



AGROINDUSTRIAL ENGINEERING STUDY PROGRAM

Department of Agroindustrial Technology
Faculty of Agricultural Engineering and Technology
IPB University



AGROINDUSTRY BRINGS AGRICULTURE INTO PERFECTION



DEPARTEMEN TEKNOLOGI INDUSTRI PERTANIAN
DEPT. OF AGROINDUSTRIAL TECHNOLOGY

PROGRAM STUDI SARJANA TIN
PROGRAM STUDI PASCASARJANA TIP



A PIONEER STUDY PROGRAM CONTRIBUTING TO THE DEVELOPMENT AGROINDUSTRY

Founded in 1981 with vision "To be an outstanding and internationally recognized education institution that provides qualified human resources in the field of agroindustrial technology and management". This Study Program is Internationally accredited by ABET (2013-2020) and now on process for international accreditation by IABEE.

Annual Enrollment 120 students
Over 4629 Graduates
27 Patents
75% of its graduates obtained
their first job less than 3 months





**WE SPEAK
AGROINDUSTRY**

The curriculum prepares graduates with ability to design, develop, implement, control, evaluate, and improve the system performance of sustainable agroindustry, through an integrated approach of transformation process, system engineering, industrial management, and environmental aspects to increase the added value of agricultural/bio-based resources and their derivatives.



STUDENTS LEARNING OUTCOMES

Graduating from the Agroindustrial Engineering Study Program, students are expected to be:

1. able to identify, analyze and solve problems in agroindustry that cover aspects of process technology, industrial management, systems engineering, and environmental engineering and management by applying knowledge of mathematics, science, engineering and information technology using modern engineering tools.





- 2. able to design an agroindustrial system/ component, process and product to meet the desired needs within realistic constraints.
- 3. able to design and conduct scientific and engineering experiments and analyze and interpret the resulting data.



- 4. able to recognize the needs and have the ability to be involved in lifelong learning.
- 5. able to communicate in writing and oral effectively.
- 6. able to function effectively within multidisciplinary and multicultural teams.
- 7. able to understand the application of ethics and professionalism in solving engineering problems of agroindustry in the economic, environmental and societal contexts as well as other contemporary issues.
- 8. able to transform science and technology-based ideas into the concept of agroindustry business (technopreneurship).





**PLAN YOUR
CARRER**



"After 4 (four) years of work, graduates of The Agroindustrial Engineering Program are able to apply the knowledge, skills, and attitudes learned from the academic program to solve engineering problems of agroindustry as quality engineers, productive, and sensitive to the consequences of work ethically and professionally, develop themselves through graduate education, become technopreneurs in the field of agroindustry, play an active role and communicate effectively in multidisciplinary teams, and continue to engage in lifelong learning".



STUDENT'S TESTIMONY



My 4 years in Agroindustrial Engineering Study Program was very enjoyable, yet very challenging as we are mandated to have competence about three important agroindustrial aspect which are process tech, system, and environmental tech. However, despite of those challenges that department gave to us, the learning materials and delivery is very well managed. The lecturers have wide knowledge about industry which made us got a lot of knowledge and skills about agroindustry in term of current implementation and innovation. Department of agroindustrial technology is a good place to understand agroindustry also good place to discover more idea for bringing agricultural products into more valuable products. All of those knowledge that department taught us will help us as alumni to compete in working world.

M. Rizki Maulana

Studying at Agroindustrial Engineering Study Program IPB University exposed me to various disciplines that are necessary to add value to agricultural commodities by designing innovative Agroindustrial business/product/services. Further, there are numerous opportunities for students to explore and forge their knowledge and skills through collaborative research, summer program, and competitive events. These opportunities enrich student's practical skills in approaching real problem and solving the problem effectively. Agroindustrial Engineering Study Program is a great place to hone knowledge as well as practical skills in broad areas!

Reza Satria

Based on my experience, Technopreneurship gave fresh insight and most importantly mindset for solving problems. Knowledge on many aspects in agroindustrial technology combined with tecnopreneur mindset becomes provision and foundation for growing business.

Ignatia Herti



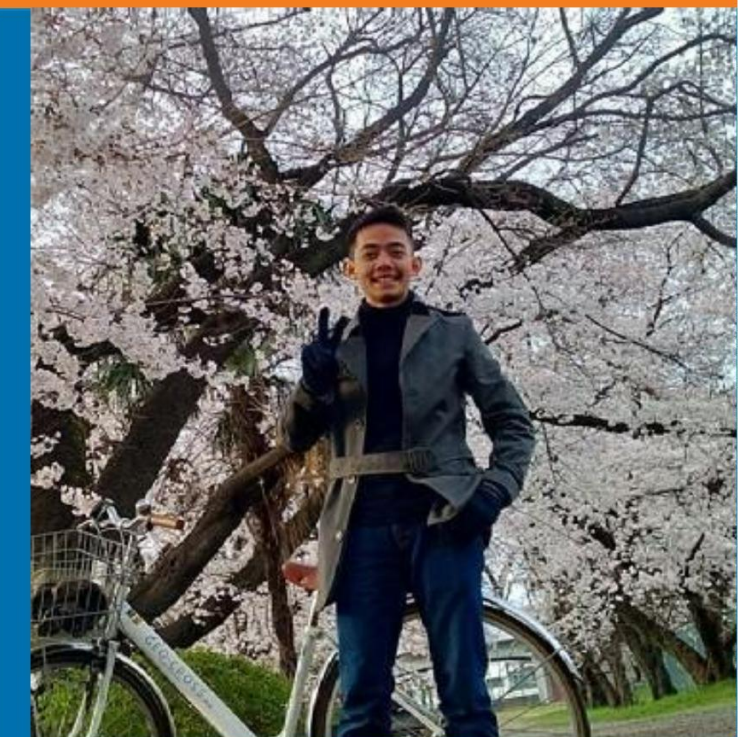
In my second year of study, I dreamed of going to Thailand and this fourth year it happened. It was a wonderful moment doing research here with the completed laboratory equipment. Besides, there were so many laboratory rooms you can use and provided a special laboratory for research. The teacher and engineer were also helpful and kind-hearted, I can ask everything to them. While doing research at Maejo University, I learned a lot about Thai people and it's culture. I also meet amazing friends who took me exploring the city with hundreds of temples, Chiang Mai.

