INFORMATICS STUDY PROGRAM
CURRICULUM
UNIVERSITAS MULTIMEDIA NUSANTARA

Drafting Team

Rector of Universitas Multimedia Nusantara
Vice Rector I for Academic Affairs
Head of the Study Program
Deputy Head of the Study Program
Academic Information Bureau

CURRICULUM OF THE INFORMATICS STUDY PROGRAM

A. Profile

This part describes profile related to the Informatics Study Programme, department of Informatics Faculty of Engineering and Informatics Multimedia Nusantara University.

Program Specification	:	Undergraduate program
Programme type	:	Full-time and joint degree (option)
Programme title	:	Bachelor of Informatics (Bachelor Computer)
Department	:	Department of Informatics
Faculty	:	Faculty of Engineering and Informatics
University	:	Universitas Multimedia Nusantara
Degree title	:	Bachelor in Computer Science (B.Cs); Sarjana Komputer (S.Kom) Joint Degree: plus Bachelor of Information and Communication Technology (B. ICT)
Awarding institution	:	Universitas Multimedia Nusantara and Swinburne University of Technology (Joint degree)
Teaching institution	:	Universitas Multimedia Nusantara and Swinburne University of Technology (Joint degree)
Class	:	Local/regular class
		Joint degree
Language of study	:	Indonesian
		English
Duration of the Programme	:	48 months (4 years) Joint Degree: 30 months (2,5 years in Universitas Multimedia University) and 18

		months (1,5 years in Swinburne University of Technology)
Credits	:	Minimum 145 credits
KKNI (EQF level)	:	Level 6
Accreditation bodies	:	BAN-PT (NAAHE) Predicate B (2020-2025)
QAA benchmarks	:	BAN–PT (NAAHE)

As for a Vision and Mission of Informatics Study Program is as following:

VISION:

Becoming a leading Informatics Study Program that produces graduates with international insight who are competent in the field of computer science, have an entrepreneurial spirit and have noble character.

MISSION:

1. Organizing learning with the best technology and curriculum and supported by professional teaching staff
2. Carry out research activities in the field of informatics science and technology
3. Carry out community service activities based on information technology and science in the context of practicing informatics science and technology

Based on Vision and Mission of the informatics study program, then Program Objectives are also formulated from the Informatics Study Program, namely:

1. Produce graduates who are competent in the field of intelligent system, software development, computer systems and networks, and use their

expertise to build and develop systems based on informatics science
2. Produce graduates who understand the development, engineering and construction of systems in the field of intelligent systems, software development, systems and network security based on professional ethics imposed in informatics science
3. Produce graduate who carry out lifelong learning and innovating solution with technopreneur concept in the field of informatics science which then continues to be applied when graduates work in national and global, conduct research, community service in order to face the global era of industry 4.0.

B. Career Prospects and Opportunities

Graduates from Informatics Study Program are accepted by high quality businesses as well as industries as expert in the field of computer science and information technology.
The result of tracer study of Informatics study program alumni shows that around 90 % of graduates being hired for less than three months after their graduations.
A number of positions occupied by graduates of the informatics study program is as following:

1. Software developer/engineering
2. Web Developer/engineer
3. Mobile Application developer/engineer
4. Database administrator
5. System analyst
6. Network administrator / engineer
7. Cybersecurity specialist / engineer
8. Technical support engineer
9. Used experience designer
10. Project manager in IT
11. Data Scientist

12. Cloud computing engineer
13. Artificial intelligence / machine learning engineer
14. IT Consultant
15. IT Trainer / Educator
16. Quality Assurance Tester
17. Business analyst
18. Game developer / Programmer
19. Full Stack Developer / Engineer
20. DevOps Engineer

C. Graduate Profile

Graduate Profile is a benchmark in determining competency standards for the graduates of Informatics Study Program. Mastery of knowledge in the topic of Informatics is reflected in several profiles that have been formulated. Graduates of Informatics Study Program have four main profiles. The detailed explanation of each profile is described in Table 1.

Table 1. Graduate Profile of Informatics Study Program

#	Profile Name	Description
1	Software Developer	Become a software developer who is able to design the user interface and application architecture, develop program including the field of artificial intelligence and cybersecurity, conducting testing, monitoring, and evaluation, analyze the behavior of the programs and performs maintenance, as well as to work in teams for complex projects.
2	System Administrator	Become an system administrator who is able to manage specific applications or software in a company, including computer systems, database management systems, security systems, and intranet systems.

3	Technopreneur	Become a technopreneur who is able to create business concepts based on existing opportunities by taking advantage of the development of technology and knowledge in the field of Informatics
4	Researcher	Become a researcher who is able to conduct and contribute scientific research in the field of Informatics in accordance with applicable rules and ethics.

D. Expected Learning Outcome

The ELOs have been simplified from ten to nine objectives based on the suggestion form the stakeholders and alumni, and the reviews from the curriculum team, as well as the Program Education updates. The graduate profiles for the Informatics Study Program have been update into software developer, system administrator, technopreneur and researcher.

The detail of ELOs shown in Table 2.

