is to establish a solid foundation in Computer Science, combining practical application with theoretical knowledge, to meet the current and future demands of the business sector. The subjects encompassed within this group include programming, algorithm design and analysis, software engineering, database systems, computer graphics, multimedia technology, human-computer interaction, operating systems, computer architecture, and computer networks.

Entrepreneur and Employability Skill

The aim of this group of subjects is to equip students with professional experience, a strong work ethic, and exposure to real-world working environments. Students are expected to apply and integrate their academic knowledge in practical settings such as industry, research laboratories, and entrepreneurial startups. Furthermore, they are required to document and report on their experiences and outcomes in these subjects.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013001	Character Building: Pancasila	2	20
	MATH6025001	Discrete Mathematics	4	

Sem	Code	Course Name	SCU	Total
	MATH6031001	Calculus	4	
	COMP6047001	Algorithm and Programming[2] **(AOL)**	4/2	
	COMP6798001	Program Design Methods[1] **(AOL)**	2	
	COSC6058001	Intelligent Automation	2	
	Foreign Language Courses		0	
2	CHAR6014001	Character Building: Kewarganegaraan	2	20
	MATH6030001	Linear Algebra	2	
	COMP6048001	Data Structures[1&2] **(AOL)**	4/2	
	STAT6171001	Basic Statistics	2	
	ENPR6311001	Creativity and Innovation	2	
	COMP6065001	Artificial Intelligence[2] **(AOL)**	4	
	COMP6983001	Machine Learning	2	
	Foreign Language Courses		0	
3	CHAR6015001	Character Building: Agama	2	19
	LANG6027001	Indonesian	2	
	MATH6183001	Scientific Computing **(AOL)**	2/1	
	COMP6984001	Machine Learning Operations **(AOL)**	2/1	
	COSC6051001	Deep Learning **(AOL)**	2/1	
	SCIE6063001	Computational Physics **(AOL)**	2/1	
	COMP6799001	Database Technology[2] **(AOL)**	2/1	
	Foreign Language Courses		0	
4	COMP6049001	Algorithm Design and Analysis[1] **(AOL)**	4	21
	COMP6986001	Artificial Intelligence Solution **(AOL)**	2	
	COMP6800001	Human and Computer Interaction[2] **(AOL)**	2/1	
	CPEN6247001	Computer Networks **(AOL)**	2/1	
	SCIE6062001	Computational Biology	2/1	
	COMP6965001	Applied Natural Language Processing[1&2]	2/1	
	COMP6966001	Applied Computer Vision[1&2]	2/1	
	Foreign Language Courses		0	
5	ENPR6312001	Venture Creation	2	20
	COMP6697001	Operating System **(AOL)**	2	
	COMP6062001	Compilation Techniques	4	
	COMP6696001	Research Methodology in Computer Science[1] **(AOL)**	2	
	COMP6967001	Internet of Things and Robotics	2/2	
	COMP6100001	Software Engineering[2] **(AOL)**	4	
	COMP6987001	Signal Processing	2	
6	**Enrichment Program I**		20	20
7	**Enrichment Program II**		20	20
8	COMP6833001	Pre-Thesis	2	6
	COMP6834001	Thesis	4	
	COMP6881001	Thesis	6	
Total Credits 146 SCU				

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

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

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.

Appendix Foreign Language Courses

Foreign Language Courses		SCU
ENGL6253001	English for Frontrunners	0
ENGL6254001	English for Independent Users	0
ENGL6255001	English for Professionals	0
JAPN6190001	Basic Japanese Language*	0
CHIN6163001	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*

Pre-thesis (2 SCU) & Thesis (4 SCU) *can be taken in the 6th and/or 7th semester by the students who meet the requirements from the Study Program/Program*

Enrichment Program (6th Semester & 7th Semester):
-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

Enrichment Track Scheme

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	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	
13							v	v							
14							v				v				
15							v					v			

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	etc
16							v						v		
17	v													v	
18		v												v	
19						v		v							
20						v					v				
21						v						v			

Note:

IN : Internship
RS : Research
EN : Entrepreneurship
CD : Community Development
SA : Study Abroad
FS : Further Study
IS : Certified Specific Independent Study
etc : Study Program Special Purposes

Description:

1. Students will take only one track in each Enrichment Program.
2. Students who failed in Enrichment Program I can retake according to the table above.
3. As for Enrichment Program II, students who failed should retake the same track, except Certified Specific Independent Study.
4. For those who failed in the Certified Study Abroad track will retake the courses from the home campus.

Certified Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
COSC6052001	Industrial Experience in Information Technology	8	
COSC6053001	Information Technology Practice in Industrial Experience	8	
COSC6054001	EES in Information Technology Industry	4	
Enrichment Program II			20
COSC6055001	Professional Experience in Information Technology	8	
COSC6056001	Information Technology Practice in Professional Experience	8	
COSC6057001	Professional Development in Information Technology Industry	4	

Certified Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
ENPR6284001	New Venture Initiation in Computer Science	8	
ENPR6285001	Computer Science Product Development Process	8	
ENPR6286001	EES in New Computer Science Business I	4	
Enrichment Program II			20
ENPR6287001	Computer Science Product Launching	8	
ENPR6288001	Computer Science Business Development	8	
ENPR6289001	EES in New Computer Science Business II	4	