Adzimatunnur



In the future, I am aspired to be an outstanding researcher and lecturer and make a good impact on the research and education field. I am so grateful for all of the supports and efforts from my supervisor, lecturers, friends, and all of the supporting system in the department of Agroindustrial Technology. It is a dream comes true to have international experience through the STEP@TUAT (Tokyo University of Agriculture and Technology) program that tested our motivation and persistence to adapt to a new culture, environment and life. I could not say anything except thank you so much for the inspiration and kindness. I will always remember this unforgettable moment in my life.

Ilham Maulidin





I feel so grateful to be the part of this International Program and feel International learning atmosphere. Studying using english language was challenging and fun actually, with all support from lecturer and all staff we can pass the adjustment phase.

Zefanya Ajiningrat Wibowo

It is a good opportunity for me to join this international program. By joining the international program, I get the opportunity for study abroad and join the summer course program with the other students from different universities and also different cultures.

Maula Khairul Amar



ENGAGED SCHOLARSHIPS



International class in agroindustrial technology bring Us know widely about agroindustry not only in Indonesia but also overseas.

Nur Auliya Yulita

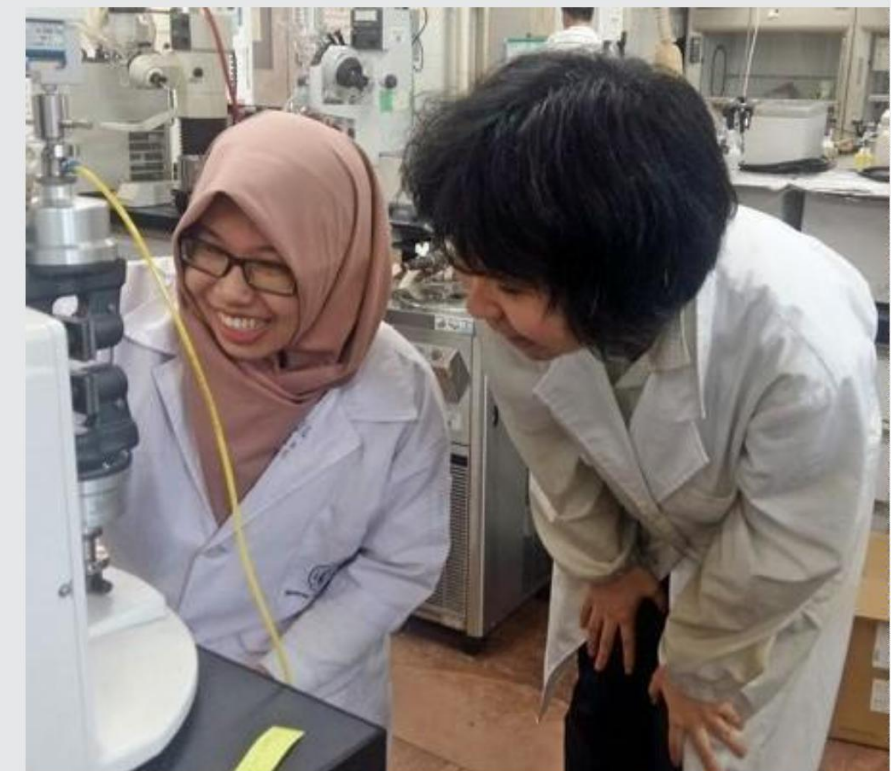
It feels great to be part of the International Class. I can learn many new things about the field of agroindustry while improving my English at the same time.

Fabian Akbar Putranto



CAPSTONE PROJECT

Applying leaned knowledge and skills to solve real-life complex engineering problems in collaboration with stakeholders.





STUDENT EXCHANGE

Gain exposure to different education systems and cultures and learning environment.

SUMMER SCHOOL AND OUTREACH ACTIVITIES

Develop empathy, creativity and innovative capabilities through project-based learning and hands-on experience in a multicultural and multidisciplinary teams.



RESEARCH INTERNSHIP

Engaged with research communities in different universities, industries (SMEs or MNCs), and rural areas to master their engineering problem solving skills.