Table 2. ELOs of Informatics Study Program

Code	ELO
ELO-1	**Ethical and Religiosity Skill** Students can apply religious and divine values, ethics and morals in learning, and teamwork in the field of informatics studies
ELO-2	**Analytical Thinking** Students are able to master basic concepts and theories as well as applied concepts and are able to implement these relationships with an informatics scientific approach and utilize this knowledge to find solutions to problems related to the fields of intelligent systems, information security, game development and software development

ELO-3	**Communication Skill** Students can communicate effectively independently or in groups and are able to conduct measurable performance appraisals
ELO-4	**Professional Skill** Students have work skills and are able to collaborate in the field of informatics to be able to compete nationally and globally
ELO-5	**Technopreneur Skill** Students are able to combine technical skills and entrepreneurial concepts in meeting business demands and societal demands
ELO-6	**Software Developing Skill** Students are able to apply informatics science theoretically and technically in the form of system requirements gathering and analysis, design and implementation using programming languages in software development.
ELO-7	**System Administrator** Students are able to manage certain applications or software, including computer systems, database management systems, security systems and intranet systems
ELO-8	**Research Skill** Students are able to implement informatics science and compile scientific descriptions of research results
ELO-9	**Long life Learning** Students can improve their skills in informatics through lifelong learning

E. MBKM Program

The concept behind MBKM is that the campus will facilitate students' freedom of learning by giving them the freedom to take credits outside the study programme but still inside the universities (for one semester) and the freedom to carry out learning activities outside of universities (for two semesters), which can be chosen from several MBKM activities (**internship,**

entrepreneurship, student exchange, research, community outreach project, humanity project, and independent project). The MBKM programme is expected to provide opportunities for UMN students to enrich their competencies. In implementing the programme, several teaching method concepts help with the student learning process, including discovery learning, experiential learning, collaborative learning, and opportunities for students to work independently. Students can do MBKM activities if they have met a minimum of 90 credits. It involves a minimum of 907 hours (60 hours of preparation, 640 hours of field work, 207 hours of counselling).

F. Distribution of Courses per Semester

In the first and second semesters (for first-year students), every student is required to take all specified mandatory or compulsory courses. In the subsequent semesters, the maximum number of Semester Credit Units (SKS) that a student can take is determined by their academic performance in the previous Semester Grade Point Average (IPS) (note: if it's an odd semester, then the IPS of the previous odd semester or two semesters before will be considered, and vice versa). Students with good academic performance can request their Academic Advisor to take courses with a number of SKS in accordance with the IPS regulations and SKS allocation. This can be done by students during the Pre-Registration period in the preceding semester.

This curriculum is designed to be completed by students within 8 semesters (4 years) – ideally referred to as the Regular Path or an accelerated path if the student demonstrates outstanding academic performance, with the details as follows:

Regular Path

Semester 1

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF130	Programming Fundamentals	3	0	-	Compulsory	
2	IF120	Discrete mathematics	3	0	-	Compulsory	
3	CE121	Linear Algebra	3	0	-	Compulsory	
4	CE232	Digital system	3	0	-	Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
5	UM162	Pancasila	2	0	-	Compulsory	16
6	UM152	Religion	2	0	-	Compulsory	
7	UM163	Civics	2	0	-	Compulsory	16
8	UM122	English 1: Composition	2	0	-	Compulsory	
TOTAL CREDIT SEMESTER 1			**20**				

Semester 2

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF260	Operating System	2	1		Compulsory	
2	IF232	Algorithm & Data structure	3	1	IF130, CE121	Compulsory	
3	IF231	Introduction to Internet Technology	2	1		Compulsory	
4	MSC1003	Communication and Personal Relationships	2	0		Compulsory	
5	EPM101	Calculus	4	0		Compulsory	
6	CE332	Computer Architecture and Organization	3	0	CE232	Compulsory	
7	UM223	English 2 : speaking	2	0	UM122	Compulsory	
TOTAL CREDIT SEMESTER 2			**21**				

Semester 3

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF350	Software Engineering and Project Management	3	0	-	Compulsory	
2	IF330	Web Programming	2	1	IF231	Compulsory	
3	IF331	Declarative Programming	3	0	IF232	Compulsory	
4	IF332	Language Theory and Automata	3	0	IF120	Compulsory	
5	IF351	Database System	3	0	IF120	Compulsory	1,2,5
6	CE319	Probabilistic and Statistics	3	0	IF120	Compulsory	
7	UM142	Bahasa Indonesia	2	0	-	Compulsory	
TOTAL CREDIT SEMESTER 3			**20**				

Semester 4

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF433	Object Oriented Programming	2	1	IF232	Compulsory	
2	IF470	Computer Security	3	0	IF260	Compulsory	9, 17
3	IF420	Numerical Analysis	3	0	EPM101	Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
4	IF450	Human and Computer Interaction	3	0	IF350	Compulsory	
5	IF432	Algorithm Design and Analysis	3	0	IF232	Compulsory	
6	IF440	Artificial Intelligence	3	0	CE319	Compulsory	
7	CE449	Computer Network	2	0	IF260	Compulsory	
TOTAL CREDIT SEMESTER 4			**20**				

Semester 5

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF580	Computer Graphic and Animation	2	1	EPM101	Compulsory	
2	IF540	Machine Learning	2	1	IF440	Compulsory	
3	IF570	Mobile App Programming	2	1	IF433	Compulsory	8,9
4	IF541	Expert System	3	0	IF440	Compulsory	
5	IF590	Information Technology Research	2	0	UM142	Compulsory	1,2,5,8, 9,10,17

6	EM604	Technopreneurship	2	0	-	Compulsory	10
7	UM321	English 3 : academic writing	2	0	UM223	Compulsory	
TOTAL CREDIT SEMESTER 5			**18**				

Semester 6

Num.	**Course Code**	**Course Name**	**Credit**		**Pre-requisite Course Code**	**Compulsory / Elective**	**SDG**
			Lect.	**Lab**			
1	IFM601	Internship Track 1	20	0	Min. 90 credits pass and have no D and E grade for all taken courses	Compulsory	
	IFM602						
	IFM603						
	IFM604						
TOTAL CREDIT SEMESTER 6			**20**				

Semester 7

Num.	**Course Code**	**Course Name**	**Credit**		**Pre-requisite Course Code**	**Compulsory / Elective**	**SDG**
			Lect.	**Lab**			
1	IFXXX / IFM7XX	Minimum 20 credits of elective courses	20			Elective	
TOTAL CREDIT SEMESTER 7			**20**				

Semester 8

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF800	Thesis	0	6	IF590; 122 credits (pass)	Compulsory	
TOTAL CREDIT SEMESTER 8			**6**				

