Undergraduate Program

Bachelor of Computer Science in Information Systems

Course Structure and Syllabus

Prepared By

Curriculum Team
Department of Information Systems
Faculty of Intelligent Electrical and Informatic Technology
Institut Teknologi Sepuluh Nopember

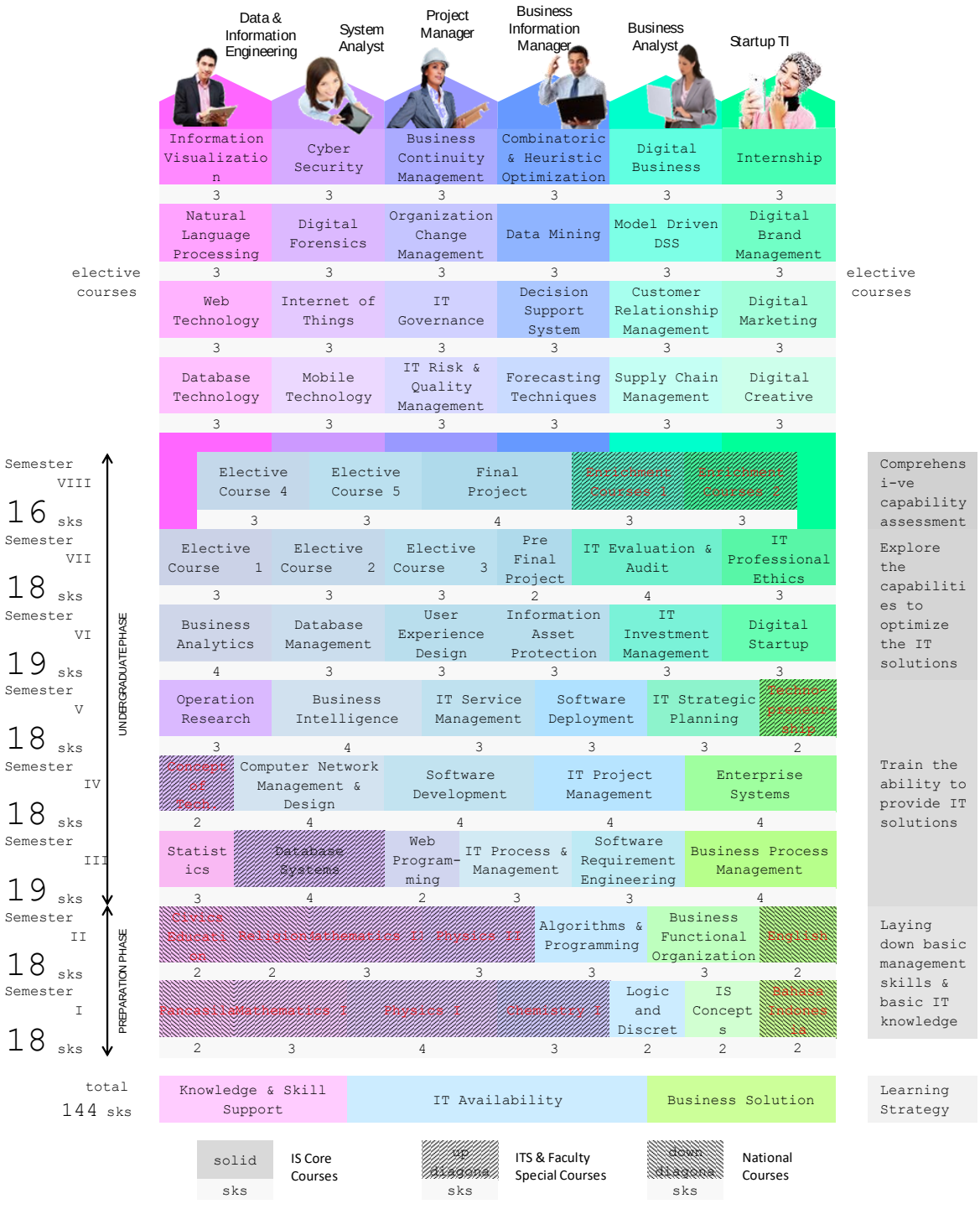
sisfor 2018

Curriculum 2018

Course Structure

Program: Bachelor of Computer Science in Information Systems

Year of commencement: 2018



Courses with **RED** font are delivered by TPB / MKDU / other Programs at ITS

Course Structure

Semester 1

No	Code	Course	Credit/Total
1	UG184912	Bahasa Indonesia Indonesian	2
2	SF184101	Fisika 1 Physics 1	4
3	SK184101	Kimia 1 Chemistry 1	3
4	IS184102	Konsep SI Information System Concepts	2
5	IS184101	Logika & Struktur Diskrit Logic and Discrete Structures	2
6	KM184101	Matematika 1 Mathematics 1	3
7	UG184911	Pancasila Pancasila	2
		Total Credit	**18/18**

Semester 2

No.	Code	Course	Credit/Total
1	UG18490X	Agama X Religion studies	2
2	IS184203	Algoritma & Pemrograman Algorithms & Programming	3
3	UG184914	Bahasa Inggris English	2
4	SF184202	Fisika 2 Physics 2	3
5	UG184913	Kewarganegaraan Civics	2
6	KM184201	Matematika 2 Mathematics 2	3
7	IS184204	Organisasi dan Fungsional Bisnis Organization and Functional Business	3
		Total Credit	**18/36**

Semester 3

No	Code	Course	Credit/Total
1	IS184308	Manajemen & Proses TI IT Process & Management	3
2	IS184310	Manajemen Proses Bisnis Business Process Management	4
3	IS184307	Pemrograman Web Web Programming	3
4	IS184309	Rekayasa Kebutuhan Perangkat Lunak Software Requirement Engineering	3
5	IW184301	Sistem Basis Data Database System	4
6	IS184305	Statistika Statistics	3
		Total Credit	**20/56**

Semester 4

No.	Code	Course	Credit/Total
1	IS184411	Desain & Manajemen Jaringan Komputer Computer Network Management & Design	3
2	IS184621	Manajemen Basis Data Database Management	3
3	IS184413	Manajemen Proyek TI IT Project Management	4
4	IS184412	Rancang Bangun Perangkat Lunak Software Development	4
5	IS184414	Sistem Enterprise Enterprise Systems	4
		Total Credit	**18/74**

Semester 5

No.	Code	Course	Credit/Total
1	IS184518	Implementasi Perangkat Lunak Software Deployment	3
2	IS184516	Kecerdasan Bisnis Business Intelligence	4
3	IS184517	Manajemen Layanan Teknologi Informasi IT Service Management	3
4	IS184519	Perencanaan strategis TI IT Strategic Planning	3
5	IS184515	Riset Operasi Operation Research	3
6	UG184915	Teknopreneur Technopreneurship	2
		Total Credit	**18/92**

Semester 6

No.	Code	Course	Credit/Total
1	IS184620	Analitika Bisnis Business Analytics	4
2	IS184622	Desain Pengalaman Pengguna User Experience Design	3
2	IS184624	Manajemen Investasi TI IT Investment Management	3
3	IS184623	Proteksi Aset Informasi Information Asset Protection	3
4	IS184625	Rintisan Bisnis Digital Digital Startup	3
5	UG184916	Wawasan dan Aplikasi Teknologi Concept of Technology	3
		Total Credit	**19/111**

Semester 7

No.	Code	Course	Credit/Total
1	IS184726	Pra TA Pre-Final Project	2
2	IS184727	Evaluasi dan Audit TI IT Evaluation & Audit	4
3	IS184728	Etika Profesi TI IT Professional Ethics	2
4	IS1849XX	Mata Kuliah Pilihan 1 Elective Course 1	3
5	IS1849XX	Mata Kuliah Pilihan 2 Elective Course 2	3
6	IS1849XX	Mata Kuliah Pilihan 3 Elective Course 3	3
		Total Credit	**17/128**

Semester 8

No.	Code	Course	Credit/Total
1	XXXXXXXX	Mata Kuliah Pengayaan 1 Enrichment Course 1	3
2	XXXXXXXX	Mata Kuliah Pengayaan 2 Enrichment Course 2	3
3	IS1849XX	Mata Kuliah Pilihan 4 Elective Course 4	3
4	IS1849XX	Mata Kuliah Pilihan 5 Elective Course 5	3
5	IS184853	Tugas Akhir Final Project	4
		Total Credit	**16/144**

Elective Courses

No.	Code	Course	Credit
1	IS184935	Forensika Digital Digital Forensics	3
2	IS184934	Internet untuk Segala Internet of Things	3
3	IS184936	Keamanan Siber Cyber Security	3
4	IS184949	Kreatif Digital (Pengayaan) Digital Creative (Enrichment)	3
5	IS184953	Magang Industri Internship	6
6	IS184954	Magang Industri Internship	9
7	IS184955	Magang Industri Internship	12
8	IS184952	Magang Industri Internship	3
9	IS184946	Manajemen Hubungan Pelanggan Customer Relationship Management	3
10	IS184940	Manajemen Keberlangsungan Bisnis Business Continuity Management	3
11	IS184951	Manajemen Merek Digital Digital Brand Management	3
12	IS184939	Manajemen Perubahan Organisasi Organization Change Management	3
13	IS184945	Manajemen Rantai Pasok Supply Chain Management	3
14	IS184937	Manajemen Risiko & Kualitas TI IT Risk & Quality Management	3
15	IS184944	Optimasi Kombinatorik & Heuristik Combinatorial Optimization and Heuristic	3
16	IS184950	Pemasaran Digital Digital Marketing	3
17	IS184956	Pengembangan dan Operasi Sistem System Development and Operations	3
18	IS184943	Penggalian Data Data Mining	3
19	IS184931	Pengolahan Bahasa Alami Natural Language Processing	3

No.	Code	Course	Credit
20	IS184947	Sistem Keputusan Berbasis Model Model Driven DSS	3
21	IS184942	Sistem Pendukung Keputusan Decision Support System	3
22	IS184938	Tatakelola TI IT Governance	3
23	IS184941	Teknik Peramalan Forecasting Techniques	3
24	IS184929	Teknologi Basis Data Database Technology	3
25	IS184933	Teknologi Bergerak Mobile Technology	3
26	IS184930	Teknologi Web Web Technology	3
27	IS184932	Visualisasi Informasi Information Visualization	3
28	IS184948	Bisnis Digital Digital Business	3

Course Name

Logic & Discrete Structure

Code: IS184101	Credits: 2	Semester: 1

Course Description

In this course, students will learn important concepts from mathematics which are important for understanding important concepts in the computer science family. The study material includes the basics of logic mathematics, discrete structures, number theory, counting, and algorithm-based problem solving. After attending this course, students are expected to understand discrete structures, be able to solve problems with a computational approach, and be able to think logically and computationally.