PARTICIPATION IN INTERNATIONAL CONFERENCE / SEMINARS

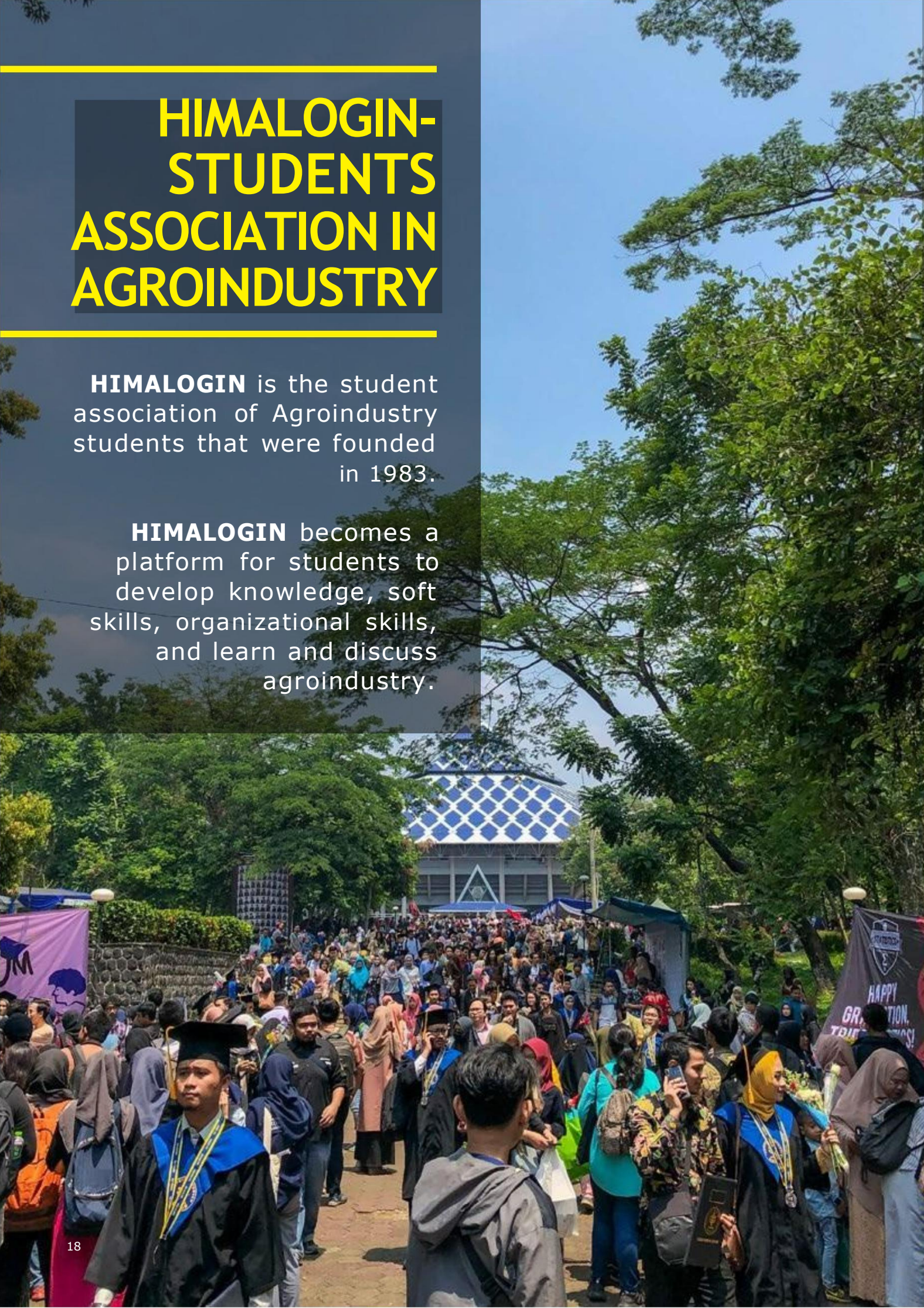
Improve communication skills in writing and oral and develop relationships with academic communities.



HIMALOGIN-STUDENTS ASSOCIATION IN AGROINDUSTRY

HIMALOGIN is the student association of Agroindustry students that were founded in 1983.

HIMALOGIN becomes a platform for students to develop knowledge, soft skills, organizational skills, and learn and discuss agroindustry.



FESTIVAL OF AGROINDUSTRY

FOA, Festival of Agroindustry, is an annual event organized by HIMALOGIN dedicated for Agroindustrial communities, university and high school students. This event is full with festivities introducing current and future developments in agroindustry ranging from Agroindustrial Expo, Agroindustrial Olympics, Business Model Competition, Essay and Infographic Competition, and Seminar.

AGROINDUSTRIAL ACADEMY

Agroindustrial academy is a student club within HIMALOGIN act as a platform for Agroindustrial students to actively introduce & apply knowledge and skills learned from classes into Agroindustrial practices.





OUR DIVISIONS

FRIENDS OF COMMUNITY OUTREACH

Friends of community outreach is a program to develop student's empathy to their surrounding communities. Students volunteer to work with rural communities around IPB campus in various activities (education, economy, or social activities).

HAGATRI - AGROINDUSTRY DAY

HAGATRI is a routine activity of HIMALOGIN. It is a program that introduces Agroindustrial Technology Department to the second year students. It consists of introduction about agroindustry and Agroindustrial engineering that are given by the professors and alumni. It is expected that students will get ready and easily adapt for their journeys in Agroindustrial Engineering Study Program.



INDUSTRIAL SYSTEM ENGINEERING

- Industrial engineering focusing on Agroindustrial production system and management.
- System science and engineering covering soft and hard system, modeling, system simulation, knowledge engineering and intelligent business system.



PROCESS ENGINEERING

- Process design, optimization, scaling up, and process development & new product development.



BIOPROCESS ENGINEERING

- Identification and utilization of microbes and enzymes for agroindustry.
- Bioprocess and product development.
- Biotechnology for agroindustry.
- Bioprocess and bioindustrial optimization and scale up.



QUALITY CONTROL

- Material and product characterization.
- Material, process and product quality control.
- Quality parameter and standard.
- Development of testing techniques and quality analysis.

PACKAGING, WAREHOUSING AND TRANSPORTATION

- Packaging material, packaging equipment and process, packaging economics.
- Storage and warehouse engineering.
- Transportation systems.



ENVIRONMENTAL SYSTEM AND ENGINEERING

- Development and application of environmental pollution control technologies (input and output pollution control) in Agroindustrial system.



INDUSTRIAL APPLICATION AND BUSINESS

- Technology assessment and valuation.
- Technopreneurship: bringing technologies into business.
- Market analysis and research.
- Agroindustrial Project Planning.



OUR PARTNERSHIPS



SOME INDUSTRIAL PARTNERS

Corinthian
KML
ADEV

UNIVERSITY PARTNERS

Adelaide University
Maejo University
UPM
Villanova University
Rhein Waal University
INSP Toulouse
Tokyo University

RURAL COMMUNITIES

Lingkar Kampus



GEDUNG
ANDI HAKIM NASOETION







CURRICULUM STRUCTURE

SEMESTER 1

No	Courses		Credit
	Code	Name	
1	IPB1100-1110	Religion	3(2-1)
2	IPB1111	Pancasila	1(1-0)
3	IPB1114	Civic	1(1-0)
4	MAT1102	Mathematics & Logical Thinking	3(2-1)
5	FIS1104	Physics for Science and Technology	3(2-1)
6	KIM1104	Chemistry for Science and Technology	3(2-1)
7	IPB1106	Indonesia Language	2(1-1)
8	IPB1108	English	3(2-1)
Sub total SKS			19