Elective Course

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF680	Multimedia concept	3	0	IF580	Elective	
2	IF681	3D Game Design and Development	1	2	IF433	Elective	8,9
3	IF682	AR VR Game Design and Development	1	2	IF433	Elective	8,9
4	IF670	Cross Platform Mobile Programming	2	1	IF570	Elective	9
5	IF671	Blockchain and Cryptocurrency	2	1	IF433	Elective	9
6	IF672	Parallel Processing	2	1	IF260	Elective	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
7	IF673	Cybersecurity : Firewall configuration and management	2	1	IF470;CE449	Elective	9
8	IF674	Cybersecurity : Cloud Security and Security Operation	2	1	IF470;CE449	Elective	9
9	IF690	Computer and Society	3	0	-	Elective	1, 2, 5, 8,9, 10,17
10	IFM701	Industry Pipeline Knowledge	6	0	-	Elective	
11	IFM702	Professional Literacy	4	0	-	Elective	
12	IFM703	Industry Pipeline Validation	4	0	-	Elective	
13	IFM704	Industry Based Project	6	0	-	Elective	
14	IFM711	Idea validation	4	0	-	Elective	
15	IFM712	Product validation	4	0	-	Elective	
16	IFM713	Business validation	5	0	-	Elective	
17	IFM714	Business mentoring	7	0	-	Elective	
18	IFM721	Research problem formulation	4	0	-	Elective	
19	IFM722	Implementation of research methodology	7	0	-	Elective	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
20	IFM723	Research evaluation	4	0	-	Elective	
21	IFM724	Scientific publications	5	0	-	Elective	
22	IFM731	Community outreach project idea	3	0	-	Elective	
23	IFM732	Community outreach phase 1	7	0	-	Elective	
24	IFM733	Socio entrepreneurship development & managing	7	0	-	Elective	
25	IFM734	Community outreach phase 2	3	0	-	Elective	
26	IFM741	Generation	4	0	-	Elective	
27	IFM742	Design creation	4	0	-	Elective	
28	IFM743	Development and evaluation	8	0	-	Elective	
29	IFM744	Publication	4	0	-	Elective	
30	IFM751	Humanity Project Idea	4	0	-	Elective	
31	IFM752	Project Validation	4	0	-	Elective	
32	IFM753	Project Development	8	0	-	Elective	
33	IFM754	Humanity Project Evaluation	4	0	-	Elective	

Acceleration Path

Semester 1

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF130	Programming Fundamentals	3	0	-	Compulsory	
2	IF120	Discrete mathematics	3	0	-	Compulsory	
3	CE121	Linear Algebra	3	0	-	Compulsory	
4	CE232	Digital system	3	0	-	Compulsory	
5	UM162	Pancasila	2	0	-	Compulsory	16
6	UM152	Religion	2	0	-	Compulsory	
7	UM163	Civics	2	0	-	Compulsory	16
8	UM122	English 1: Composition	2	0	-	Compulsory	
TOTAL CREDIT SEMESTER 1			**20**				

Semester 2

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF260	Operating System	2	1		Compulsory	
2	IF232	Algorithm & Data structure	3	1	IF130, CE121	Compulsory	
3	IF231	Introduction to Internet Technology	2	1		Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
4	MSC1003	Communication and Personal Relationships	2	0		Compulsory	
5	EPM101	Calculus	4	0		Compulsory	
6	CE332	Computer Architecture and Organization	3	0	CE232	Compulsory	
7	UM223	English 2 : speaking	2	0	UM122	Compulsory	
TOTAL CREDIT SEMESTER 2			**21**				

Semester 3

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF350	Software Engineering and Project Management	3	0	-	Compulsory	
2	IF330	Web Programming	2	1	IF231	Compulsory	
3	IF331	Declarative Programming	3	0	IF232	Compulsory	
4	IF332	Language Theory and Automata	3	0	IF120	Compulsory	
5	IF351	Database System	3	0	IF120	Compulsory	1,2,5
6	CE319	Probabilistic and Statistics	3	0	IF120	Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
7	UM142	Bahasa Indonesia	2	0	-	Compulsory	
8	IFXXX	Elective Course	3		-	Elective	
TOTAL CREDIT SEMESTER 3			**23**				

Semester 4

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF433	Object Oriented Programming	2	1	IF232	Compulsory	
2	IF470	Computer Security	3	0	IF260	Compulsory	9, 17
3	IF420	Numerical Analysis	3	0	EPM101	Compulsory	
4	IF450	Human and Computer Interaction	3	0	IF350	Compulsory	
5	IF432	Algorithm Design and Analysis	3	0	IF232	Compulsory	
6	IF440	Artificial Intelligence	3	0	CE319	Compulsory	
7	CE449	Computer Network	3	0	IF260	Compulsory	
8	IFXXX	Elective Course	3		-	Elective	
TOTAL CREDIT SEMESTER 4			**24**				

Semester 5

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF580	Computer Graphic and Animation	2	1	IF240	Compulsory	
2	IF540	Machine Learning	2	1	IF440	Compulsory	
3	IF570	Mobile App Programming	2	1	IF433	Compulsory	8,9
4	IF541	Expert System	3	0	IF440	Compulsory	
5	IF590	Information Technology Research	2	0	UM142	Compulsory	1,2,5,8, 9,10,17
6	EM604	Technopreneurship	2	0	-	Compulsory	10
7	UM321	English 3 : academic writing	2	0	UM223	Compulsory	
8	IFXXX	Elective Course	6 (2 Course)			Elective	
TOTAL CREDIT SEMESTER 5			**24**				

Semester 6

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IFM60X	Internship Track 1 (compulsory)	20		Min. pass 90 credits	compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
2	IFXXX	Elective Course (optional)	3		-	elective	
TOTAL CREDIT SEMESTER 6			**23**				