Program Learning Outcomes

- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have excellent intrapersonal and interpersonal skills in business environment
- Have knowledge in organization management, IT process and artifact in organization
- Apply expertise to the nation and country
- Internalize entrepreneurial spirit that suitable with the expertise

Course Learning Outcomes

General Skills :
- Apply logic & math for solving business problem.
- Apply logical, critical, systematic and innovative thinking in the expertise field.

Knowledge :
- Have knowledge of optimization & automation of IT services in organizations

Attitude :
- Respect the diversity of others;
- Internalizing values, norms, & academic ethics in life;
- Strive for perfect results;

Specific Learning Outcome

Cognitive :
- Able to differentiate proportion and not proportion.
- Able to represent proportion in predicate and quantifier.
- Able to draw a valid conclusion by using rules of inference.
- Able to draw methods of proof to test validity on mathematical theorem.
- Able to explain concepts of sets.
- Able to identify the right answer on set operations.
- Able to count correctly the cardinality of sets.
- Able to correctly count arithmetic operator division and modulo.
- Able to explain the concepts of prime numbers and greatest common divisor computationally.
- Able to apply the theory of number for simple cryptography.
- Able to use induction and recursive method to solve computational problems.
- Able to solve combinatoric problems with counting methods.
- Able to represent computational problems with relation and graph.
- Able to solve problems with computational approach.
- Able to think logically and computationally.

Psycomotor :
- Able to solve problems with computational approach.

Affective :
- Able to think logically and computationally.

Course Materials

Course Name
Logic & Discrete Structure

Code: IS184101	Credits: 2	Semester: 1

- **Logic and Proof:** Logic proportion, Predicates dan Quantifier, Rules of Inference, Method of Proof;
- **Set Theory:** Concepts of Sets, Set Operation, Cardinality**;**
- **Number Theory:** Divisibility and Modular Arithmetic, Primes and Greatest Common Divisors, Cryptography;
- **Induction and Recursion**;
- **Counting:** Pigeonhole principle, permutation and combination;
- **Relation;**
- **Graph Theory;**
- **Algorithmic based Problem Solving**

Main References

1. **Kenneth H Rosen**, Discrete Mathematics and Its Applications Seventh Edition, 2012

Additional References

1. **Backhouse, R.,** Algorithmic problem solving. John Wiley & Sons, 2011
2. **João Fernando Peixoto Ferreira,** Principles and Applications of Algorithmic Problem Solving, 2010.

WorkLoad

1. Lectures: 2 x 50 = 150 minutes (1.66 hours) per week.
2. Independent study: 2 x 60 = 120 minutes (2 hours) per week.

Examination:

- Quiz
- Mid-term examination
- Final examination

Lecturer

Contact Person : Eko Wahyu Tyas Darmaningrat, S.Kom., M.BA.
Lecturer :
Ahmad Mukhlason, S.Kom., M.Sc., Ph.D.
Eko Wahyu Tyas Darmaningrat, S.Kom., M.BA.

Course name

Information System Concepts

Code: IS184102	Credit : 2	Semester: 1

Course Description

The information system is a very important component for the success of businesses and organizations. Information systems can help all types of businesses in terms of increasing the efficiency and effectiveness of business processes, making managerial decisions, so as to strengthen the competitive position of the business in a rapidly changing market. Internet-based information systems quickly became the ingredients needed for business success in today's dynamic global environment.

Businesses today need Information Systems. So what needs to be known regarding the use of information systems in business, this Information Systems Concept Course will answer basic questions about the role of Information Systems in business organizations.

In this Information System Concept course, students can understand the various characteristics of Information Systems (IS) and their development trends, and can take advantage of IS to help provide solutions to business problems.

For this reason, the learning methods used are expository, contextual, inquiry, provide examples and discussions as well as problem-based learning & cooperative learning to be understood by students through some real cases in the SI field in the current era. So that students can respond to the best solutions to business problems through the role of SI.

The benefits that can be obtained from following the Information Systems Concept lecture include:

1. have basic knowledge about the basic concepts of Information Systems
2. understand the types of Information Systems that are not just ordinary Information Systems, but there are several types of special Information Systems and integrated Information Systems related to business
3. able to play a role as a problem solver related to what Information Systems are in accordance with existing business problems
4. understand the latest trends related to Information Systems

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise
- Able to show independent, quality & measurable performance
- Have innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Work together and have social sensitivity and care for the community and the environment
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitif :
- Students able to understand the basic concepts of Information Systems in business
- Students able to characterize and compare E-Commerce and M-Commerce
- Students able to explain the concept of an Enterprise System and distinguish the types of Enterprise Systems: TPS, ERP, SCM, CRM
- Students able to differentiate between Management Information Systems and Decision Support Systems
- Students able to explain the concepts of Knowledge Management Systems and Special Information Systems
- Students able to provide examples of the latest information system trends and their benefits

Psychomotor :
- Students able to identify the difference between E-Commerce and M-Commerce
- Students able to sort out the characteristics and uses of each type of Enterprise System: TPS, ERP, SCM, CRM
- Students able to create or initiate simple examples of Management Information Systems and Decision Support Systems according to today's business needs
- Students able to create or initiate simple examples of Knowledge Management Systems and Special Information Systems according to current business needs
- Students able to create or come up with innovative ideas on future SI trends in order to solve global business problems

Affective :
- Students actively answer questions given by lecturers through discussion and brainstorming activities
- Students are able & will behave honestly
- Students are able & will behave communicatively
- Students are able & will comply with applicable rules & regulations
- Students are able & will behave responsibly

Course Materials

- **Basics of Information Systems in Business**: Definition & Concepts of Information Systems, Concepts & Components of Computer-Based Information Systems (Coputer-Based Information System)
- **Information System Business:** Definition of Business / Organization, Definition and Characteristics of Business Information Systems, Role of IS in Business Organizations, Identification of Successful IS Strategies for Business Organizations, Threats and Challenges of IS in Business Organizations
  - Electronic dan Mobile Commerce
  - Enterprise Systems: TPS, ERP, SCM, CRM
  - Information dan DSS
  - Knowledge Management System dan Specialized Information Systems

- **Latest Trends and Technology in Information Systems**

Main References

1. **Ralph Stair, George Reynolds,** Principles of Information Systems, 9e, Course Technology Cengage Learning, 2010
2. **Patricia Wallace, John's Hopkins University,** Introduction to Information Systems, 3e, Pearson, 2018
3. **James O' Brien,** Introduction to Information Systems, 16e, McGraw-Hill, 2013
4. **R. Kelly Rainer & Brad Prince**, Introduction to Information Systems: Supporting and Transforming Business, Willey 2015

Additional References

WorkLoad

1. Lectures: 2 x 50 = 100 minutes (1.66 hours) per week.
2. Independent study: 2 x 60 = 120 minutes (2 hours) per week.

Examination:

- Mid-term examination
- Final examination

Lecturer

Contact Person : Feby Artwodini, S.Kom., M.T.
Lecturer :
Feby Artwodini, S.Kom., M.T.
Bekti Cahyo Hidayanto, S.Si., M.Kom.

Course name

Algorithms & Programming

Code: IS184203	Credit : 3	Semester: 2

Course Description

Students are introduced to object-oriented concepts, terminology, and syntax, and the steps required to create a basic Java program. Students will learn Java programming concepts, design and create simple object-oriented applications with Java.

Program Learning Outcomes

- Enhance the quality of business and IT integration in organizations
- Implement logic and math, statistics, physics, chemistry to solve business problems

Course Learning Outcomes

Special Skills :
- Integrate data & transform it into information which is used to improve organizational competitiveness

General Skills :
- Apply logic & math for solving business problem

Specific Learning Outcome

Cognitif :
- Able to explain basic concept of Algorithm, Branching, iteration.
- Able to explain basic concept of data types (primitive, object, array)
- Able to explain basic concept Sorting
- Able to explain Mampu menjelaskan Object Oriented Programming Concepts: Class, Method, Property, Attribute.

Psychomotor :
- Able to run & find program code translation
- Able to designing the proram flow
- Able to combine basic programming concepts
- Able to write program code for simple applications
- Able to debugging to remove 'bugs and errors'

Affective :
- Stundent able & want propose alternative solutions
- Stundent able & want agree on differences in alternative solutions
- Stundent able & want behave responsibly

Course Materials

- **Java basics** : Java Development Kit (JDK) , Java Runtime Environment (JRE), Compile and run Java programs
- **Java Data Types :** Declare and initialize variables, Using basic arithmetic operators to manipulate data +, -, *, /, dan%, Operator relational ==,! =,>,> =, <, dan <=, Operator conditional &&, ||,
- **String Class :** Method dan manipulate String
- Concept of Branching and looping : Branching (if-then dan if-then-else), Looping, Difference while, dan do-while loops
- **Debugging dan Exception Handling :** Identify syntax errors and logic, exception handling
- **Basic Concepts of Object Oriented Programming** : Class, Method, Property, Attribute.

Main References

1. H.M. Deitel, P.J. Deitel , S.E. Santry, Java How To Program, Late Objects, 11th Edition, Deitel & Associates, Inc, 2017.

Additional References

1. Java Fundamentals (curriculum 2016), Oracle Academy
2. Java Foundations (curriculum 2016), Oracle Academy

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Independent study: 3 x 60 = 180 minutes (3 hours) per week.
3. Practical Work 100 minutes per week.