SEMESTER 2

No	Courses		Credit
	Code	Name	
1	IPB1107	Innovative Agriculture	2(2-0)
2	KOM1100	Computational Thinking	2(2-0)
3	IPB1112	Sports & Arts	1(0-1)
4	MAT1103	Calculus 1	3(2-1)
5	BIO1100	Fundamentals of Biology	3(2-1)
6	EKO1100	Economics	2(2-0)
7	KPM1131	Sociology	2(2-0)
8	STA1111	Statistics and Data Analysis	3(3-0)
Sub total SKS			18

SEMESTER 3

No	Courses		Credit
	Code	Name	
1	TMB1208	Engineering Drawing	3(2-1)
2	TIN1200	Sustainable Agroindustry	2(2-0)
3	TIN1212	Human Resources Development	2(2-0)
4	TIN1214	Information and Computing Technology	2(1-1)
5	TIN1215	Industrial Mathematics	3(2-1)
6	TIN1220	Basic Calculation in Process Engineering	3(2-1)
7	TIN1233	Industrial Microbiology	2(2-0)
8	TIN1251	Agroindustrial Material Science	2(2-0)
9	TIN1252	Analysis of Agroindustrial Materials	1(0-1)
Sub total SKS			20

SEMESTER 4

No	Courses		Credit
	Code	Name	
1	TIN1211	Work Methods	2(2-0)
2	TIN1217	Algorithm and Computer Programming	3(2-1)
3	TIN1223	Unit Operations	3(2-1)
4	TIN1224	Unit Process	2(2-0)
5	TIN1230	Fundamentals of Bioprocess Engineering	2(2-0)
6	TIN1234	Bioprocess Laboratory	2(0-2)
7	TIN1242	Packaging Technology	3(2-1)
8	TIN1253	Agroindustrial Product Materials	2(2-0)
9	TIN1254	Analysis of Agroindustrial Products	1(0-1)
Sub total SKS			20

SEMESTER 5

No	Courses		Credit
	Code	Name	
1	TIN1310	Plant Layout and Material Handling	3(2-1)
2	TIN1311	Operations Research	3(2-1)
3	TIN1318	Cost Engineering	3(3-0)
4	TIN1326	Industrial Machines and Equipment	3(2-1)
5	TIN1351	Quality Engineering	2(2-0)
6	TIN1360	Environmental Management of Agroindustry	2(2-0)
7	TIN1362	Environment Laboratory	1(0-1)
8	TIN1319	Industrial Statistics	3(2-1)
Sub total SKS			20

SEMESTER 6

No	Courses		Credit
	Code	Name	
1	TIN1312	Production Planning and Control	3(2-1)
2	TIN1316	System and Decision Making Analysis	3(2-1)
3	TIN131A	Modelling and Optimization Process	3(2-1)
4	TIN1370	Agroindustrial Product and Business Innovation	3(2-1)
5	TIN1340	Warehousing and Storage Technology	3(2-1)
6	TIN1361	Industrial Pollution Control Technology	3(2-1)
Sub total SKS			18

SEMESTER 7

No	Courses		Credit
	Code	Name	
1	TIN400	Research Methods and Scientific Presentation	2(1-1)
2	TIN401	Investigation Project	3(0-3)
3	TIN402	Agroindustrial Project Planning	3(2-1)
Sub total SKS			8

SEMESTER 6 & 7

No	Courses		Credit
	Code	Name	
1	IPB400	Thematic Outreach	4(0-4)
2	FTP401	Industrial Practice	2(0-2)
Sub total SKS			6

SEMESTER 8

No	Courses		Credit
	Code	Name	
1	TIN461	Work Health and Safety	2(2-0)
2	TIN495	Agroindustrial Capstone Design Project	6(0-6)
Sub total			8

SEMESTER 6 ELECTIVES

No	Courses		Credit
	Code	Name	
1	TIN131B	Stochastic Quantitative Methods	3(2-1)
2	TIN131C	Logistic System and Supply Chain	3(2-1)
3	TIN1328	Process Engineering of Starch, Sugar and Sucro-chemical	3(2-1)
4	TIN1329	Fats and Oils Technology	3(2-1)
5	TIN1341	Distribution and Transportation Packaging	3(2-1)
6	TIN1363	Cleaner Production	3(2-1)
Sub total			18

SEMESTER 7 ELECTIVES

No	Courses		Credit
	Code	Name	
1	TIN411	Automatic Process Control	3(2-1)
2	TIN412	Design of Digital Agroindustrial System	3(2-1)
3	TIN422	Process and Product Engineering of Fibres, Rubber, and Gum	3(2-1)
4	TIN424	Leather processing and Tanning Technology	3(2-1)
5	TIN425	Process and Product Engineering of Alkaloids and Horticultures	3(2-1)
6	TIN426	Process Engineering of Essential Oils, Spices and Phytopharmaca	3(2-1)
7	TIN430	Process Engineering on Bioindustry	3(2-1)
8	TIN440	Smart and Active Packaging	3(2-1)
9	TIN462	Engineering of Liquid Waste Handling	3(2-1)
10	TIN463	Engineering of Solid Waste Handling	3(2-1)
11	TIN464	Engineering of Air Pollution Handling	3(2-1)
Sub total			33