Semester 7

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IFXXX	Elective Courses	Min. 4 credits		-	Elective	
2	IF800	Thesis	-	6	IF590; 122 credits (pass)	Compulsory	
TOTAL CREDIT SEMESTER 7			**Min. 10 credits**				

Joint Degree Path

Semester 1

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF130	Programming Fundamentals	3	0	-	Compulsory	
2	IF120	Discrete mathematics	3	0	-	Compulsory	
3	CE121	Linear Algebra	3	0	-	Compulsory	
4	CE232	Digital system	3	0	-	Compulsory	
5	UM162	Pancasila	2	0	-	Compulsory	16
6	UM152	Religion	2	0	-	Compulsory	
7	UM163	Civics	2	0	-	Compulsory	16
8	UM122	English 1: Composition	2	0	-	Compulsory	
TOTAL CREDIT SEMESTER 1			**20**				

Semester 2

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF260	Operating System	2	1		Compulsory	
2	IF232	Algorithm & Data structure	3	1	IF130, CE121	Compulsory	
3	IF231	Introduction to Internet Technology	2	1		Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
4	MSC1003	Communication and Personal Relationships	2	0		Compulsory	
5	EPM101	Calculus	4	0		Compulsory	
6	CE332	Computer Architecture and Organization	3	0	CE232	Compulsory	
7	UM223	English 2 : speaking	2	0	UM122	Compulsory	
TOTAL CREDIT SEMESTER 2			**21**				

Semester 3

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF350	Software Engineering and Project Management	3	0	-	Compulsory	
2	IF330	Web Programming	2	1	IF231	Compulsory	
3	IF331	Declarative Programming	3	0	IF232	Compulsory	
4	IF332	Language Theory and Automata	3	0	IF120	Compulsory	
5	IF351	Database System	3	0	IF120	Compulsory	1,2,5
6	CE319	Probabilistic and Statistics	3	0	IF120	Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
7	UM142	Bahasa Indonesia	2	0	-	Compulsory	
TOTAL CREDIT SEMESTER 3			**20**				

Semester 4

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF433	Object Oriented Programming	2	1	IF232	Compulsory	
2	IF470	Computer Security	3	0	IF260	Compulsory	9, 17
3	IF420	Numerical Analysis	3	0	EPM101	Compulsory	
4	IF450	Human and Computer Interaction	3	0	IF350	Compulsory	
5	IF432	Algorithm Design and Analysis	3	0	IF232	Compulsory	
6	IF440	Artificial Intelligence	3	0	CE319	Compulsory	
7	CE449	Computer Network	2	0	IF260	Compulsory	
TOTAL CREDIT SEMESTER 4			**20**				

Semester 5

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IF580	Computer Graphic and Animation	2	1	EPM101	Compulsory	
2	IF540	Machine Learning	2	1	IF440	Compulsory	
3	IF570	Mobile App Programming	2	1	IF433	Compulsory	8,9
4	IF541	Expert System	3	0	IF440	Compulsory	
5	IF590	Information Technology Research	2	0	UM142	Compulsory	1,2,5,8, 9,10,17
6	EM604	Technopreneurship	2	0	-	Compulsory	10
7	UM321	English 3 : academic writing	2	0	UM223	Compulsory	
TOTAL CREDIT SEMESTER 5			**18**				

Semester 6

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IFD60101	Introduction to Business Information Systems	4	0	-	Compulsory	
2	IFD60102	Network Administration	4	0	-	Compulsory	

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
3	IFD60103	Advanced Object Oriented Programming	4	0	-	Compulsory	
4	IFD60104	Development Project 1 – Tools and Practices	4	0	-	Compulsory	
TOTAL CREDIT SEMESTER 6			**16**				

Semester 7

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IFD70101	IT Security	4	0	-	Compulsory	
2	IFD70102	Software Development for Mobile Devices	4	0	-	Compulsory	
3	IFD70103	Elective 1	4	0	-	Elective	
4	IFD70104	Elective 2	4	0	-	Elective	
TOTAL CREDIT SEMESTER 7			**16**				

Semester 8

Num.	Course Code	Course Name	Credit		Pre-requisite Course Code	Compulsory / Elective	SDG
			Lect.	Lab			
1	IFD80101	Information Technology Project Management	4	0	-	Compulsory	
2	IFD80102	IoT Programming	4	0	-	Compulsory	
3	IFD80103	Information Technology Project	4	0	-	Compulsory	
4	IFD80104	Professional Issues in Information Technology	4	0	-	Compulsory	
TOTAL CREDIT SEMESTER 8			**16**				

G. Courses Description

Description of informatics study program courses containing: Name of courses, amount of credits, ELO, and short description of the courses.

Semester 1

Course	IF130 Programming Fundamentals
Credits	3
ELO	ELO-2; ELO-6
Min Pass (Grade)	C
Description	This course discusses the design of structured programs, using flowchart and pseudocode, which includes branching, iteration, desk checking, and modular.