Examination:

- Computing Assignment
- Courseworks
- Final Project
- Final examination

Lecturer

Contact Person : Ahmad Mukhlason, S.Kom., M.Sc., Ph.D.
Lecturer :
Ahmad Mukhlason, S.Kom., M.Sc., Ph.D.
Dr. Ir. Aris Tjahyanto, M.Kom.
Renny Pradina Kusumawardani, S.T., M.T.

Course Name

Organizational & Functional Business

Code: IS184204	CREDITS: 3	Semester: 2

Course Description

This course provides a contemporary overview of the management of functions within organizations. There are four functions in organizations that will be discussed in this lecture: planning, organizing, leading, controlling. At the end of this course, students are expected to have a comprehensive organizational management perspective. This description is very important, especially when students face non-technology problems when implementing information technology in organizations.

Program Learning Outcomes

- Enhance the quality of business and IT integration which provides competitiveness in organizations
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

General Skills :
- Exploring the needs & designing system integrations that increase organizational competitiveness
- Analyze data & information to obtain important findings that support intelligent business decision making & solutions
- Able to carry out the self-evaluation process of the work group under their responsibility, & able to manage learning independently

Knowledge :
- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitive
- Able to explain the functions, roles and skills of managers in the organization
- Able to explain the stages in decision making
- Able to identify techniques for effective decision making techniques
- Able to distinguish ethnocentric, polycentric, and geocentric behavior
- Able to distinguish viewpoints on the change process
- Able to classify area organizational change
- Able to explain how to manage change
- Able to explain the characteristics of organizational culture
- Able to explain six elements in organizational design
- Able to differentiate mechanistic structures and organic structures
- Able to explain the stages in group formation
- Able to explain human resource management and processes in human resources
- Able to explain various personality theories
- Able to explain various theories of motivation

Psychomotor	:	• Able to explain how the organization and employee performance are measured • Able to identify the SWOT of an organization in the real world • Able to identify the organizational culture of an organization in the real world
Affective	:	• Able to report SWOT from an organization in the real world orally or in writing • Able to report the organizational culture of an organization in the real world orally or in writing

Course Materials

- Introduction to Management
- Decision Making
- Global Management
- Constraints on Manager
- Strategic Planning
- Organization Design
- Organizing Around Teams
- Human Resource Management
- Organization Behavior
- Motivation
- Controlling Activities and Operations

Main References

1. **Robbins, Stephen P., and Mary Coulter, 2018, Management, 14th ed. Pearson**

Additional References

1. Robbins, Bergman, Stagg, Coutler, 2012, Management, 6th Edition, Pearson
2. Angelo Kinicki, Brian K Williams, 2016, Management: A Practial Approach, McGraw Hill

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 = 180 minutes (3 hours) per week.

Examination:

- In-class exercises
- Assignment 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- Mid-term examination
- Final Project
- Final examination

Lecturer

Contact Person : Prof. Erma Suryani, ST., MT., Ph.D.
Lecturer :
Prof. Erma Suryani, ST., MT., Ph.D.
Edwin Riksakomara, S.Kom., M.T.
Ir.Khakim Ghozali M.MT.

	Course Name **Statistics**		
	Code: IS184305	Credit : 3	Semester: 3

Course Description

The Statistics course studies various statistical data processing techniques. This course is the basic foundation of various monitoring and evaluation approaches to Information Technology implementation.
Students will learn statistical concepts in data analysis, differences between population and sample, primary data collection, distribution and sampling concepts and confidence intervals. Students are also asked to do hypothesis testing, correlation test, regression test then interpret the results of the analysis according to the context of the problem at hand.
Students are also required to be able to present the results of their analysis orally and in writing

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have intrapersonal and interpersonal skills

Course Learning Outcomes

General Skills :
- Planning investment & acquisition of viable IT solutions so as to provide organizational competitiveness
- Integrate data & transform it into information which is used to improve organizational competitiveness
- Apply logic & math for solving business problem
- Use statistics to help find business solutions
- Able to document, store, secure, & recover data to ensure validity and prevent plagiarism ;

Knowledge :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Be devoted to God Almighty and able to show a religious attitude ;
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitif :
- Able to name all data scales
- Able to describe all data scales
- Able to exemplify all data scales
- Able to distinguish population and sample, parameter and statistics, inferential and descriptive, sampling and census
- Able to calculate central tendency and data variance
- Able to diagram data in the form of tables, plots, or graphs
- Able to interpret the results of descriptive analysis according to the context of the problem
- Students able to apply the concept of sampling distribution and confidence interval
- Students able to apply hypothesis testing in either one sample or two samples

- Students able to apply correlation and regression tests
- Able to interpret the results of inferential analysis according to the context of the problem
- Able to formulate problems behind the making of the questionnaire
- Able to make precise and accurate questionnaire questions based on problem formulation
- Able to differentiate between various sampling methods: probabilistic sampling and non-probabilistic sampling
- Able to calculate the number of samples from respondents
- Able to determine the appropriate sampling method according to the problem formulation
- Able to distinguish reliability test and validity test
- Able to apply reliability and validity tests to data taken from questionnaires
- Able to diagnose questionnaire data errors or questionnaire question errors
- Able to reconstruct data or questionnaire questions so that they have a validity and reliability test value that is scientifically acceptable

Psychomotor :
- Able to operate statistical software to process data

Affective :
- Able to report the results of descriptive analysis orally and in writing
- Able to report the results of inferential analysis orally and in writing
- Able to ask questionnaire questions to respondents

Course Materials

- The concept of population and sample, parameters and statistics, inferential and descriptive, sampling and census
- Central tendency and data variance
- The concept of sampling distribution and confidence interval
- Hypothesis testing for both one sample and two samples
- Correlation test and regression
- Making questionnaire questions
- Probabilistic sampling dan non-probabilistic sampling
- Reliability test and validity test

Main References

1. Bowerman, Bruce L, O'Connel, Richard T. Business Statistics in Practice, Mc Graw Hill, 2007

Additional References

1. Lind, Marchal, Wathen. Statistical Techniques in Business and Economics, Mc Graw Hill, 2009
2. Levine, Stephan, Krehbel, Berenson. Statistics for Managers: Using Microsoft Excel. Prentice-Hall, 2009
3. Stephen D Rousch. Basic Business Statistics.
4. Maria Korjenevitch, Rachel Dunifon. Improving Survey Questions
5. Imam Ghozali, Implementasi Statistika dengan SPSS

Course Name
Statistics

Code: IS184305	Credit : 3	Semester: 3

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Mid-term examination
- Final examination

Lecturer

Contact Person: Wiwik Anggraeni, S.Si., M.Kom.
Lecturer :
Wiwik Anggraeni, S.Si., M.Kom.
Renny Pradina Kusumawardani, S.T., M.T.

Course Name

Database Systems

Code: IW184301	Credit: 4	Semester: 3

Course Description

Database Systems are becoming increasingly important nowadays. As the basis of student information system database knowledge, this course is very important considering the knowledge of database concepts, architecture and relational data models needs to be known. In addition, the concept of relational algebra also requires special attention to support other courses that require the use of databases as support. This course will provide a Conceptual Database for a Relational Data Model using the ER Model and Enhanced-ER (EER) Model, build a Logical Database design experience for students to manipulate data using SQL, build designs and physics for a Relational Data Model, and identify functional dependencies. and perform Data Normalization. This understanding and experience in this course will produce a work in the form of a physical database design and provide students with the challenges of building an ideal database for use in storing and managing organizational operational data.

Program Learning Outcomes

- Implement compromised IT solution alternative for the organization
- Enhance the quality of business & IT integration in the organization
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have excellent intrapersonal and interpersonal skills in business environment
- Have knowledge in organization management, IT process and artifact in organization
- Have knowledge in business & IT organization
- Apply expertise to the nation and country

Course Learning Outcomes

Special Skills :
- Develop & implement IS in organizations based on best practice
- Integrate data & transform it into organizational information

General Skills :
- Using logic & mathematics in business solutions

Knowledge :
- Demonstrate independent, quality & measurable performance to the organization & peers
- Have knowledge of IT infrastructure development, maintenance & evaluation in the organization
- Have knowledge of current & future IT (including processes, organizations, applications, infrastructure, people IT, data)

Attitude
- Demonstrate independence & responsibility for their work

Specific Learning Outcome

Cognitif :
- Students able to understand Database and Database Users
- Students able to understand Database Concepts and Architecture
- Students able to understand the Relational Data Model and the Boundaries of the Relational Database
- Students able to understand Relational Algebra and Relational Calculus
- Students able to understand fact gathering techniques

Psychomotor :
- Students able to manipulate data using SQL
- Students able to build a Conceptual Database design for a Relational Data Model using the ER Model and the Enhanced-ER (EER) Model

Affective :
- Students able to build Logical and Physical Database designs for Relational Data Models
- Students able to identify functional dependencies and perform data normalization
- Students able & will to behave honestly
- Students able & will to behave communicatively
- Students able & will to comply with applicable rules & regulations
- Students able & will to behave responsibly

Course Materials

- Database and Database Users,
- Concept and Database Architecture,
- Relational Data Models and Boundaries of Relational Databases,
- Relational Algebra and Relational Calculus,
- Data Manipulation using SQL,
- Data definition using SQL,
- Query-By-Example (QBE),
- Fact Gathering Techniques,
- Conceptual Database Design for Relational Data Model using ER Model and Enhanced-ER (EER) Model,
- Logical Database Design for Relational Data Models,
- Functional Dependency and Data Normalization,
- Physical Database Design for Relational Data Models

Main References

1. **Ramez Elmasri dan Shamkant B. Navathe**, Fundamentals of Database Systems, Sixth Edititon, Addison-Wesley, 2011.
2. **Thomas M. Connolly dan Carolyn E. Begg**, Database Systems: A Practical Approach to Design, Implementation, and Management, Sixth Edititon, Addison-Wesley, 2015.

Additional References

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.3 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.

Examination :
- Mid-term examination
- Final examination

Lecturer

Contact Person: Rully Agus Hendrawan, S.Kom., M.Eng.
Lecturer :
Rully Agus Hendrawan, S.Kom., M.Eng.

Course Name

Database Systems

Code: IW184301	Credit: 4	Semester: 3

Irmasari Hafidz, S.Kom., M.Sc.
Andre Parvian Aristio, S.Kom., M.Sc.