8					TIN495 Final Project (Major Engineering Project) 6 (0-6)	TIN461 Work Health and Safety 2 (2-0)														2	8 (2-6)		
Semester Break					FTP401 Industrial Practice 2 (0-2)	IPB400 Thematic Outreach Program 4 (0-4)															1	2 (0-2)	
7				TIN401 Investigation Project 3 (0-3)	TIN402 Agroindustrial Project Planning 3 (2-1)	TIN400 Research Method and Scientific Presentation 2 (1-1)	TIN4xxx Elective 2 3 (2-1)	TIN4xxx Elective 3 3 (2-1)													5	14 (7-7)	
Semester Break					IPB400 Thematic Outreach Program 4 (0-4)	FTP401 Industrial Practice 2 (0-2)																1	4 (0-4)
6	TIN1316 System and Decision Making Analysis 3 (2-1)	TIN131A Modelling and Optimization Process 3 (2-1)	TIN1312 Production Planning and Control 3 (2-1)	TIN1370 Agroindustrial Product and Business Innovation 3 (2-1)	TIN1340 Warehousing and Storage Technologies 3 (2-1)	TIN1361 Industrial Pollution Control Technology 3 (2-1)	TIN13xx Elective 1 3 (2-1)														7	21 (13-7)	
5	TIN1318 Cost Engineering 3 (3-0)	TIN1311 Operation Research 3 (2-1)	TIN1310 Plant Layout and Material Handling 3 (2-1)	TIN1326 Industrial Machines & Equipment 3 (2-1)	TIN1351 Quality Engineering 2 (2-0)	TIN1319 Industrial Statistics 3 (2-1)	TIN1360 Environmental Management of Agroindustry 2 (2-0)	TIN1362 Environment Laboratory 1 (0-1)													8	20 (15-5)	
4	TIN1217 Algorithm and Computer Programming 3 (2-1)	TIN1211 Work Methods 2 (2-0)	TIN1242 Packaging Technology 3 (2-1)	TIN1223 Unit Operations 3 (2-1)	TIN1224 Unit Process 2 (2-0)	TIN1253 Agroindustrial Product Science 2 (2-0)	TIN1254 Analysis of Agroindustrial Products 1 (0-1)	TIN1230 Fundamentals of Bioprocess Engineering 2 (2-0)	TIN1234 Bioprocess Laboratory 2 (0-2)												9	20 (14-6)	
3	TIN1214 Information and Computing Technology 2 (1-1)	TMB1208 Engineering Drawing 3 (2-1)	TIN1215 Industrial Mathematics 3 (2-1)	TIN1220 Basic Calculation in Process Engineering 3 (2-1)	TIN1200 Sustainable Agroindustry 2 (2-0)	TIN1251 Agroindustrial Material Science 2 (2-0)	TIN1252 Analysis of Agroindustrial Materials 1 (0-1)	TIN1233 Industrial Microbiology 2 (2-0)	TIN1212 Human Resources Development 2 (2-0)												9	20 (15-5)	
2	KOM1100 Computational Thinking 2 (2-0)	BIO1100 Fundamentals of Biology 3 (2-1)	MAT1103 Calculus 1 3 (2-1)	KPM1131 Sociology 2 (2-0)	EKO1100 Economics 2 (2-0)	IPB1107 Innovative Agriculture 2 (2-0)	STA1111 Statistics & Data Analysis 3 (3-0)	IPB1112 Sports & Arts * 1 (0-1)													8	18 (15-3)	
1	IPB1106 Indonesia Language 2 (2-0)	IPB1108 English 3 (2-1)	MAT1102 Mathematics & Logical Thinking 3 (2-1)	FIS1104 Physics for Science & Technology 3 (2-1)	KIM1104 Chemistry for Science & Technology 3 (2-1)	IPB1100-1110 Religion 3 (2-1)	IPB1111 Pancasila 1 (1-0)	IPB1104 Civic 1 (1-0)													8	19 (13-6)	
																			58	146 (95-51)			

	Mathematics and Science		Engineering Science & Technology		Information Communication and Technology		Engineering Design & Problem-based Experiment		General Knowledge
---	-------------------------	---	----------------------------------	---	--	---	---	---	-------------------



COURSE DESCRIPTION

TIN1200 SUSTAINABLE AGROINDUSTRY - 2 (2-0)

This course introduces the concept of agroindustry, the role in increasing the added value of agricultural products, the importance of developing human resources, and the role and challenges of agroindustrial engineering disciplines in national agroindustrial development.

TIN1212 HUMAN RESOURCES DEVELOPMENT - 2 (2-0)

This course explains the aspects of managing and developing human resources, including planning, recruitment, selection, training, mentoring and empowering human resources in organizations; leadership and relationships between leaders and subordinates to increase productivity; motivation, assessment and development of human resources; work health, safety and environment and productivity; learning organizations and their role in the development of agroindustry innovation and competitiveness.

TIN1214 INFORMATION AND COMPUTING TECHNOLOGY - 2 (1-3)

This course explains the Tools, Apps, Devices, encoding mechanisms, architecture, and computer components that include input, output, data processing and recording devices; the application softwares that include spreadsheets, word processing, and statistics; operating systems and database management, information systems, the basics of computer networks and the internet, the mobile computing sensor industry and computer security.

TIN1215 INDUSTRIAL MATHEMATICS - 3 (2-2)

This course explains mathematical techniques, including differential equations, integrals, numerical analysis, and laplace transforms to support the application of logical, critical, systematic and innovative thinking in solving engineering problems of agroindustry.

TIN1319 INDUSTRIAL STATISTICS - 3 (2-1)

This course explains the principles of statistics and methods of statistical analysis for the collection, processing, data analysis, and decision making, including experimental design, non-parametric statistics, design of field research (surveys), and quality control statistics for products and processes to be applied in the field of agroindustry

TIN1220 BASIC CALCULATIONS IN PROCESS ENGINEERING - 3 (2-3)

This course gives students the understanding and skills to master the basic principles of process engineering calculations, including the understanding of units, conversions, material and energy balance calculations under various process conditions.

TIN1233
INDUSTRIAL MICROBIOLOGY - 2 (2-0)

This course discusses general knowledge about microorganisms, namely classification, reproduction, isolation, selection, and identification; design processes that involve microorganisms ranging from nutritional requirements, bioreactors, control of cultivation conditions, harvesting and product purification; the use of microorganisms for the development of various food and non-food products; and the influence of microorganisms on damage to agroindustrial materials and products

TIN1251
AGROINDUSTRIAL MATERIAL SCIENCE
- 2 (2-0)

This course provides basic knowledge about the characteristics of agricultural products as agroindustrial raw materials, including macro components (water, carbohydrates, fats and proteins), micro components (vitamins, minerals, flavor, aroma, color, alkaloids), physico-chemical and organoleptic properties, and their quality.