Course	IF120 Discrete Mathematics
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	Discrete Mathematics aims to teach students to know and understand the basic concepts of Discrete Mathematics. Some of the materials taught in this course include the basic ideas of sets; Mathematical logic and proof; basic concepts of functions, sequences, and series; relations and relation matrices; introduction to number theory; calculation method; discrete opportunities; recurrence relation; graph and tree theory; and Boolean algebra and circuit combinatorial

Course	CE121 Linear Algebra
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course covers matrix theory and linear algebra, emphasizing topics useful in computer science field

Course	CE232 Digital System
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course covers basic digital system including concept of digital system, numbering system and conversion, logic simplification, combination circuit, and sequential circuit

Course	UM162 Pancasila
Credits	2
ELO	ELO-1
Min Pass (Grade)	C
Description	This course discusses Pancasila as the Philosophical basic values (philosophical grondslag), the soul of the nation (volksgeist) as well as the innerself of nation, ideology of Indonesia, and Indonesian actual way of life

Course	UM152 Religion
Credits	2
ELO	ELO-1
Min Pass (Grade)	C
Description	This course discusses the Divinity of God beyond any limitation as taught by every Religion in Indonesia; and its implications on human life

Course	UM163 Civics
Credits	2
ELO	ELO-1
Min Pass (Grade)	C
Description	This course develops students' basic competencies to become scientists and professionals with strong value of nationalism and love of the homeland; democratic society; become citizens with competence and

	compliance; and actively participate in Indonesia's development

Course	UM122 English 1 : Composition
Credits	2
ELO	ELO-3
Min Pass (Grade)	C
Description	This course discusses the elements of English to enrich the vocabulary, improve the pronunciation of words and improve students' knowledge related to sentence construction, paragraphs and texts that are focused on the development of reading skills, vocabulary skill-building and vocabulary learning strategies

Semester 2

Course	IF260 Operating System
Credits	3
ELO	ELO-2; ELO-7
Min Pass (Grade)	C
Description	This course covers operating systems, processes and threads, concurrency, process scheduling, memory management, multiprocessor, process synchronization, device settings, deadlock and solving, and file systems

Course	IF232 Algorithm and Data Structure
Credits	4
ELO	ELO-2; ELO-6
Min Pass (Grade)	C
Description	This course equips students with knowledge of algorithms and data structures in programming

Course	IF231 Introduction to Internet Technology
Credits	3
ELO	ELO-6
Min Pass (Grade)	C

Description	This subject teaches the basic concepts of Web programming using client-side scripting

Course	**MSC1003 Communication and Personal Relationship**
Credits	2
ELO	ELO-3
Min Pass (Grade)	C
Description	The subjects include understanding, scope, concepts and axioms of communication, culture in interpersonal communication, perception and self in interpersonal communication, listening in interpersonal communication, interpersonal messages: verbal, nonverbal, emotion, and conversation, interpersonal relationships, interpersonal development and fractures, types of interpersonal relationships: friendship, romance, family and workplace, conflict and interpersonal conflict management, power and influence in interpersonal relationships

Course	**EPM101 Calculus**
Credits	4
ELO	ELO-2
Min Pass (Grade)	C
Description	This course provides basic concepts of limits and continuity; definitions, properties and derivative formulas and their applications; definitions and properties of transcendent functions and their applications; definitions, traits, indefinite integral and definite, derivatives and integrals of multivariable functions, application problems, and more

Course	**CE332 Computer Architecture and Organization**
Credits	3
ELO	ELO-7
Min Pass (Grade)	C

Description	This course introduces details of computer architecture and organization. It covers computer top level view, memory types and hierarchies, I/O and Storage devices, CPU architectures such as RISC, CISC, parallel, multi-core and GPGPU systems

Course	**UM233 English 2 : speaking**
Credits	2
ELO	ELO-3
Min Pass (Grade)	C
Description	This course discusses the concepts and processes of writing scientific articles (planning, designing, reviewing and editing) from writing paragraphs to writing essays, introducing literary variety and discussing the factors that influence the production of a good quality and well-written writing, as well as fostering students' writing habits

Semester 3

Course	**IF350 Software Engineering and Project Management**
Credits	3
ELO	ELO-2; ELO-5; ELO-6
Min Pass (Grade)	C
Description	This course student will apply the principles and approaches of software engineering theory and practice and manage them into a software project management that is efficient, within budget, quickly and of good quality. Student will develop a comprehensive project plan using the project of their choice. By the end of this course, student will understand why project management requires a high level of professionalism, and how to achieve that goal in future software projects

Course	**IF330 Web Programming**
Credits	3
ELO	ELO-5; ELO-6

Min Pass (Grade)	C
Description	This course covers web programming using server side scripting (eg. PHP) and database

Course	**IF331 Declarative Programming**
Credits	3
ELO	ELO-2; ELO-6
Min Pass (Grade)	C
Description	Declarative programming is a programming paradigm in which a computer program is formed based on a computational logic structure that can be used to solve a problem. In declarative programming, the source code of a program does not express the control flow of a problem solving. The purpose of using declarative programming is to minimize and eliminate side effects (in the form of bugs) from a program by describing what must be solved based on a problem domain. By understanding declarative programming, besides being able to create programs that are free from side effects, users can also write parallel programs more easily. Logical programming and functional programming are two parts of the declarative programming paradigm. This course will specifically discuss logic programming as part of declarative programming

Course	**IF332 Language Theory and Automata**
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course studies the formal language, especially for the purposes of designing a compiler and a text processor. Automata are abstract machines that can recognize, accept, or generate a sentence in a particular language. The theory of language and automata is a theory of abstract machines, and is closely related to formal language theory

Course	IF351 Database System
Credits	3
ELO	ELO-4; ELO-6
Min Pass (Grade)	C
Description	This course covers the concepts, terminology, technique used in database management systems

Course	CE319 Probability and Statistics
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course provides the basics of probability distribution and statistical analysis methods, relevant for students of information and communication technology.

Course	UM142 Bahasa Indonesia
Credits	2
ELO	ELO-3
Min Pass (Grade)	C
Description	This course covers the status and function of Bahasa Indonesia (Indonesian Language), traits of Bahasa Indonesia, variety / barrel of language, word and word formation, choice of words, sentences and sentence patterns, the effectiveness of sentences, paragraph development and paragraph sequencing, paraphrase, systematic scientific writing, writing excerpts with the APA system, completeness of papers, oral proficiency in presentations, interviews and arguments

Semester 4

Course	IF433 Object Oriented Programming
Credits	3
ELO	ELO-6

Min Pass (Grade)	C
Description	This course deals with the basic concepts of object-oriented programming and Java and C ++ programming (Control Structure, I / O Stream, Function, Array, Pointer, String, Class, Overloading Operator, File, etc.)