Course Name

Web Programming

Code: IS184307	Credit: 2	Semester: 3

Course Description

This course is one of a series of courses that provide understanding to students regarding the development of information system applications. In this course, students will understand web-based service architecture and create web-based applications. In addition, students gain insight into web-based application frameworks

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have knowledge in organization management, IT process and artifact for business continuity

Course Learning Outcomes

Special Skills :
- Integrate data & transform it into information which is used to improve organizational competitiveness

Knowledge :
- Having knowledge about optimization & automation of IT services with the best technology for the organization

Specific Learning Outcome

Cognitive :
- Students able to understand web-based service architecture
- Students able to understand the technology used to create web applications
- Students able to explain various MVC frameworks for building web applications

Psychomotor :
- Students able to make web-based applications with the proposed framework

Affective :
- Students able to show and report the process and results of web-based application development

Course Materials

- Web Technologies
- Information Architecture
- Web Development
- MVC Frameworks

Main References

1. Harvey M. Deitel, Paul J. Deitel, Java How To Program, Prentice Hall, 7th Edition, 2007.
2. H.M. Deitel, P.J. Deitel , S.E. Santry, Advanced Java 2 Platform - How To Program , 2nd Edition, Deitel & Associates, Inc, 2001.
3. Kurt Mehlhorn, Peter Sanders, Algorithms and Data Structures: The Basic Toolbox, Springer, 2008.

Additional References

1. Sandra Andersen, Data Structures in Java: A Laboratory Course, Jones and Bartlett Publishers, 2001.
2. T.H.Cormen, C.E. Leiserson, R.L Rivest, Introduction to Algorithms, 2nd Edition, MIT Press, Cambridge, Mass., 2001.
3. Tim Boudreau, Jesse Glick, Simeon Greene, Jack Woehr, NetBeans: The Definitive Guide, O'Reilly, 2002.

Course Name
Web Programming

Code: IS184307	Credit: 2	Semester: 3

WorkLoad

1. Lectures: 2 x 50 = 100 minutes (1.6 hours) per week.
2. Private study: 2 x 60 = 120 minutes (2 hours) per week.

Examination :

- In-class exercises
- Quiz 1 and 2
- Assignment 1, 2, 3
- Mid-term examination
- Final examination

Lecturer

Contact Person: Rully Agus Hendrawan, S.Kom., M.Eng.
Lecturer :
Rully Agus Hendrawan, S.Kom., M.Eng.
Irmasari Hafidz, S.Kom., M.Sc.
Andre Parvian Aristio, S.Kom., M.Sc.

Course Name

IT Process & Management

Code: IS184308	CREDITS: 3	Semester: 3

Course Description

Information technology (IT) has now become an integral and inseparable element in business. In order to meet business objectives, IT is managed through processes that follow a cycle of planning, development, delivery and improvement. Through standardized management, IT can be managed based on a framework that becomes an organizational reference, including: COSO, ITIM, PMBOK, PMMM, OPM3, CMMI, PRINCE2, ISO 9000-2000, Six Sigma, ISO / IEC 20000, ITSM, CobIT, ISO 17799, ISO / IEC 27001-2005, OPBOK, Kano Model.

This course focuses on discussing standardized frameworks in IT process management. For this reason, this course uses visual (poster), verbal (presentation), physical (experience with case studies), solitary (individual - test) and social (group - discussion) learning methods. The topics discussed in this course include: 1) the concept of management and governance; 2) IT processes; and 3) ITG reference model. This course provides a basic understanding of topics in IT process management such as IT project management, IT service management, IT asset security, enterprise systems, software development.

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

General Skills :
- Able to show independent, quality & measurable performance
- Able to implement information & communication technology in the context of the implementation of their work

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs
- Have knowledge of current & future business environment (including management, organization, functions, business processes)

Attitude :
- Respect the diversity of cultures, views, religions and beliefs, as well as the original opinions or findings of others

Specific Learning Outcome

Cognitive :
- Students are able to understand the concepts of management and governance
- Students are able to understand the IT process
- Students are able to understand ITG reference models, frameworks & standards

Psychomotor :
- Students are able to differentiate between management and governance
- Students are able to describe IT processes
- Students are able to distinguish various ITG reference models

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to behave responsibly

Course Materials

- Governance: Define, Multi level governance

Course Name
IT Process & Management

Code: IS184308	CREDITS: 3	Semester: 3

- Corporate Governance (CG): Institution, Functions of CG, Human Side of CG
- Program: Defining, caracter, katagori, manajemen & live cycle
- Program Governance (PG): Domain, Functions, Roles & intitution,
- IT Governance: Why ITG? ITG for Risk management, intelektual capital, Compliance
- ITG reference to model,
- framework & standard: COSO, ITIM, PMBOK, PMMM, OPM3, CMMI, PRINCE2, ISO 9000-2000, Six Sigma, ISO/IEC 20000, ITSM, CobIT, ISO 17799, ISO/IEC 27001-2005, OPBOK, Kano Model

Main References

1. **Muhammad Ehsan Khan**, Program Governance (Best Practices and Advances in Program Management) 1st Edition, Taylor & Francis Group, 2015
2. **Alan Calder**, IT Governance: Guidelines for Directors, IT Governance Publishing 2005
3. **Gad J Selig,** Implementing IT Governance (Best Practice) First edition Edition, Van Haren Publishing, 2010

Additional References

1.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 = 180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :
• In-class exercises
• Quiz
• Mid-term examination
• Final examination

Lecturer

Contact Person: Anisah Herdiyanti, S.Kom., M.Sc.
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom.
Anisah Herdiyanti, S.Kom., M.Sc.

Course Name

Software Requirement Engineering

Code: IS184309	CREDITS: 3	Semester: 3

Course Description

In general, the purpose of implementing the Software Requirements Engineering course is that students have the ability to specify software requirements. This course provides an overview of procedures or processes and analysis techniques and system specifications, methodology developments, representation methods, requirements engineering tools and techniques and can document software requirements specifications.

This course will provide students with experience to explore, analyze, specify, manage, validate, and document software requirements, as well as being able to trace back the needs that have been previously defined until they are valid. For this reason, the learning method used is expository, contextual, problem-based learning, and practice on real case examples to be solved in groups.

The benefits obtained are that this course not only provides knowledge and understanding of the basic concepts of software requirements engineering, but also the ability to explore needs and define these needs in the form of software requirements specifications, both functional and non-functional requirements. With understanding, knowledge and ability to engineer software requirements, students can provide information technology solutions that suit the company's business needs in the real world. The Software Requirements Engineering course also gives students the ability to use tools to manage their needs and document them in the form of a software requirements specification (SRS) document.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Ketrampilan Khusus :
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Exploring needs & designing system integrations that increase organizational competitiveness
- Analyze data & information for important findings that support intelligent business decision making & solutions
- Implementing a more effective & efficient business process cycle (including organizational behavior / culture, business models, business processes, business functions, business strategy) in order to increase business performance & competitiveness.

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise

- Able to show independent, quality & measurable performance
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to implement the principles of sustainability (sustainability) in developing knowledge
- Able to communicate & negotiate with (min) 2 languages well, without or using IT
- Having innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs
- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently
- Try your best to achieve perfect results
- Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitif :
- Students understand why needs are important? What is RE?
- Students can understand process concepts and process models for software requirements engineering
- Students can explain the important role of people in the software requirements engineering process
- Students can explain why process improvement is important and can suggest a process improvement model for software requirements engineering
- Students understand the concept of needs elicitation and will be able to use several techniques and methods to generate software requirements
- Students understand techniques in analyzing software requirements Students understand the need for need validation and can validate needs by using several methods, including RTM
- Students understand what are the important components in the SRS document
- Students understand the phenomenan changes in software needs that are very dynamic and the need or how to manage these needs from continuous changes without reducing the quality of the software

Psikomotor :
- Students can practice proper elicitation techniques in exploring software requirements by the characteristics of the software to be built
- Students can specify the needs that have been obtained and grouped based on functional and non-functional needs
- Students can validate and verify software requirements to the authorities and compile a RTM

Afektif	:	• Students can manage changes in software requirements appropriately • Students can create or compile SRS documents including controlling changes made during the RE process • Students actively answer questions given by lecturers through discussion and brainstorming activities • Students are able & willing to behave critically, analytically & systematically • Students are able & willing to act as problem solvers • Students are able & willing to behave unyielding & flexible • Students are able & willing to behave communicatively • Students are able & willing to comply with the prevailing rules & regulations • Students are able & willing to behave honestly • Students are able & willing to behave responsibly

Course Materials

- **Requirements Engineering (RE) Fundamentals:** the basic concepts and urgency of engineering software requirements in the early stages of software development according to the type of Software Development Life Cycle (SDLC) specified.
- **RE Process:** The process of engineering software requirements, from feasibility studies to software requirements validation
- **RE Elicitation and Needs Excavation Techniques:** The concept of RE Elicitation and introduction of several need excavation techniques both traditional and modern techniques
- **•RE Technique and Analysis (FR - NFR):** Requirement Analysis Technique which includes sub-discussions:
  - Functional Requirements and Non-Functional Requirements (FR-NFR)
  - Viewpoint Orientation Requirement Definition (VORD)
  - Data Flow Diagrams (DFD) or Activity Diagrams
- - Use Case Diagrams (UML) and User Sto**ries/Scenaries**
- **RE Validation: Steps to validate requirements**
- **Requirements Traceability:** Checking against all requirements whether they have been specified into functions that can be run through the creation of Requirements Traceability Matrix (RTM)
- **RE Documentation:** Documentation of requirements specification analysis results (well documented), SRS IEEE std document. 830 – 1998
- **RE Management:** Management of requirements to anticipate changes in requirements that are too frequent (change requirements)
- **Requirements Engineering (RE) Fundamentals:** basic concepts and urgency to engineer software requirements at an early stage of software development according to the specified Software Development Life Cycle (SDLC).
- **RE Process:** The process of engineering software requirements, starting from a feasibility study to validating software requirements
- **RE Elicitation** and Needs Excavation Techniques: The concept of RE Elicitation and an introduction to several needs excavation techniques, both traditional and modern techniques.
- **RE Technique** and Analysis (FR - NFR): Requirements Analysis Technique which includes sub-topics:
  - Functional Requirements and Non Functional Requirements (FR-NFR)
  - Viewpoint Orientation Requirement Definition (VORD)
  - Data Flow Diagrams (DFD) or Activity Diagrams