TIN1252
ANALYSIS OF AGROINDUSTRIAL
MATERIALS - 1 (0-3)

This is a practical course to equip students with the skills to do lab analysis of agroindustrial materials, including analysis of macro components (water, carbohydrates, fats and proteins), micro components (vitamins, minerals, flavor, aroma, color, alkaloids), and physico-chemical and organoleptic properties.

TIN1211
WORK METHODS - 2 (2-0)

This course discusses work methods, work method analysis, motion studies, which include work maps, motion economics, value stream mapping, human and environmental factors in work systems, work measurement techniques and standard time determination.

TIN1217
ALGORITHM AND COMPUTER
PROGRAMMING - 3 (2-3)

This course discusses techniques used in the design and analysis of Computer Algorithms and Programming. The algorithm discussed is emphasized for solving computational problems in agroindustry. Topics include: data structure, algorithm complexity analysis, sorting; search trees, heaps, and hashing; divide-and-conquer; dynamic programming; amortized analysis; graph algorithms; shortest paths; network flow; matrix calculations; caching; mobile programming and the principle of parallel computing.

TIN1223
UNIT OPERATIONS - 3 (2-2)

This course explains the theories and principles of unit operations in agroindustry and equips students with skills to calculate the performance and efficiency of the unit operations.

TIN1224
UNIT PROCESSES - 2 (2-0)

This course explains the unit processes in the conversion / transformation of chemical, biological and enzymatic agricultural raw materials, changes in characteristics during the process, and the application of unit processes in the development of high value-added agroindustrial products.

TIN1230
FUNDAMENTALS OF BIOPROCESS
ENGINEERING - 2 (2-0)

This course discusses the relationships between biological/microbiological aspects (structures and functions of microbe cells, development of industrial microbes through mutation and recombination), biochemical aspects (microbe cells metabolism and metabolism engineering), chemical engineering aspect (enzyme and enzyme immobilization, cell growth stoichiometry and product development) to be applied to bioindustry/agroindustry.

TIN1234
BIOPROCESS LABORATORY - 2 (0-6)

This course discusses concepts and basic skills to good laboratory processes that includes basic skills of microbiology that are applied to quality test of agroindustrial products and development of bioindustry products.

TIN1242
PACKAGING TECHNOLOGY - 3 (2-3)

This course discusses the definition, function and role of packaging, classification of packaging, the properties of packaging materials (physical, mechanical, optical and thermal), alternative packaging materials, and interactions between packaging materials and packaged products.

TIN1253
AGROINDUSTRIAL PRODUCT SCIENCE
- 2 (2-0)

This course explains the principles in developing innovative and creative ideas of high-value and commercially prospective agroindustrial products at the national and global levels according to the physical, chemical and functional characteristics of agricultural-based materials, such as carbohydrates, oils and fats, proteins (animal and vegetable), horticulture (fruits, vegetables and flowers), natural fibers, essential oils, herbs, spices, stimulating/refreshing beverages (tea, coffee, chocolate), natural polymers (rubber, resin, gum), and seaweed.

TIN1254

ANALYSIS OF AGROINDUSTRIAL PRODUCTS - 1 (0-3)

Laboratory works for agroindustrial products analysis enable students to master physical-chemical and functional properties analysis of commodities and agroindustrial products, quality and organoleptic tests. This course also helps students to experiment with product development based on carbohydrates, oils and fats, protein (from animal and plants), horticultures (fruits, vegetables, and flowers), natural fibres, essential oils, spices, herbs, alkaloids (tea, coffee, cacao), natural polymers (rubber, resin, gum), and seaweeds.

TIN1310

PLANT LAYOUT AND MATERIAL HANDLING - 3 (2-2)

This course discusses the principles of designing and evaluating the layout of plant facilities, methods and stages in design according to Systematic Layout Planning, and selection and management of material handling equipment as well as their role in agroindustrial productivity.

TIN1311

OPERATIONS RESEARCH - 3 (2-2)

This course discusses the application of linear analytical methods for decision making and solving of agroindustrial problems. Topics covered include mathematical modeling, optimization techniques for various agroindustrial cases such as graphical methods, simplex methods, sensitivity analysis, transportation models, goal programming, dynamic programming and network optimization and game theory.

TIN1318

COST ENGINEERING - 3 (3-0)

This course discusses the scope of cost engineering, time value of money, activity based costing, life cycle costing, economic value added (EVA), calculation of agroindustry financing, cash flow analysis, evaluation techniques of investment and replacement feasibility, and decision making in selection of agroindustrial investment planning.

TIN1326

INDUSTRIAL MACHINES AND EQUIPMENT - 3 (2-3)

This course explains the working principles of agroindustrial equipment and machinery and methods of evaluation and selection of the right equipment and machinery for an agroindustry.

TIN1351

QUALITY ENGINEERING - 2 (2-0)

This course discusses quality engineering principles and tools and techniques to improve product qualities and continuous improvement for organization development/enterprises.

TIN1360

ENVIRONMENTAL MANAGEMENT OF AGROINDUSTRY - 2 (2-0)

This course explains the principles of environmental management in agroindustry and the interaction of industrial activities and their impact on the environment so students are able to apply this knowledge in the planning, implementation, monitoring and evaluation of an agroindustry's environmental management.

TIN1362

ENVIRONMENTAL LABORATORY - 1 (0-3)

This is a practical course to equip students with the knowledge of the working principles of environmental pollution measurement tools (liquid waste, solid waste, air pollutants, and noise) and with skills in sampling techniques and lab analysis of environmental pollution parameters, and the interpretation of the results.

TIN1370

AGROINDUSTRIAL PRODUCT AND BUSINESS INNOVATION - 3 (2-3)

This course explains the role of innovation in the development of agroindustry and the use of design thinking principles to innovate. Innovation starts from understanding the problems, consumer needs, and dynamics in the external environment, identifying opportunities, generating creative innovation ideas, designing and evaluating product concepts and their business models. Students are also trained with entrepreneurial attitudes and engineering mindsets in providing innovative solutions to agroindustry problems.

