Game Application & Technology

Introduction

Computer, mobile, and console games represent a multi-billion dollars global industry. Game Application and Technology (GAT) Program offers dedicated degrees in game development, providing students with the technical expertise they need to enter the industry confidently.

GAT Program is designed specifically by Computer Science of BINUS UNIVERSITY to provide students with knowledge and skills to develop and create a variety of applied technology in the field of game technology. BINUS UNIVERSITY found this Program in September 2012, and it became one of the best programs under the coordination of the School of Computer Science. In collaboration with several renowned game industries, GAT Program always makes continuous improvement in our curriculum, human resources, and facilities. The GAT Laboratory, equipped with high specification computers, cutting edge technologies (e.g. Virtual Reality, Augmented Reality, and Mixed Reality) and a dedicated audio editing studio, will facilitate the students and lecturers to collaborate and deliver high-quality games.

GAT Program is designed to adapt to the dynamically changing creative industries landscape while ensuring a solid academic foundation and aligned to industry expectations. GAT focuses on game art, game design, and game programming. Derived from Computer Science Study Program, GAT Program offers game programming and development blended with creativity and innovation in Game Technology. The program will not only focus on the game development for entertainment tools but also for other purposes (e.g. serious games for learning and training, and gamification tool to a non-game application to enhance its user's motivations and engagements). The structure of the course allows students to gain valuable practical experience in building software systems and also apply knowledge in creative game design. GAT Program has a strong base in computer science foundation subjects as well as offering the theoretical and critical thinking behind current digital technologies. Students will learn in a project-orientated environment that encourages collaboration with industries. This collaboration helps them discover creative solutions to contemporary design challenges. Students are encouraged to collaborate, work according to deadlines, maintain attendance levels and develop strong communication skills. As a result, graduates are internationally renowned for their expertise and confidence to enter the workplace as newly skilled professionals rather than technicians.

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 Game Application and Technology 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 create game software with the implementation of multimedia, computer network, and applicative database with use of artificial intelligence algorithm to solve real industry problems.

Prospective Career of the Graduates

After finishing the Program, the graduate of Game Application and Technology Program is able to follow a career in:

1. Game Engineer / Developer
2. Game Designer
3. Game Artist / Technical Artist
4. Game Audio Engineer
5. Game Director / Chief Technology Officer
6. Game Content Provider
7. Gamification & Serious Games Designer
8. Game Consultant
9. Game Publisher
10. Entrepreneur

Curriculum

With an international certification from The ASEAN University Network-Quality Assurance (AUN-QA) in 2018, the program ensures that the stakeholders will have an international quality in learning experiences. The current curriculum used in the GAT Program has been developed in line with the National Curriculum. Also, the local content has been developed in line with the Computer Science Curriculum standard of ACM (Association for Computing Machinery), several local and foreign universities, national and international game industry and community (developer, publisher), up-to-date game technologies, and market trends. In addition, the students will have the opportunity to forge their Employability & Entrepreneurial Skills in the university's enrichment program to ensure the students are well prepared for their future career. In the program, the students will have the opportunity to work in the internship program offered by various global industries; experience study abroad; start their own

business; involved in world-class research project; implement their skills in the community development program. With these, our graduates are expected to be able to compete at both national and international level. Generally, the subjects of the curriculum are divided into the following groups of subjects:

Core Computer Science Group

This group's objective is to provide a grounding in GAT Program through practice as well as the applied theory, which is required by business both now and in the future. The subjects included are Programming, Algorithm Design and Analysis, Software Engineering, Database, Computer Graphs, Artificial Intelligence, Interactive Multimedia, Human and Computer Interaction, Operation System, Game Art, Game Programming & Development, and Game Design.

Science

This group's objective is to provide an understanding of natural sciences, statistics, and mathematics as one of the principal foundations of computer science. Another objective is to understand scientific methodology (data collection, hypothesis, market research, analysis) in problem-solving.

Professional Practices

The objective of this group is to develop the personal strengths of the students and to provide them with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethic, ability to work as a team and to develop a "Binusian" Character.

The Field of GAT Subject

The objective is to give the students a solid foundation of software development skills and introduce the specific skills needed to develop game applications. The students are expected to develop their skills and master the techniques which will allow them to research their thesis and to continue their studies.

The field of GAT subjects are as follows:

1. Game Programming and Development: to explore the various programming techniques and algorithm in-game using industry-standard software and game engine.
2. Game Art: to explore various methodologies and techniques of game art and learn how to transform arts into assets for computer games and related industries using the latest technology and industry-standard software (2D and 3D, animation, modeling, character design).
3. Game Design: to explore the various methodologies and techniques of game story design, level design, gameplay design, human and computer interaction design.