- Use Case Diagrams (UML) and User Stories / Scenarioes

- **RE Validation:** Steps to validate requirements
- **Requirements Traceability**: Checks whether all requirements have been specified to be functions that can be executed through the creation of a Requirements Traceability Matrix (RTM)
- **RE Documentation**: Documenting requirements specification analysis results (well documented), IEEE std SRS document. 830 - 1998
- **RE Management**: Requirements management to anticipate changing needs that are too frequent (change requirements)

Main References

1. **Roger S Presman**, Software Engineering, 6th edition, McGrawHill, 2005
2. **Ian Sommerville**, Software engineering, Seventh Edition, Pearson Education Asia, 2007
3. **Murali Chemuturi,** Requirements Engineering and Management for Software Development Projects, Springer, 2012
4. **Ellen Gottesdiener,** The Software Requirements: Memory Jogger : a Pocket Guide to Help Software and Business Teams Develop and Manage Requirements, GOAL/QPC, 2005
5. **Ian Sommerville,** Requirements Engineering: A Good Practice Guide, John Wiley & Sons, 2009
6. **Leffingwell,** Managing Software Requirements: A Use Case Approach, 2/E, Pearson Education, 2003
7. **The Requirements Engineering Body of Knowledge (REBoK) and Its Practical Guide,** IEEE Computer Society Washington, DC, USA, 2012
8. **IEEE Software Engineering Standards Committee,** IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications, October 20, 1998

Additional References

1. **Watts S.Humphrey**, A Discipline for Software Engineering, Pearson Education, 2007
2. **Sholiq**, Analisis dan Perancangan Berorientasi Obyek, Mutiara Indah Bandung, 2010
3. **Daniel Siahaan**, Analisa Kebutuhan dalam Rekayasa Perangkat Lunak, Penerbit Andi Yogyakarta, 2012
4. SWEBOK 4

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 = 180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- In-class exercises
- Quiz 1 and 2
- Assignment 1-11 (include Final Project's assignment)
- Mid-term examination
- Final Project Presentation

Lecturer

Contact Person: Feby Artwodini, S.Kom., M.T.
Lecturer :

Course Name

Software Requirement Engineering

Code: IS184309	CREDITS: 3	Semester: 3

Feby Artwodini, S.Kom., M.T.
Ika Nurkasanah, S.Kom, M.Sc.

Course Name

Business Process Management

Code: IS184310	CREDITS: 4	Semester: 3

Course Description

The Business Process Management (BPM) course answers the needs of process management in organizations. Here the process is the foundation of all information system applications. No information system moves without a process. Therefore, the management of business processes is vital to ensure effective and efficient execution of information systems.
MPB focuses on managing business processes in organizations based on the business process life cycle. There are six phases in the business process cycle: Process Identification, Process Discovery, Process Analysis, Process Redesign, Process Implementation, and Process Monitoring & Evaluation.

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Special Skills :
- Exploring needs & designing system integrations that increase organizational competitiveness
- Implementing a more effective & efficient business process cycle

General Skills :
- Able to make decisions appropriately in the context of problem solving in their area of expertise

Knowledge :
- Having knowledge about optimization & automation of IT services with the best technology for organizations.
- Have knowledge of current & future business environment (including management, organization, functions, business processes)

Attitude :
- Try your best to achieve perfect results

Specific Learning Outcome

Cognitive :
- Be able to describe the difference between the process improvement concept and the process reengineering (C2)
- Be able to describe the AS-IS process and the proposed TO-BE process (C3)
- Able to analyze AS-IS process with qualitative methods (C4)
- Able to analyze AS-IS process with quantitative methods (C4)
- Able to repair AS-IS process using redesign process method (C6)

Psychomotor :
- Able to classify processes that are still active in the organization (P3)
- Able to demonstrate model process execution on BPM software (P2)

Affective :
- Be able to compromise between best practice and organizational conditions (A2)
- Able to choose the right heuristics method in the redesign process (A1)

Course Materials

- Concept of Business Process Management
- Process Identification
- Process Discovery

- Process Modeling
- Qualitative Process Analysis
- Quantitative Process Analysis
- Process Redesign
- Process Automation

Main References

1. M. Dumas, M. La Rosa, J. Mendling, H.A. Reijers. Fundamentals of Business Process Management. Springer 2013

Additional References

1. B. Andersen. Business Process Improvement Toolbox. ASQ Quality Press 1999
2. Mathias Weske. Business Process Management: Concepts, Languages, Architectures 2nd Edition. Spinger 2012
3. Paul Harmon. Business Process Change. Morgan Kaufmann 2007

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.33 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- In-class exercises
- Quiz 1, 2, 3, 4, 5
- Assignment 1, 2, 3, 4
- Mid-term examination
- Final Project (Divided into assignment 5-11)

Lecturer

Contact Person: Arif Wibisono, S.Kom., M.Sc.
Lecturer :
Arif Wibisono, S.Kom., M.Sc.
Mahendrawathi ER, ST., M.Sc., Ph.D.
Andre Parvian Aristio, S.Kom., M.Sc.
Dr. Mudjahidin, S.T., M.T.

Course Name

Computer Network Management & Design

Code: IS184411	Credits: 4	Semester: 4

Course Description

Computer Network Management & Design provides an understanding of the concept of knowledge, analysis of network technology utilization requirements, and network management and monitoring with an emphasis on flexibility and convergence. As the main support for SI business operations through provision & network arrangement.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT

Course Learning Outcomes

Special Skills :
- Plan investment & acquisition of IT solutions that are viable for the organization that increase organizational competitiveness
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Elicit the needs & designing system integration in organizations that increase organizational competitiveness

General Skills :
- Exhibit independent, high quality and measured works to organizations and peers;
- Be responsible for team work achievement & supervise & evaluate the completion of work assigned to workers who are under their responsibility
- Implement IT & communication in the context of the implementation of the work;

Knowledge :
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future organizations

Attitude :
-

Specific Learning Outcome

Cognitive :
- Able to describe the concepts of architecture & infrastructure for a company's IS / IT (computer networks, data centers, etc.). (C2)
- Able to understand technology variations and compatibility / integrity between these technologies. (C2)

Psycomotor :
- Able to demonstrate computer network design

Affective :
- Able and willing to behave as problem solvers

Course Materials

- Network protocols and standards;
- Implementation of the OSI model;
- Network service function;
- LAN WAN design;

- Configure & Use network software functions;
- Examples of cases of Computer Network Management;
- Experience in solving design cases and managing computer networks.

Main References

1. Alexander Clemm, Network Management Fundamentals, Cisco Press, 2006.
2. Steven Karris, Networks: Design and Management, Orchard Publications, 2002.
3. Shaun Hummel, Network Planning and Design Guide, Shaun Lloyd Hummel, 2006.

Additional References

1. James D. McCabe, Network Analysis, Architecture, and Design, Morgan Kaufmann, 2007.
2. Andrew S. Tanenbaum, Computer Networking, Prentice Hall, 2007.
3. William Stallings, Data And Computer Communications 7th Edition, Prentice Hall, 2007.

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.33 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Nisfu Asrul Sani, S.Kom., M.Sc.
Lecturer :
Bekti Cahyo Hidayanto, S.Si., M.Kom.
Nisfu Asrul Sani, S.Kom., M.Sc.

Course Name

Software Development

Code: IS184412	Credit: 4	Semester: 4

Course Description

Designing and developing software is very important nowadays, along with the large number of IT implementations in organizations. Therefore, designing and developing software using the right method to improve the reliability of the resulting software is very important to be obtained by students of the Information Systems Study Program. oftware Design (RBPL) course **provides students with experience in designing and developing small-medium scale software** using an object-oriented paradigm which is carried out in a teamwork (developer) collaboration. **The learning method used** is inquiry, contextual, and final project courses to be completed in groups**. This course matter focuses on** OOAD concepts and various UML diagrams, analysis and design of object-oriented software using UML, Iconix process, UML modeling tools, software construction concepts, construction design, translation of UML diagrams to code programming languages structures, reverse engineering, design patern, software testing, and the final project. The final project of this course is intended to produce a work in the form of designing, manufacturing, and testing small-to-medium scale software along with development documentation, user guides, and unit test level testing documents.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase.
- Enhance the quality of business & IT integration that gives the organization competitiveness.
- Have intrapersonal and interpersonal skills.
- Produce IT based scientific and entrepreneurship products to solve actual problems.
- Have knowledge in organization management, IT process and artifact for business continuity.
- Have knowledge in business and IT.
- Apply expertise to the nation and country with integrity and ethics.
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era.

Course Learning Outcomes

Special Skills :
- Develop and implement information systems in the organization based on appropriate methodology to improve performance & provide organizational competitiveness.
- Gathering the requirements and designing a system integration that provide organizational competitiveness.

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that considerate & applies humanities values in accordance with their field of expertise.
- Able to show independent, quality and measurable performance.
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information and data analysis.
- Having innovative IT ideas as a solution to actual problems

Knowledge :
- Having knowledge of best practice for configuring the IT processes to fulfill business needs.
- Acquired basic knowledge of business (including management, organization, function, business process) organization both in present time and in the future

Attitude	:	Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data) • Demonstrate an attitude of responsibility for work in their field of expertise independently. • Earnestly tries to achieve perfect results. • Working together to be able to make the most of their potential.