TIN1312

PRODUCTION PLANNING AND CONTROL - 3 (2-3)

This course discusses the principles, techniques and methods, and important factors in production planning and control, including forecasting, production planning and scheduling, material requirement planning and inventory control in agroindustry, and softwares of lean production and enterprise resource planning.

TIN1316

SYSTEM AND DECISION MAKING ANALYSIS - 3 (2-3)

This course discusses methods for developing multi-criteria decision making models for solving agroindustry problems, including project selection, selection of technological alternatives and other strategic decision making. Topics covered include basic theory, structure and framework of system analysis, functional requirements analysis, BPMN-based business process modeling, decision making process of Multi-attribute Multi Criteria Program (MACDM) covering Payoff Matrix, Decision Matrix, Decision Tree, AHP, Topsis, and agroindustry DSS framework and applications. Students are introduced to problems of agroindustrial decision making using case studies.

TIN1319

INDUSTRIAL STATISTICS II - 3 (2-3)

This course explains the principles of statistics and methods of statistical analysis for the collection, processing, data analysis, and decision making, including experimental design, non-parametric statistics, design of field research (surveys), and quality control statistics for products and processes to be applied in the field of agroindustry.

TIN401

INVESTIGATION PROJECT - 3 (0-9)

This course trains students to have skill in planning, designing, and conducting scientific and engineering experiments, as well as analyzing, interpreting, drawing conclusions and presenting the results.

TIN1340
WAREHOUSING AND STORAGE
TECHNOLOGIES - 3 (2-3)

This course discusses the factors causing the decline in the quality of agroindustrial materials and products and methods of storage and warehouse, namely pre-storage treatment, cold and frozen storage techniques, controlled / modified atmospheric storage techniques (CAS / MAS), warehousing techniques for bulk commodities and commodity in packaging, securing material in warehouse, and determining and estimating shelf life.

TIN1361
INDUSTRIAL POLLUTION CONTROL
TECHNOLOGY - 3 (2-3)

This course explains the principles of dealing with agroindustrial wastes, namely waste prevention, waste management, and waste control and disposal. Topics covered include identifying waste sources, characteristics and impacts on the environment; input vs output pollution control strategy; and a greater proportion is emphasized in the treatment technology of liquid, solid/hazardous, and gas wastes, including the process principles, operations and controls, and the design of unit operations.

TIN461
WORK HEALTH AND SAFETY - 2 (2-0)

This course discusses the concepts, economic significance, and implementation of Work Health and Safety (WHS) in agroindustry, covering types of workplace hazards and work accident, risk management principles to identify, anticipate and control workplace hazards, zero accident principles, important regulations on WHS, and development of WHS management systems.

TIN402
AGROINDUSTRIAL PROJECT PLANNING - 3
(1-6)

This course provides students with concepts, methods and techniques related to agroindustrial plant design and agroindustrial project management aspects, covering project plan, operation and evaluation

FTP401
INDUSTRIAL PRACTICE - 2 (0-2)

This is a practical course to provide students with hands-on experience on how agroindustry operates. Depending on the type and scale of the industry, the scope of practical work may include all industrial activities or only some aspects of industrial activities, such as PPIC, production processes, quality control, and environmental management.

IPB400
THEMATIC OUTREACH PROGRAM
- 4 (0-12)

This is a practical course designed to train students to apply the knowledge and skills acquired during the learning process to contribute to solving real agroindustry problems in rural areas or specific communities, starting from problem formulation, providing alternative solutions, implementing selected solutions and evaluating them. In doing so, a group of students is challenged to identify, mobilize and allocate resources and engage with a network of stakeholders.

TIN400
SCIENTIFIC WRITING AND
PRESENTATION METHOD - 2 (1-1)

This course explains the principles, methods and techniques of scientific writing and presentation and trains students to apply them in writing and presenting research proposals. Topics covered include the importance of academic integrity; scientific method vs. engineering method; qualitative and quantitative research methods; literature search and review; academic language style; the position and role of the beginning, middle and end of scientific work; the functions and ways of presenting them, the rules of writing scientific figures; and tips on good oral presentation.

TIN402
Agroindustrial Project Planning 3 (1-6)

This course provides students with concepts, methods and techniques related to agroindustrial plant design and agroindustrial project management aspects, covering project plan, operation and evaluation

TIN410
MODELING AND PROCESS
OPTIMIZATION - 3 (2-3)

This course discusses the basic principles of modeling, development of models in processes, theories and models of non-linear optimization techniques, response surface methods and global optimization methods and their application in agroindustry.

TIN131A
STOCHASTIC QUANTITATIVE METHODS
- 3 (2-3)

This course explains probabilistic and non-linear models in operations research that combine three disciplines, namely mathematical modeling, computer and industrial applications, with an emphasis on quadratic programming modeling, Markov Chain-Markov decision process, queuing theory, Advanced Game Theory and simulations to analyze and solving various agroindustry problems, such as production planning and control, resource planning, service systems, computer networks, and others.

TIN131C
LOGISTIC SYSTEMS AND SUPPLY CHAIN
- 3 (2-3)

This course discusses operational concepts and competitive supply chain strategies and performance measurement; basic terminology and supply chain operations in the context of the business environment; supply chain network design, effective sourcing and policies in inventory management, demand variability, forecasting and lead time at inventory and cost levels.

TIN411
AUTOMATIC PROCESS CONTROL - 3 (2-3)

This course provides knowledge to design industrial system control, including introduction and illustration of control system, use of sensors and optimization of industrial processes.