Course	**IF470 Computer Security**
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course provides basic concepts and general knowledge of computer security, many kinds of attacks, harms caused by those attacks, vulnerabilities causing many kinds of attacks, threats which can exploit those vulnerabilities and cause security breach, and countermeasures against many kinds of attacks

Course	**IF420 Numerical Analysis**
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	In the Numerical Analysis course, students will be introduced to various numerical concepts, ranging from Linear Algebra and Systems of Linear Equations, Eigen values and vectors, Least Square Regression, Interpolation techniques, Taylor series, techniques for finding the roots of equations, Numerical derivatives, Integration Numeric, Ordinary Differential Equations, and Fourier Transforms. In addition, this course is also equipped with various examples of problems and practical application of solving these problems using basic Python programming which is introduced to students

Course	**IF450 Human and Computer Interaction**
Credits	3

ELO	ELO-2
Min Pass (Grade)	C
Description	This course provides knowledge that focuses on fundamental concepts to real-world implementation examples of the principles of human-computer interaction in the world of information technology. Theories and techniques of analysis and design of human and computer interactions are explained with an understanding that most of them are in the realm of knowledge of informatics and computer engineering as well as a small part of human psychology in interacting with computers, general digital knowledge of today's interfaces and applications, and real world conditions in society. related to interactive products in the world of information technology

Course	**IF432 Algorithm Design and Analysis**
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course discusses the analysis and design of algorithms that will be used to solve informatics problems where students will learn about the basic concepts of algorithms, algorithm analysis, algorithm design techniques, and how the algorithm works to solve a problem

Course	**IF440 Artificial Intelligence**
Credits	3
ELO	ELO-2; ELO-9
Min Pass (Grade)	C
Description	This subject discusses the basic concepts of artificial intelligence and development, the concept follows the basic knowledge representation of knowledge, problem-solving techniques with search methods, and applications of intelligent systems applications in the field of artificial intelligence

Course	CE449 Computer Network
Credits	2
ELO	ELO-7
Min Pass (Grade)	C
Description	This course covers internetworking protocols (OSI and TCP / IP layers) and their implementation with a top-down approach, from the application layer to the physical layer

Semester 5

Course	IF580 Computer Graphics and Animation
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	Computer Graphics and Animation teaches computer graphics in general, procedural programming, basic algorithms for 2D and 3D graphics, geometric transformations, graphics between face, lighting and animation. Apart from technical understanding, this course also teaches the history and application of computer graphics and animation in the industrial world

Course	IF540 Machine Learning
Credits	3
ELO	ELO-2; ELO-4; ELO-9
Min Pass (Grade)	C
Description	Machine learning courses invite students to understand basic ideas, intuition, algorithm concepts and techniques to make computers smarter. Emphasis of material on technique the basis of guided, unsupervised, and reinforcement learning. Students are introduced to problem areas and problem boundaries in machine learning which include classification and group analysis. Inviting students to understand and measure system performance, system optimization techniques and overcome overfitting

	problems, carry out preprocessing data, recognize data and its properties, and how to validate the correct model. Some of the algorithms used in developing machine learning based systems are presented to students are preprocessing data with principal component analysis and linear discriminant analysis, prediction-based models with regression, Gaussian-based modeling, modeling based on Bayes classification, decision tree based model, nearest neighbor based model, support vector based modeling, deep learning, partition algorithm, hierarchical algorithm, algorithm density based, association based algorithm, Q-Learning algorithm and SARSA

Course	**IF570 Mobile App Programming**
Credits	3
ELO	ELO-5; ELO-6
Min Pass (Grade)	C
Description	This course provides the basic knowledge required by an Android mobile application programmer, such as the use of activity, fragments, and intents; UI concept on Android; utilization of views, data management; sharing data; Android messaging feature; location-based services and Android services; Android networking; and Android application publishing, both theoretically and practically.

Course	**IF541 Expert System**
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	This course aims to teach the students to know and understand basic concept of Expert System and its applications. Some materials being taught in this course are ranging from the basic concept of an Expert System and the system's structure; Genetic Algorithm; some metaheuristic

	techniques (Particle Swarm Optimization, Ant Colony Optimization, Simulated Annealing, and Cross Entropy); and some Multi Criteria Decision Making techniques (Weighted Product Model, ELECTRE, TOPSIS, AHP, and Fuzzy-based MCDM). Moreover, the students will be given an experience to solve a problem by using the skills and knowledge they have learnt in the form of a group project

Course	**IF590 Information Technology Research**
Credits	2
ELO	ELO-3; ELO-8
Min Pass (Grade)	C
Description	Information Technology Research is a supporting course for the Thesis Course which contains the basic materials needed to ensure the success of a research project, such as the introduction of research in the field of Informatics Engineering, the basic concepts and stages of research, the basics of developing a research proposal, how to refer, test, and withdraw conclusions and research suggestions, and how to present research results, both orally and in writing

Course	**EM604 Technopreneurship**
Credits	2
ELO	ELO-5; ELO-9
Min Pass (Grade)	C
Description	This course is about entrepreneurship based on Information and Communication Technology. This course is unique as students not only learn about entrepreneurship but also include creating an innovative idea by putting forward the latest technological aspects, realizing the idea to become a product or service, and how to deliver the product or service to the consumers

Course	UM321 English 3: academic writing
Credits	2
ELO	ELO-3
Min Pass (Grade)	C
Description	This course covers methods, concepts and elements of language to improve listening and speaking skills in English which will enable students not only to understand and produce sentences related to grammatical, lexical and articulate elements but also to enable students to understand when, where, why and what ways should be applied to language production

Semester 8

Course	IF800 Thesis
Credits	6
ELO	ELO-1; ELO2; ELO-3; ELO-4; ELO-6; ELO-8-ELO-9
Min Pass (Grade)	C
Description	This course trains student's abilities to develop to scientific field of computer science or to continue their studies. In this course, students will work on research topic independently under the guidance of a lecturer. The research topic being worked on must be related to one of the fields in the research lab in the Study Program. Students must write a scientific report regarding their work and defend it at the Final Assignment Session.