Specific Learning Outcome

Cognitif	:	• Students are able to explain the concept of Object Oriented Analysis and Design (OOAD) and various Unified Modeling Language (UML) diagrams. • Students are able to explain the concept of analysis and design using the Iconic process framework with various UML diagrams. • Students are able to explain the concept of software construction and the importance of construction design. • Students are able to translate the translation of UML diagram components into programming language code as well as reverse engineering from programming language to design. • Students are able to explain the concept of design patterns in programming. • Students are able to describe the concept of software testing as well as the mechanism for obtaining a test case for unit level testing.
Psychomotor	:	• Students are able to use the starUML software modeling tool to create various UML diagrams. • Students are able to do software design using an object-oriented paradigm for a given case. • Students are able to translate designs into programming language code structures and also be able to reverse engineering from programming languages back to design. • Students are able to perform small and medium scale software construction (manufacture). • Students are able to make test case devices to test the software they have made. • Students are able to do software testing to the unit testing level using the test cases they have made. • Students are able to make software development documentation including software operation manual documents.
Affective	:	• Students are capable and willing to behave honestly. • Students are able and willing to be responsible for their work. • Students are able and willing to behave critically, analytically and systematically. • Students are able and willing to act as problem solvers. • Students are able and willing to behave communicatively and work together in teams. • Students are able and willing to try their best to achieve perfect results.

Course Materials

- **OOAD concepts and various UML diagrams:** object technology, Object-Oriented Analysis and Design.
- **BOOM**: Steps of BOOM, Analyzing End-to-End Business Processes.

- **Analysis and design of software with UML :** Storyboarding the User's Experience, Robustness Analysis, Object Interaction, Lifecycle Requirements for Key Business Objects, Gathering Across-the-Board Business Rules with Class Diagrams, Iconix Process, Iconix process, Requirements Review, Robustness Analysis Review, Preliminary Design Review, Technical Architecture Review**.**
- **UML tool:** UML star and demo with small case studies.
- **Software construction basics:** Introduction to Software Construction, Methaphors in Software Development, Prerequisites, process design, simplicity, security from bugs, ease of understanding, readiness to change, and Design in Construction.
- **Translation of UML diagrams to program code:** Overview of UML for Java Programmers, Working with Diagrams, Class Diagram, Sequence Diagram, Use Case, OOD, Packages, Object Diagram and state machine, dan reverse engieering.
- **Design Pattern:** Delegation , Interface, Adapter, Singleton, Visitor, Observer, Template method, Abstract factory, and Decorator.
- **Software testing**: Test-Case Design, Module (Unit) Testing, Higher-Order Testing, Usability (User) Testing, and Debugging.
- **Final Project:** Small-medium scale software design and development.

Main References

1. **Barclay K and Savage J**. 2004. Object-Oriented Design with UML and Java. Burlington: Elsevier Butterworth-Heinemann.gs
2. **Dennis, Allan., Wixom, Barbara Haley., Tegarden, Davis.,** Systems Analysis and Design: An Object-Oriented Approach with UML 5th Edition., New York: John Wiley & Sons.
3. **Podeswa, Howard.** 2009. UML for the IT Business Analyst, Second Edition: A Practical Guide to Requirements Gathering Using the Unified Modeling Language. Boston: Course Technology Cengage Learning.
4. **Doug Rosenberg and Matt Stephens. 2007. Use Case Driven Object Modeling with UML, Apress.**
5. **Martin and Robert Cecil. 2003. UML for Java Programmers. London: Prentice-Hall International**

Additional References

1. **MIT OpenCourseWare**. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-005-elements-of-software-construction-fall-2011/
2. **McConnell, Steve. 2004. Code Complete, 2th Edition. Washington: Microsoft Press.**
3. **Stashkova, Alyona.** and Pickersgill, Catherine. 2016. "NetBeans Developing Applications with NetBeans IDE, Release 8.1". -:Oracle
4. **Ian Sommerville.** Software Engineering, 10th edition. http://iansommerville.com/software-engineering-book

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.33 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- Mid-term examination
- Final Examination

Lecturer

Course Name

Software Development

Code: IS184412	Credit: 4	Semester: 4

Contact Person: Sholiq, S.T., M.Kom.
Lecturer :
Faizal Johan Atletiko, S.Kom, M.T.
Radityo Prasetianto Wibowo, S.Kom, M.Kom.

Course Name

IT Project Management

Code: IS184413	Credit: 4	Semester: 4

Course Description

IT project management is becoming increasingly important today. Planning, implementing & controlling an IT project is a relatively complex & difficult activity to do because it is required to consider various aspects, such as quality, time, cost, resources & progress towards achieving goals. This course will provide **students with experience to initialize, plan, execute, control, and close an IT project**. For this reason, the **learning method** used is inquiry, contextual & IT projects to be completed in groups. This **course matter focuses** on best practice project frameworks & project management processes. An understanding of project concepts, project knowledge areas & the use of project management tools and experience in working on IT project assignments in this course will produce a work in the form of an IT project document & provide provisions for students to excel in the competition in the world of work.

Program Learning Outcomes

- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Able to practice all skills in the nation & state with integrity & ethics

Course Learning Outcomes

Special Skills :
- Able to manage various resources to realize IT solutions that are safe, high quality, fast & affordable.

General Skills :
- Able to demonstrate independent, quality and measurable performance.
- Able to be responsible for the achievement of group work and to supervise and evaluate the completion of work assigned to workers under their responsibility.
- Able to communicate and negotiate in (at least) 2 languages well, without or using IT.
- Able to implement information & communication technology in the context of the implementation of their work.
- Creating works, scientific works and or IT entrepreneurship that provides design solutions to actual problems.

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs.

Attitude :
- Upholding human values in carrying out duties based on religion, morals and ethics.
- Obeying the law and discipline in public and state life.
- Demonstrate an attitude of responsibility for work in their field of expertise independently.

Specific Learning Outcome

Cognitif :
- Students are able to understand project concepts
- Students are able to understand the project management framework
- Students are able to understand the project management knowledge area
- Students are able to understand the IT project environment
- Students are able to apply the rules & laws that apply in the project

Psychomotor :
- Students are able to initiate IT projects
- Students are able to plan IT projects
- Students are able to execute IT projects
- Students are able to monitor & evaluate the implementation of IT projects
- Students are able to control changes in IT project implementation
- Students are able to close IT projects

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with applicable rules & regulations
- Students are able & willing to behave responsibly

Course Materials

- **Project concept:** Project definition & characteristics, production vs project, examples of IT & non IT projects, Project portfolio & program.
- **Project management concept:** Project management expertise, project stakeholders, project organization, project life circle.
- **Kerangka kerja proyek**: PMBOK, Stepwise, Prince 2;
- **Project knowledge areas:** integration management, scope management, time management, cost management, quality management, communication management, human resource management, risk management, procurement management, stakeholder management.
- **IT project environment:** Software development life cycle, IT project stakeholders.
- **Project Regulations & Laws:** Standard tariff, PP 80.
- **Practice managing IT projects:** Creating project charters, making IT project plans, executing IT projects, controlling & closing IT projects.

Main References

1. **Achmad Holil**, *Modul Ajar Manajemen Proyek Teknologi Informasi -- Edisi 3*, Jurusan Sistem Informasi ITS 2016
2. **PMI**. *A Guide to the Project Management Body of Knowledge (PMBOK® guide) – fifth edition*, PMI 2013
3. **Lisa A. Bucki**, *The Microsoft Office Project 2007 Survival Guide: The Go-To Resource for Stumped and Struggling New Users 1st Edition,* Thomson Course Technology 2017
4. **Project Management Docs**, *Enhance your project management skills with our PMBOK based Project Management Templates,* http://www.projectmanagementdocs.com

Additional References

1. **Schwalbe, Kathy**. *Information Technology Project Management*, Thomson 2004
2. **Arthur M. Langer**, *Guide to Software Development: Designing and Managing the Life Cycle*, Springer-Verlog London Limited 2016
3. **Marc Maxmeister**, *Trello for Project Management*, Amazonkindle 2014

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.33 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Course Name
IT Project Management

Code: IS184413	Credit: 4	Semester: 4

Examination :
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom.
Lecturer :
Feby Artwodini, S.Kom., M.T.
Anisah Herdiyanti, S.Kom., M.Sc.
Eko Wahyu Tyas Darmaningrat, S.Kom., M.BA.

Course Name

Enterprise Systems

Code: IS184414	Credits: 4	Semester: 4

Course Description

Today organizations need information systems and technology that can provide accurate, fast data and information to support their business processes. ERP, which is a software package with a single database to automate various cross-functional business processes, has become a standard for organizations in various industrial fields. On the other hand, ERP is known as a complex system and its implementation involves large resources. Therefore an understanding of the business processes of the software is needed and the ability to configure and implement it so that it can provide value to the organization. This course will provide students with knowledge of best practices in corporate resource planning business processes and experience in configuring, operating and executing ERP software implementation projects. For this reason, the learning methods used are lectures, discussions, project-based assignments to implement ERP, and practice operating ERP software. This course material will focus on the main business processes in ERP software, ERP implementation cycles and methodologies and the practice of operating ERP software.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase;
- Enhance the quality of business and IT integration in organizations;
- Have intrapersonal and interpersonal skills
- Produce works, scientific works, & IT entrepreneurship that are able to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Special Skills :
- Aligning IT and Business that has a maximum and measurable contribution for the organization
- Develop and implement information systems in the organization based on appropriate methodology to improve performance & provide organizational competitiveness.
- Gathering the requirements and designing a system integration that provide organizational competitiveness.

General Skills :
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis.
- Able to be responsible for the achievement of group work & supervise & evaluate the completion of work assigned to workers who are under their responsibility.
- Able to implement information & communication technology in the context of the implementation of their work.
- Compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page.

Knowledge
- Having knowledge about optimization & automation of IT services with the best technology for organizations

Course Name
Enterprise Systems

Code: IS184414	Credits: 4	Semester: 4

- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Work together and have social sensitivity and care for the community and the environment.
- Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitif :
- Able to explain the basic concepts of Enterprise Systems.
- Be able to describe the evolution of enterprise systems.
- Able to explain the concept of system integration.
- Able to compare various enterprise system architectures
- Able to compare various types of enterprise systems
- Be able to describe common business processes in ERP
- Be able to distinguish the system development life cycle from the ERP implementation cycle
- Able to differentiate ERP implementation strategies
- Able to describe operational activities and post ERP implementation

Psychomotor :
- Able to plan ERP implementation projects
- Able to configure ERP software
- Able to operate ERP software

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with applicable rules & regulations
- Students are able & willing to behave responsibly

Course Materials

- **Introduction to Enterprise Systems:** Evolution and historical role of information systems that drive system integration and ERP, ERP evolution.
- **Enterprise System Evolution:** functional silos, business processes and silos, Evolution of information systems in organizations.
- **Systems integration:** logical vs. physical, ERP and system integration.
- **Enterprise System Architecture:** Why study Enterprise System Architecture ?, ERP modules
- **Types of Corporate Systems:** ERP, SCM, CRM and BPM.
- **ERP Business Process:** Procure-to-pay, Order-to-Cash, Planning, Accounting, Finance, Human Capital Management.
- **Development life cycle:** System Development Life Cycle, ERP Implementation Life Cycle.
- **Implementation strategy:** ERP components, database requirements, ERP implementation organization and its approaches, ERP implementation examples, platform issues, vendor research, matching user needs and features, request for quotations, vendor analysis and elimination, contract management and license approval.
- **Operations and post implementation:** Readiness for Go-Live, ERP Training, Stabilization, Post production support, Knowledge transfer.