Students of the GAT Program are required to follow these three fields to become our eligible graduates. These fields' objective is to provide the students with the knowledge and skills required by business & industry and those who want to develop their own game company.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013001	Character Building: Pancasila	2	20
	MATH6025001	Discrete Mathematics	4	
	MATH6030001	Linear Algebra	2	
	COMP6047001	Algorithm and Programming[2] **(AOL)**	4/2	
	GAME6002001	Game Design[1&2] **(AOL)**	2	

Sem	Code	Course Name	SCU	Total
	LANG6027001	Indonesian	2	
	GAME6081001	2D Game Art	2	
	Foreign Language Courses		0	
2	CHAR6014001	Character Building: Kewarganegaraan	2	20
	COMP6048001	Data Structures[1&2] (AOL)	4/2	
	MATH6031001	Calculus	4	
	ENPR6311001	Creativity and Innovation	2	
	COMP6800001	Human and Computer Interaction[2] (AOL)	2/1	
	MATH6183001	Scientific Computing (AOL)	2/1	
	Foreign Language Courses		0	
3	CHAR6015001	Character Building: Agama	2	21
	COMP6049001	Algorithm Design and Analysis[1] (AOL)	4	
	COMP6065001	Artificial Intelligence[2] (AOL)	4	
	STAT6171001	Basic Statistics	2	
	SCIE6063001	Computational Physics (AOL)	2/1	
	GAME6085001	Object Oriented Game Programming[1&2]	2	
	COMP6798001	Program Design Methods[1] (AOL)	2	
	GAME6093001	Serious Game & Gamification	2	
	Foreign Language Courses		0	
4	CPEN6247001	Computer Networks (AOL)	2/1	21
	SCIE6062001	Computational Biology	2/1	
	GAME6069001	Game Programming[1&2] (AOL)	4	
	COMP6100001	Software Engineering[2] (AOL)	4	
	GAME6082001	Game Animation[1&2]	2	
	COMP6799001	Database Technology[2] (AOL)	2/1	
	COMP6697001	Operating System (AOL)	2	
	Foreign Language Courses		0	
5	COMP6696001	Research Methodology in Computer Science[1] (AOL)	2	18
	COMP6062001	Compilation Techniques	4	
	ENPR6312001	Venture Creation	2	
	GAME6091001	Advanced Game Development	2	
	GAME6084001	Game Development Capstone Project[1&2] (AOL)	4	
	GAME6071001	3D Modeling for Games[1&2]	2	
	GAME6092001	Fundamental in Game Balancing	2	
6	**Enrichment Program I**		20	20
7	**Enrichment Program II**		20	20
8	GAME6087001	Pre-Thesis	2	6
	GAME6088001	Thesis	4	
	GAME6026001	Thesis	6	
			Total Credits 146 SCU	

[1]) *This course is delivered in English*

[2]) *Global Learning System Course*

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

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*

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*

Enrichment Program I (6th Semester) & Enrichment Program II (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			
16						v							v		
17	v													v	

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

Note:

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

Description:

Student will take one of enrichment program tracks

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			
GAME6061001	Game Industry Experience	8	20
GAME6089001	Game Production in Industry	8	
GAME6052001	EES in Game Industry	4	
Enrichment Program II			
GAME6062001	Game Development Practice in Industry	8	20
GAME6090001	Game Research in Industry	8	
GAME6063001	EES in Game Development Experience	4	

Certified Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			
ENTR6653001	New Venture Initiation in Game Technology & Industry	8	20
ENTR6655001	Product Development Process in Game Technology & Industry	8	
ENTR6657001	EES in Game Technology & Industry I	4	
Enrichment Program II			
ENTR6654001	Product Launching in Game Technology & Industry	8	20
ENTR6656001	Business Development in Game Technology & Industry	8	
ENTR6658001	EES in Game Technology & Industry II	4	

Certified Research Track

Code	Course Name	SCU	Total
Enrichment Program I			
RSCH6244001	Research Experience I	8	20
RSCH6532001	Scientific Writing I in Game Technology	8	
RSCH6033001	Global EES I (Team Work, Communication, Problem Solving & Decision Making)	4	
Enrichment Program II			
RSCH6259001	Research Experience II	8	20
RSCH6533001	Scientific Writing II in Game Technology	8	
RSCH6267001	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Certified Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			
CMDV6160001	Community Outreach Project Implementation	8	20
CMDV6314001	Community Outreach Project Design in Game Technology	8	
CMDV6265001	Employability and Entrepreneurial Skills in Game Application and Technology Community	4	
Enrichment Program II			
CMDV6185001	Community Development Project Implementation	8	20
CMDV6315001	Community Development Project Design in Game Technology	8	
CMDV6194001	Employability and Entrepreneurial Skills in Game Application and Technology Community Development	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			
Enrichment Program I			
GLOB6005001	Elective Course for Study Abroad 1	4	20
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	

Code	Course Name	SCU	Total
GLOB6018001	Elective Course for Study Abroad 14	4	
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	

Code	Course Name	SCU	Total
CSIS6026001	Elective Course for Specific Independent Study 22	2	
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