Elective Courses

Course	IF680 Multimedia Concept
Credits	3
ELO	ELO-2
Min Pass (Grade)	C
Description	Multimedia concept teaches students the basic understanding of the concept of using multimedia elements and their processing in the real world. This course teaches various terms, definitions, technical meanings and techniques for using

	multimedia elements consisting of text, image, audio, video, and animation. In addition, students are also taught to complete a multimedia project in the form of collaborative interactive multimedia applications. The technique of using multimedia elements and making interactive multimedia projects is done using the Visual Scratch programming language as a multimedia authoring tool

Course	**IF681 3D Game and Development**
Credits	3
ELO	ELO-2; ELO-5; ELO-6
Min Pass (Grade)	C
Description	This course discusses the process of making a digital game in 3-dimensional form, starting from the process of designing elements in a game and using three-dimensional assets from 3D software, to the process of implementing and programming a digital game in three-dimensional form. Before entering into the process of designing elements in a game, students will be taught the concept of elements in a game according to several experts in the field of Game Design and Development. The implementation and programming technology taught in this course will use the Unity Game Engine as a digital game development tool

Course	**IF682 AR VR Game Design and Development**
Credits	3
ELO	ELO-2; ELO-5; ELO-6
Min Pass (Grade)	C
Description	This course discusses the process of making a digital game in 3-dimensional form by utilizing tools related to making game development such as smartphones to create Virtual Reality games or Augmented Reality games and also learning how to make games using procedural content generation methods by utilizing Unity software

Course	IF670 Cross Platform Mobile Programming
Credits	3
ELO	ELO-5; ELO-6
Min Pass (Grade)	C
Description	Cross-Platform Mobile Programming discusses how to build a hybrid mobile app using various web technologies that can run on Android and iOS platforms using the same codebase. Students will also learn how to build mobile applications that can access native device features, such as cameras, sensors, geolocation, and access cloud-based databases

Course	IF671 Blockchain and Cryptocurrency
Credits	3
ELO	ELO-2; ELO-4; ELO-6
Min Pass (Grade)	C
Description	This course explores the potential use of blockchain technology by various stakeholders related to economics and finance. Starting with a review of the early applications of the technology, Bitcoin cryptocurrency, students will gain an understanding of the commercial, technical, and public policy underpinnings of blockchain technology, distributed ledgers, and contracts smart contracts in open source and private applications. The discussion covers current blockchain applications with case reviews from payment systems to non-fungible tokens (NFT)

Course	IF672 Parallel Processing
Credits	3
ELO	ELO-2; ELO-6
Min Pass (Grade)	C
Description	This course covers the theory of concurrency and parallelism, the history of high-performance machines and how to use high-performance computing facilities such as computing on clusters and GPUs.

	Students will be taught theories about the parallel programming paradigm, SOMD and MIMD engine concepts, as well as issues such as shared memory, mutual exclusion, and semaphores, and also be equipped with practical knowledge about the latest standards such as Open MP, Cuda and so on

Course	**IF674 Cybersecurity : Cloud security and Security Operation**
Credits	3
ELO	ELO-1; ELO-4; ELO-9
Min Pass (Grade)	C
Description	This course provides the students basic principles associated with securing the cloud and SaaS-based applications through Secure Access Service Edge architecture and identify concepts required to recognize and potentially mitigate attacks against traditional and hybrid datacenters as well as mission critical infrastructure. Students will also learn how to initially setup and configure containers on a Docker bridge network and test the container security through the use of vulnerability scans and reports. This course also provides the student with an understanding of Security operations (SecOps) and the role it plays in protecting our digital way of life, for businesses and customers. Students will learn continuous improvement processes to collect high-fidelity intelligence, contextual data, and automated prevention workflows that quickly identify and respond to fast-evolving threats. They will also learn how to leverage automation to reduce strain on analysts and execute the Security Operation Center's (SOC) mission to identify, investigate and mitigate threats

Course	**IF673 Cybersecurity : firewall configuration and management**
Credits	3
ELO	ELO-4; ELO-7

Min Pass (Grade)	C
Description	This course provides students with a general understanding of how to install, configure, and manage firewalls for network architecture defense. Students will learn theory and configuration steps for setting up security, networking, threat prevention, logging, and reporting features of firewall technology. Students will also learn the theory and advanced configuration features needed to set up traffic handling, advanced content/user identification, quality of service, global protection, monitoring/reporting, and high availability using firewall technology.

Course	**IF690 Computer and Society**
Credits	3
ELO	ELO-1; ELO-3; ELO-9
Min Pass (Grade)	C
Description	The rapid development of ICT (Information and Communication Technology) has changed many activities in our lives. For example, in learning, playing, working, communicate and do business. Moreover, now social media has also been widely used in various ways. In addition to having a positive impact, the development of ICT also has a negative impact. This negative impact needs to be understood so that the community using ICT can minimize its impact. To that end, the Indonesian government has drawn up various laws, including the Law on Information and Electronic Transactions to regulate the use of ICT in society. As an ICT professional, it is not enough just to master the technology but also to understand the code ethics to prevent the misuse of ICT, both for personal interests and the interests of other parties

Joint Degree Courses offered by Swinburne University of Technology

Semester 6

Course	IFD60101 Introduction to Business Information Systems
Credits	4
ELO	ELO-2; ELO-3; ELO-4, ELO-8, ELO-9
Min Pass (Grade)	C
Description	This unit aims to instill an appreciation of how technology can be used to assist business, without the technology becoming an end in itself. In particular, students will develop an awareness of the importance of information to decision-making and how to provide such information to ensure its usefulness to the decision makers. Students gain a strong foundation of business systems fundamentals and the influence of the Internet on business stakeholders; customers, suppliers, manufacturers, service makers, regulators, managers and employees.