- **Program and project management:** Project roles and responsibilities, Project team, Project leadership, Critical Success Factors, Manage Scope / Scope.

Main References

1. Motiwalla, Luvai dan Thompson, Jeffrey, (2014), *Enterprise Systems for Management (2nd Edition)*, Pearson Education Limited, Essex.
2. Monk, E., and Wagner, B., (2013), *Concepts in Enterprise Resource Planning 4th Ed.*, Course Technology, Cengage Learning.
3. Ptak, C.A (2004), *ERP: Tools, Techniques and Applications for Integrating the Supply Chain*, St. Lucie Press.
4. O'Leary, D.E (2000), *Enterprise Resource Planning Systems: Systems, Life Cycle, Electronic Commerce and Risk*, Cambridge University Press

Additional References

1. Curran, T. A., and Ladd, A. (2000), SAP R/3 Business Blueprint: Understanding Enterprise Supply Chain Management 2nd Ed, Prentice Hall PTR Enterprise Resource Planning Series.
2. Weidner, S., 2010, Introduction to ERP Using SAP Global Bike Inc.: Teaching Materials, SAP AG
3. Pinckaers, F. & Gardiner, G. (2009), Open ERP, a Modern Approach to Integrated Business Management Release 1.0.

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3.33 hours) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- In-class exercise
- Quiz 1 and 2
- Assignment 1, 2, 3
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Mahendrawathi Er., ST., M.Sc., Ph.D.
Lecturer :
Mahendrawathi Er., ST., M.Sc., Ph.D.
Dr. Mudjahidin, S.T., M.T.
Andre Parvian Aristio, S.Kom., M.Sc.
Irmasari Hafidz, S.Kom., M.Sc.

Course Name

Operation Research

Code: IS184515	Credit: 3	Semester: 5

Course Description

Operations Research is one area of science that is more widely used in the determination of the optimal result of the problems that occur in an organization or business. The optimal results can later be used to assist management in providing information used in the decision making process. This course will **give students the ability to model and solve organizational and business problems (optimization) using a management science (mathematical) approach**. For this reason, the **learning method** used will be accompanied by examples of problems or real case studies in organizations, companies, or businesses (problem based learning). This **course material focuses** on the concept of modeling, model completion, analysis of the optimal results that have been obtained, and the integer program used to make optimal solutions more suitable for implementation.

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Apply logic & mathematics to solve various business problems

Course Learning Outcomes

Special Skills :
- Analyze data & information to find critical findings that support intelligent business decision making & solutions

General Skills :
- Apply logic & math for solving business problem
- Being able to apply logical thinking, critical, systematic, and innovative in the context of the development or implementation of science and technology that takes into account and apply the value of the humanities are relevant to their expertise
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis.

Attitude :
- Able and willing to make concrete contributions in solving optimization problems faced by society

Specific Learning Outcome

Cognitif :
- Students are able to understand modeling concepts and solutions
- Students are able to understand how solutions can be applied

Psychomotor :
- Students are able to complete organizational (business) models and provide optimal alternative solutions

Affective :
- Students are able & willing to behave critically, analytically & systematically
- Students are capable & willing to behave unyielding & flexible
- Students are able & willing to behave as problem solvers

Course Materials

- **Introduction to Operations Research:** Definition, elements in science management, stages of problem solving in science management, examples of models and their solutions.
- **Model formulation:** characteristics of the linear model, model components, examples of models with different types of components.
- **Graphic Illustration:** The completion of the model using a graphic method.
- **Simplex Method:** Solution of the model with different types of components (regular and irregular) using the simplex method.

- **Post Optimal Analysis:** Duality and sensitivity analysis.
- **Transport and Assignment Models:** Characteristics of each model, methods for solving them.
- **Integer Program:** Characteristics of a model that includes integers and the methods for solving them.

Main References

1. **David R.Anderson, Dennis J.Sweeney,** *An Introduction to Management Science : Quantitative Approach to Decision Making*, South-Western College Pub, 2015
2. **Powell, Kenneth R.Baker,** *Management Science: The Art of Modelling with Spreadsheets*, 4th edition, Wiley, 2013
3. **Bernard W. Taylor,** *Introduction to Magement Science*, Prentice Hall, 12th edition, 2015.
4. **Wayne L., Winston, S. Christian Albright,** *Practical Management Science*, 5th edition, Cencage Learning, 2015

Additional References

1. **A. Hamdy Taha,** *Operations Research: an Introduction 10th Ed*, Pearson, 2016
2. **Wayne L. Winston,** *Operations Research: Applications and Algorithms (with CD-ROM and InfoTrac) 4th Ed*, Duxbury Press, 2003

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- In-class exercise
- Quiz 1 and 2
- Assignment 1, 2, 3
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Wiwik Anggraeni, S.Si., M.Kom.
Lecturer :
Edwin Riksakomara, S.Kom., M.T.
Wiwik Anggraeni, S.Si., M.Kom.

Course Name

Business Intelligence

Code: IS184516	Credits: 4	Semester: 5

Course Description

Business intelligence course is indispensable at this time to answer the growing business challenges. The faster the business runs, it requires quick answers to all the business questions. This course aims to provide insight into how to analyze business and manage business performance using available data and facts. Students will gain an understanding of OLAP, business analytics and business performance management, and Dashboard and data visualization for business intelligence. This understanding and experience in this course will produce dashboard and data visualization for business intelligence to solve real problems.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity

Course Learning Outcomes

Spesific Skills :
- Align IT & Business that contribute to the organization in a maximum & measurable manner
- Develop & implement IS in organizations based on best practice to improve performance & provide organizational competitiveness
- Integrate data & transform it into organizational information to improve organizational competitiveness;

General Skills :
- Apply logic & math for solving business problem
- Apply statistics to help find business problem solutions
- Examine the implication of knowledge implementation to humanity according to their expertise based on scientific principles, procedures & ethics in order to produce solutions, ideas, designs or art criticism;

Knowledge :
- Have knowledge of optimization & automation of IT services with the best technology for the organization
- Have knowledge of IT infrastructure development, maintenance & evaluation in organizations

Specific Learning Outcome

Cognitive :
- Able to understand the introduction and overview of business intelligence and analytics
- Able to understand OLAP
- Able to implement business analytics and business performance management
- Able to implement Dashboard and Data Visualizations for business intellgence

Psychomotor :
- Able to demonstrate Dasboard and Data Visualizations for business intellgence

Course Materials

- Introduction and overview of business intelligence and analytics
- Datawarehousing: star schema, snowflake schema, galaxy schema

- Cube and multidimensional data
- Online Analytical Processing
- Business analytics and business performance management
- Dashboard and Data Visualizations for business intellgence

Main References

1. Moss, Larissa Terpeluk, and Shaku Atre. Business intelligence roadmap: the complete project lifecycle for decision-support applications. Addison-Wesley Professional, 2003.
2. Brian Larson, Delivering Business Intelligence with Microsoft Sql Server 2008, McGraw Hill, 2009
3. Teradata White Papers
4. Tableau White Papers

Additional References

1.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- In-class exercise
- Quiz 1 and 2
- Assignment 1, 2, 3
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Faizal Mahananto, S.Kom., M.Eng., Ph.D
Lecturer :
Rully Agus Hendrawan, S.Kom., M.Sc.
Faizal Mahananto, S.Kom., M.Eng., Ph.D
Ahmad Muklason, S.Kom., M.Sc., Ph.D

	Course Name **IT Service Management**	
Code : IS184517	Credits: 3	Semester: 5

Course Description

This course aims to enable students to plan, design, manage, and improve information technology services .

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase.
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Special Skills :
- Align IT & Business that contribute to the organization in a maximum & measurable manner.
- Plan investment & acquisition of viable IT solutions so as to provide organizational competitiveness.
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable.
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness.
- Monitor, evaluate, & audit organization, IT processes & artifacts in order to gradually & continuously improve organizational performance

General Skills :
- Having innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs.
- Having knowledge about optimization & automation of IT services with the best technology for organizations.
- Having knowledge of information availability assurance & IT risk management for business continuity.
- Having knowledge of information asset security in the organization. Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Upholding human values in carrying out duties based on religion, morals and ethics.
- Obeying the law and discipline in public and state life.
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitif :
- Students are able to explain concepts, roles & functions, activities, products, and tools for 26 IT Service Management processes.

	Course Name **IT Service Management**	
Code : IS184517	Credits: 3	Semester: 5

		• Students are able to analyze implementing the concepts of Utility & Warranty, RACI, Service Level Management, and various IT Service Management processes in a case example.
Psychomotor	:	• Students are able to use IT Service Management tools. • Students are able to simulate the IT Service Management process
Affective	:	• Students are able & willing to behave honestly. • Students are able & willing to behave communicatively. • Students are able & willing to comply with applicable rules & regulations. • Students are able & willing to behave responsibly

Course Materials

- Basic concepts of IT Service Management
- IS / IT Service Cycle based on IT Infrastructure Library (ITIL) V3
- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement.