Certified Research Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6731001	Research Experience I in Computer Science	8	
RSCH6732001	Scientific Writing I in Computer Science	8	
RSCH6733001	Global EES I (Team Work, Communication, Problem Solving & Decision Making) in Computer Science	4	
Enrichment Program II			20
RSCH6734001	Research Experience II in Computer Science	8	
RSCH6735001	Scientific Writing II in Computer Science	8	
RSCH6736001	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Certified Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6481001	Community Outreach Project Implementation	8	
CMDV6482001	Community Outreach IT Project Design	8	
CMDV6483001	Employability and Entrepreneurial Skills in Computer Science Community	4	
Enrichment Program II			20
CMDV6484001	Community Development Project Implementation	8	
CMDV6485001	Community Development IT Project Design	8	
CMDV6486001	Employability and Entrepreneurial Skills in Computer Science Community Development	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			20
Enrichment Program I			
GLOB6005001	Elective Course for Study Abroad 1	4	
GLOB6006001	Elective Course for Study Abroad 2	4	
GLOB6007001	Elective Course for Study Abroad 3	4	
GLOB6008001	Elective Course for Study Abroad 4	4	
GLOB6009001	Elective Course for Study Abroad 5	2	
GLOB6010001	Elective Course for Study Abroad 6	2	
GLOB6011001	Elective Course for Study Abroad 7	2	
GLOB6012001	Elective Course for Study Abroad 8	2	
GLOB6013001	Elective Course for Study Abroad 9	2	
GLOB6014001	Elective Course for Study Abroad 10	2	
GLOB6015001	Elective Course for Study Abroad 11	2	
GLOB6016001	Elective Course for Study Abroad 12	2	
GLOB6251001	Elective Course for Study Abroad 29	4	
Enrichment Program II			20
GLOB6017001	Elective Course for Study Abroad 13	4	
GLOB6018001	Elective Course for Study Abroad 14	4	

Code	Course Name	SCU	Total
GLOB6019001	Elective Course for Study Abroad 15	4	
GLOB6020001	Elective Course for Study Abroad 16	4	
GLOB6021001	Elective Course for Study Abroad 17	2	
GLOB6022001	Elective Course for Study Abroad 18	2	
GLOB6023001	Elective Course for Study Abroad 19	2	
GLOB6024001	Elective Course for Study Abroad 20	2	
GLOB6025001	Elective Course for Study Abroad 21	2	
GLOB6026001	Elective Course for Study Abroad 22	2	
GLOB6027001	Elective Course for Study Abroad 23	2	
GLOB6028001	Elective Course for Study Abroad 24	2	
GLOB6253001	Elective Course for Study Abroad 31	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
Elective courses list for certified specific independent study*			
CSIS6001001	Course Certification	3	
CSIS6002001	Technical Skill Enrichment	4	
CSIS6003001	Industrial Project	9	
CSIS6004001	Soft Skill Enrichment	4	
CSIS6005001	Elective Course for Specific Independent Study 1	8	
CSIS6006001	Elective Course for Specific Independent Study 2	8	
CSIS6007001	Elective Course for Specific Independent Study 3	6	
CSIS6008001	Elective Course for Specific Independent Study 4	6	
CSIS6009001	Elective Course for Specific Independent Study 5	6	
CSIS6010001	Elective Course for Specific Independent Study 6	5	
CSIS6011001	Elective Course for Specific Independent Study 7	5	
CSIS6012001	Elective Course for Specific Independent Study 8	5	
CSIS6013001	Elective Course for Specific Independent Study 9	5	20
CSIS6014001	Elective Course for Specific Independent Study 10	4	
CSIS6015001	Elective Course for Specific Independent Study 11	4	
CSIS6016001	Elective Course for Specific Independent Study 12	4	
CSIS6017001	Elective Course for Specific Independent Study 13	4	
CSIS6018001	Elective Course for Specific Independent Study 14	4	
CSIS6019001	Elective Course for Specific Independent Study 15	3	
CSIS6020001	Elective Course for Specific Independent Study 16	3	
CSIS6021001	Elective Course for Specific Independent Study 17	3	
CSIS6022001	Elective Course for Specific Independent Study 18	3	
CSIS6023001	Elective Course for Specific Independent Study 19	3	
CSIS6024001	Elective Course for Specific Independent Study 20	3	
CSIS6025001	Elective Course for Specific Independent Study 21	2	
CSIS6026001	Elective Course for Specific Independent Study 22	2	

Code	Course Name	SCU	Total
CSIS6027001	Elective Course for Specific Independent Study 23	2	
CSIS6028001	Elective Course for Specific Independent Study 24	2	
CSIS6029001	Elective Course for Specific Independent Study 25	2	
CSIS6030001	Elective Course for Specific Independent Study 26	2	
CSIS6031001	Elective Course for Specific Independent Study 27	2	
CSIS6032001	Elective Course for Specific Independent Study 28	2	
CSIS6033001	Elective Course for Specific Independent Study 29	1	
CSIS6034001	Elective Course for Specific Independent Study 30	1	
CSIS6035001	Elective Course for Specific Independent Study 31	1	
CSIS6036001	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.*

Further Study Track

Students will receive information about Further Study Track courses during the registration period.

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

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6013001	Character Building: Pancasila	B
2.	COMP6047001	Algorithm and Programming*	C
3.	COMP6798001	Program Design Methods*	C
4.	COMP6048001	Data Structures*	C
5.	COMP6799001	Database Technology	C
6.	COMP6100001	Software Engineering*	C
7.	COMP6697001	Operating System	C
8.	ENPR6312001	Venture Creation	C

*) Tutorial