Course	IFD60102 Network Administration
Credits	4
ELO	ELO-7
Min Pass (Grade)	C
Description	To build the knowledge and skills required to design, configure and manage a single domain network.

Course	IFD60103 Advanced Object Oriented Programming
Credits	4
ELO	ELO-6
Min Pass (Grade)	C

Description	This unit of study aims to introduce students to object oriented programming and design.

Course	**IFD60104 Development Project 1 – Tools and Practices**
Credits	4
ELO	ELO-2, ELO-6
Min Pass (Grade)	C
Description	This unit of study aims to expose students to the range of software development methodologies and project management practices that are used in contemporary software development projects. During the study, students will be able to use a range of tools and techniques for modelling problem and solution domains for software systems; and understand the knowledge and concepts behind these tools and techniques. They will also learn and understand the major issues that contemporary project managers have to handle.

Semester 7

Course	**IFD70101 IT Security**
Credits	4
ELO	ELO-1, ELO-2, ELO-7, ELO-8
Min Pass (Grade)	C
Description	Students who complete this unit of study will understand the nature of security threats to IT systems. Student will be familiar with the tools used by hackers and crackers and be aware of ways of identifying and rectifying security breaches and will understand how to assess the vulnerability of computing systems.

Course	**IFD70102 Software Development for Mobile Devices**
Credits	4
ELO	ELO-6
Min Pass (Grade)	C

Description	This unit of study aims to introduce students to software development and design for mobile devices.

Semester 8

Course	**IFD80101 Managing IT Projects**
Credits	4
ELO	ELO-2, ELO-3, ELO-4, ELO-9
Min Pass (Grade)	C
Description	This unit aims to develop an understanding of possible approaches to planning and managing information technology projects. With a focus on adhering to an agreed timeframe and budget, students learn how IT projects are managed successfully and acquaint themselves with the appropriate methods, tools, techniques, and processes to achieve this goal. Students learn to identify risk factors and means to address risks to the completion of IT projects on time and within budget. Students also familiarize themselves with change management, the roles and responsibilities of project managers and the recruitment of project teams.

Course	**IFD80102 IoT Programming**
Credits	4
ELO	ELO-2, ELO-3, ELO-4, ELO-6, ELO-8
Min Pass (Grade)	C
Description	The Internet of Things (IoT) programming unit will teach students the fundamentals of developing IoT-based solutions for domains such as Smart Homes, Smart Cities etc., using IoT sensors and devices. Students will learn the skills to work with current popular IoT sensors and platforms such as Arduino and will have the opportunity to apply these skills in developing innovative IoT-based solutions. The unit will be hand-on with students expected to work in small groups to design, develop and implement the IoT-based solutions.

Course	IFD80103 Information Technology Project
Credits	4
ELO	ELO-2, ELO-3, ELO-4, ELO-5, ELO-8, ELO-9
Min Pass (Grade)	C
Description	This unit is designed as a capstone industry project unit that provides students with professionally focused learning experiences during their final year of study. The unit aims at consolidating and integrating student learning with real world practice and facilitating a successful transition from academic learning environment to work environment. In conjunction with the development of analytical, critical thinking, problem solving, technical, and project management skills, the unit also has a strong emphasis on the development of professional and generic skills such as communication skill, teamwork skill, ability to tackle unfamiliar problems, and ability to work independently.

Course	IFD80104 Professional Issues in Information Technology
Credits	4
ELO	ELO-2, ELO-3, ELO-8, ELO-9
Min Pass (Grade)	C
Description	This unit assists students in identifying and understanding issues relating to the personal and organizational application of Information and Communication Technologies (ICT) with particular emphasis on ethics and privacy. Students will develop a sense of professional responsibility through exploring the professional code of ethics articulated by professional accrediting bodies. Students will explore a range of social, legal, ethical and business issues that ICT professionals face in their careers.

MBKM in Informatics Study Program

No	Code	Courses	ELO-1	ELO-2	ELO-3	ELO-4	ELO-5	ELO-6	ELO-7	ELO-8	ELO-9
	MBKM Internship Track 1 (compulsory)										
1	IFM601	Professional Business Ethics	v			v		v			
2	IFM602	Industry Experience		v	v	v		v			
3	IFM603	Industry Model Validation		v		v		v			
4	IFM604	Evaluation and Reporting			v	v		v			
MBKM Internship Track 2 (elective)											
5	IFM701	Industry Pipeline Knowledge		v				v			
6	IFM702	Professional Literacy				v					
7	IFM703	Industry Pipeline validation						v			
8	IFM704	Industry based project		v				v			
Entrepreneurship											
9	IFM711	Idea validation		v							
10	IFM712	Product validation					v				
11	IFM713	Business validation		v			v				
12	IFM714	Business mentoring					v	v			

Research											
13	IFM721	Research problem formulation		v							
14	IFM722	Implementation of research methodology		v						v	
15	IFM723	Research evaluation		v							
16	IFM724	Scientific publication						v		v	
Community Service Program											
17	IFM731	Community outreach project idea		v							
18	IFM732	Community outreach phase 1		v				v			
19	IFM733	Socio entrepreneurship development & managing				v		v			
20	IFM734	Community outreach phase 2								v	
Independent Project											
21	IFM741	Generation		v							
22	IFM742	Design creation						v			

23	IFM743	Development and evaluation		v				v			
24	IFM744	Publication								v	
Humanity Project											
25	IFM751	Humanity Project Idea		v							v
26	IFM752	Project Validation		v							v
27	IFM753	Project Development		v	v						v
28	IFM754	Humanity Project Evaluation			v						v