TIN1328
**PROCESS ENGINEERING OF STARCH,
SUGAR AND SUCRO-CHEMICAL - 3 (2-1)**

This course provide knowledge to design product and process that utilize agricultural raw materials based on carbohydrates, sugar and sucro-chemical in agroindustry. It covers the development of agroindustry based on carbohydrates, sugar and sucrochemical, sources and potentials, physico chemical properties, structure and principles of extraction methods, the use of enzyme in carbohydrates industry. Application of carbohydrates as modified starch, hydrolysate products and their derivatives, and bioconverted starch products, varieties and quality of sugar from sugar cane, alternative processing technologies, palm sugar technologies, crystal sugar technologies and monitoring.

TIN1329
OILS AND FAT TECHNOLOGIES - 3 (2-1)

This course provides knowledge about techniques and methods for oil/fat extraction, oil/fats purifying, oils/fat processing into basic oleochemical and their derivaties (surfactant, emulsifier, demulsifier, etc); application techniques for various product of oil/fats (frying oils, margarine, shortening, CBS, CBX, CBR, etc), basic oleochemicals (glycerol, methyl ester, fatty acid, fatty alcohol) and derivative oleochemical (MES, DEA, AS, GE) and emulsion product processing techniques and their application in industries (personal care products, pesticides, oil, and environment industry etc).

TIN1341
**TRANSPORTATION AND DISTRIBUTION
PACKAGING - 3 (2-3)**

This course discusses definition, function and scope of transportation and distribution packaging, regulation and standards on packaging for transportation and distribution, test and standarization of transportation packaging, handling (loading with individual and unit loading, stacking and unloading), handling/transporting equipments (pallet and containers, crane etc) and transportation modes.

TIN1363
CLEANER PRODUCTION - 3 (2-3)

This course explains the concept of cleaner production (CP) in agroindustry, analysis of sources of industrial waste generation, waste prevention strategies, CP audit methodology and procedures, CP integration in EMS / ISO 14000, and discusses case studies of CP application in agroindustry.

TIN131B
Stochastic Quantitative Methods
- 3 (2-1)

This course explains probabilistic and non-linear models in operations research that combine three disciplines, namely mathematical modeling, computer and industrial applications, with an emphasis on quadratic programming modeling, Markov Chain-Markov decision process, queuing theory, Advanced Game Theory and simulations to analyze and solving various agroindustry problems, such as production planning and control, resource planning, service systems, computer networks, and others

TIN412
**DESIGN OF DIGITAL
AGROINDUSTRIAL SYSTEM - 3 (2-1)**

This course discusses the concept of digital information system design for agroindustrial management processes in the digital business ecosystem (DBE) environment and the principles of preparing technical specifications for databases and object-directed digital features. The material covers the process of requirements analysis, modeling of mobile computing, cloud computing programming, and the formulation of smart computing operations in analytics (business) production / service information / services including large-scale database engineering that is able to support the process of Enterprise Resource Planning / ERP based on big data in a complex agroindustrial operation.

TIN424
**PROCESS ENGINEERING OF ESSENTIAL
OILS, SPICES AND PHYTOPHARMACA**
- 3 (2-3)

This course discusses the important role of essential oils, herbs and phytopharmaca as well as its business prospects; sources of plants and raw materials that produce essential oils, herbs and phytopharmaca; benefits of various types of essential oils, herbs and phytopharmaca; technology for processing raw materials, extraction techniques and refining essential oils and phytopharmaca, physical and chemical quality analysis, as well as developing their use in various types and product formulations that can increase added value.

TIN425

PROCESS AND PRODUCT ENGINEERING OF ALCALOIDS AND HORTICULTURES - 3 (2-3)

This course discusses integrated introduction to product and process engineering of tea, coffee, cacao, fruits, vegetables and flowers. This course covers processing principles of tea, coffee, cacao, fruits, vegetables and flowers (chemical and biochemical transformation during commodities maturing and processing including qualities, grading, and packaging).

TIN426

PROCESS AND PRODUCT ENGINEERING OF FIBRES, RUBBER AND GUM - 3 (2-3)

This course discusses processing technologies of fibres, rubber and gum. This course covers introduction and characterization of raw materials quality, technology selection to produce high value added products, product handling based on quality standards, identification of new processing technology with high economy and business potentials.

TIN427

LEATHER PROCESSING AND TANNING TECHNOLOGIES - 3 (2-3)

This course discusses processing technologies of leather into high value added products for food and non-food such as gelatine, collagen, leather glue, leather crackers, and tanned leather. Tanning technologies are given in-depth ranging from pre-tanning up to tanning.

TIN430

PROCESS ENGINEERING IN BIOINDUSTRY - 3 (2-3)

This course discusses the use of microbes and their process design that covers media design, cultivation techniques design and their kinetics, design of environment influencing kinetics of microbes growth and products, bioreactor design and scaling up, downstream process and techno-economic aspects to produce various products in bioindustry.

TIN440

SMART AND ACTIVE PACKAGING - 3 (2-3)

This course discusses the definitions, principles and mechanisms, types and forms of active and smart packaging, and the development and application of modern packaging technology in agroindustrial products.

TIN462

AGROINDUSTRIAL WASTEWATER TREATMENT TECHNOLOGY - 3 (2-3)

This course explains the treatment technology of agroindustrial wastewater for safe discharge or recycling purposes. The topics cover the principles of process, operation and control, and the design of unit operations in primary treatment (equalization, neutralization, coagulation / flocculation, precipitation, and phase separation), secondary treatment (aerobic, anaerobic, photosynthesis), tertiary treatment (physical, chemical, biological), and sludge treatment and disposal.



TIN463

ENGINEERING OF SOLID WASTE TREATMENT - 3 (2-3)

This course explains the treatment technology of agroindustrial solid waste, dangerous and poisonous material treatment for safe discharge or recycling purposes. The topics cover ranges of solid waste treatment and processing technologies as curative actions before being safely discharged to the environment.

TIN464

ENGINEERING OF AIR/GAS POLLUTANT CONTROL - 3 (2-3)

This course explains the treatment technology of agroindustrial air pollution. The topics cover the identification of air pollution data, determining techniques to control air pollution, engineering of air pollution control (particulates, gas, smells, vibration, and noises) and determining the status of agroindustrial air pollution.





IPB University
— Bogor Indonesia —