Main References

1. Sukses Mengelola Layanan Teknologi Informasi & Kiat Lulus Ujian Sertifikasi ITIL Foundation, AISINDO, Tony Dwi Susanto, 2017
2. Manajemen Layanan Teknologi Informasi, Tony Dwi Susanto, 2014
3. Foundation of IT Service Management based on ITIL V3, Jan Van Bon et.al., Van Haren Publishing,2007
4. Effective IT Service Management, Robb A, Springer Verlag, 2007
5. ITIL For Dummies, Peter Farenden, 2012

Additional References

1. Youtube Channel: ITIL series, Charles Sturt University (CSU), Marco Cattaneo

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Tony Dwi Susanto, S.T., M.T., Ph.D.
Lecturer :
Tony Dwi Susanto, S.T., M.T., Ph.D.
Anisah Herdiyanti, S.Kom., M.Sc.

Course Name:

Software Deployment

Code: IS184518	Credits: 3	Semester: 5

Course Description

In the current era of Information Technology, almost all organizations use various types of software to speed up business process execution, increase communication speed between units, and other purposes. The software used by organizations can come from in-house self-development, outsourced development, purchasing a license or purchasing a software package as a product. Regardless of where software comes from, its implementation is not simple. Not a few cases have occurred where an organization has made a large investment for the development or purchase of software, but failed to be implemented in the organization.

This course aims to equip students with the knowledge and experience to plan, execute, evaluate and control software implementation in organizations. For this reason, this course uses visual (pictures, concepts), verbal (presentation), physical (experience with case studies), solitary (individual) and social (group, discussion) learning methods. This course matter focuses on knowledge of the factors of success, failure, including considerations in software implementation, processes / methods in software implementation, and cases of software implementation in software packages such as ERP. In the end, students are expected to produce documents as a provision for implementing the software in the form of templates.

Program Learning Outcomes

- Able to design & implement IT solutions based on appropriate methods & can improve business performance & organizational competitiveness gradually & sustainably
- Have intrapersonal and interpersonal skills
- Able to practice all skills in the nation & state with integrity & ethics

Course Learning Outcomes

Special Skills :
- Develop and implement information systems based on appropriate methodologies to improve performance & provide organizational competitiveness

General Skills :
- Able to study the implications of the development or implementation of technological science that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics in order to produce solutions, ideas, designs or art criticism.
- Able to maintain and develop networks with mentors, colleagues, peers both inside and outside the institution.
- Able to implement information & communication technology in the context of the implementation of their work.
- Able to communicate & negotiate with (at least) 2 languages well, without or using IT.

Knowledge :
- Acquired basic knowledge of business (including management, organization, function, business process) organization both in present time and in the future
- Acquired basic knowledge of IT (including processes, organization, application, infrastructures, IT people, data) organization both in present time and in the future

Attitude :
- Upholding human values in carrying out duties based on religion, morals and ethics.
- Obeying the law and discipline in public and state life.

- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcomes

Cognitif :
- Students are able to understand the concept of software provision.
- Students are able to understand the success and failure factors of software implementation.
- Students are able to understand the correlation between IT processes and software implementation.
- Students are able to understand the software implementation process

Psychomotor :
- Students are able to plan software implementation.
- Students are able to execute simple software implementations.
- Students are able to evaluate software implementation

Affective :
- Students are able & willing to behave honestly.
- Students are able & willing to behave communicatively.
- Students are able & willing to comply with applicable rules & regulations.
- Students are able & willing to behave responsibly

Course Materials

- **Concept of Software Provisions:** Software types including COTS definitions, software licenses, Dilemmas in software provision, Considerations in software provision.
- **Software Implementation Success and Failure Factors:** Software Implementation in IT Process according to Framework; Phenomenon of Software Implementation Failure; Success and Failure Factors.
- **Software Implementation Process:** Software Implementation Planning; Software Implementation Execution; Evaluation and Controlling Software Implementation.
- **Software Implementation for Software Packages:** Making plans; Perform implementation execution; Perform implementation evaluation and control.

Main References

1. **Christine B. Tayntor**, *Successful Packaged Software Implementation*, Auerback Publications
2. **Careline Howard,** *Strategic Adoption of Technological Innovation*, Information Science Reference
3. **Karlheinz Kautz & Jan Pries- Heje,** Diffusion and Adoption of Information Technology, Springer Science

Additional References

1. **Schwalbe, Kathy**. *Information Technology Project Management*, Thomson 2004

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :
- Mid-term examination

Course Name:
Software Deployment

Code: IS184518	Credits: 3	Semester: 5

- Final Examination

Lecturer

Contact Person: Hanim Maria Astuti, S.Kom., M.Sc.
Lecturer :
Radityo Prasetianto Wibowo, S.Kom, M.Kom.
Hanim Maria Astuti, S.Kom., M.Sc.

Course Name

IT Strategic Planning

Code: IS184519	Credits: 3	Semester: 5

Course Description

Every certain period (usually 5 years) an organization requires an information system strategic planning. With the existence of IS strategic planning, the organization can maximize the support of information systems and information technology to achieve the organization's business goals. IS strategic planning is good if the planning can support the organization to achieve the organization's business goals.

This course aims to equip students with the knowledge and experience to align IT & Business that contributes to the organization in a maximum & measurable manner, plan investment & acquisition of feasible IT solutions so as to provide organizational competitiveness, Manage various resources to realize IT solutions that are safe, high quality, fast & affordable, explore needs & design system integrations that improve organizational competitiveness and integrate data & transform into information which is used to increase organizational competitiveness. This course material focuses on how to develop an IS / IT strategy that is in line with the organization's business strategy.

Program Learning Outcomes

- Use an IT solution and its alternatives that improve business performance & competitiveness
- Plan an improvement of the quality of business & IT integration that deliver competitiveness to the organization
- Produce scientific papers & IT entrepreneurship that can solve actual problems
- Recognize basic knowledge of business & IT
- Demonstrate all of the expertise for the nation & country

Course Learning Outcomes

Specific Skills :
- Able to align IT & Business that contribute to the organization in a maximum & measurable manner
- Able to plan investment & acquisition of viable IT solutions so as to provide organizational competitiveness
- Able to manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Able to explore needs & design system integrations that increase organizational competitiveness
- Able to integrate data & transform it into information that is used to improve organizational competitiveness

General Skills :
- Have innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge of current & future business environment (including management, organization, functions, business processes)Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Upholding human values in carrying out duties based on religion, morals, and ethics;
- Obeying the law and discipline in public and state life;
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Course Name
IT Strategic Planning

Code: IS184519	Credits: 3	Semester: 5

Cognitive :
- Students are able to understand current & future business environment (including management, organization, functions, business processes)
- Students are able to understand the current & future IT environment (including processes, organization, applications, infrastructure, IT people, data)

Psychomotor :
- Students are able to synchronize IT & Business
- Students are able to plan investment & acquisition of viable IT solutions
- Students are able to manage various resources to realize IT solutions
- Students are able to explore needs & design system integration
- Students are able to integrate data & transform it into information

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with the prevailing rules & regulations
- Students are able & willing to behave responsibly

Course Materials

- **The role of IS from a strategic point of view**; Definition and initial SI model, SI strategy.
- **The concept of a business strategy and its implications for the IS strategy**; Strategic planning frameworks, processes, techniques and business planning tools.
- **Development of an effective IS strategy**; Issues and limitations, the IS strategy frameworknd its approach.
- **IS strategy analysis**; Techniques for interpretation and analysis of the current situation, gap evaluation between existing and IS needs, value chain analysis, information systems and value chains, determining the organization's competitive strategy.
- **Determinining of the company's SI strategy**; Strategic planning techniques and their relationship, How IS can influence strategy.
- **Management of application portfolios**; Application portfolio classification, management strategy and its application to the application portfolio.
- **Organizing and availability of IS resources**; SI management organizing strategy, Increasing the contribution of the IS function.
- **SI investment management**. Determination of investment policies and priorities, assessment and management of investment risks.
- **Strategies for information and knowledge management**; Implementation of business information management, Management of knowledge resources..

Main References

1. Ward, John. Strategic Planning for Information System, John-Wiley
2. Tozer, Edwin. Strategic IS/IT Planning, Butterworth-heinemann

Additional References

1.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Course Name
IT Strategic Planning

Code: IS184519	Credits: 3	Semester: 5

Examination :
- In-class exercises
- Quiz 1 and 2
- Assignment 1, 2, 3
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom.
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom.
Dr.Eng. Febriliyan Samopa, S.Kom., M.Kom.

Course Name

Business Analytics

Code: IS184620	Credit: 4	Semester: 6

Course Description

In the Business Analytics course, students are introduced to the concept of intelligence in a computational context. With mastery of this concept of intelligence, students will be able to create a computational body that can be programmed to act in accordance with the conditions they face with the aim of achieving maximum utility (acting rationally). These concepts form the basis of the data analysis and decision-making process and in subsequent courses.

Program Learning Outcomes

- Use basic of logic & mathematics, statistics, physics, chemistry to solve various business problems
- Demonstrate intrapersonal & interpersonal skills in business environment
- Recognize basic concept of managing IT organizations, processes & artifacts for business continuity
- Recognize basic knowledge of business & IT
- Demonstrate all of the expertise for the nation & country

Course Learning Outcomes

Specific Skills :
- Apply logic & math for solving business problem
- Able to apply logical, critical, systematic, & innovative thinking in the context of the development or implementation of science & technology that pays attention to & applies humanities values in accordance with their field of expertise
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs
- Having knowledge about optimization & automation of IT services with the best technology for organizations
- Have knowledge of current & future business environment (including management, organization, functions, business processes)

Attitude :
- Contributing to improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila

Specific Learning Outcome

Cognitive :
- Students are able to understand intelligence agents
- Students understand and explain the concept of learning
- Students are able to understand the concepts of supervised and unsupervised learning

Psychomotor :
- Students are able to plan Artificial neural network models
- Students are able to plan probalistic learning models
- Students are able to implement support vector machines

Course Materials

- Intelligent agent concepts and learning
- Linear model and neural network
- Characterization of learning features and experimental design

- Unsupervised learning / fuzzy inference system
- Probabilistic learning
- SVM

Main References

1. **Stuart Russell,Peter Norvig**, Artificial Intelligence: A Modern Approach (3rd Edition), 2009
2. **Peter Flach**, Machine Learning: The Art and Science of Algorithms that Make Sense of Data, 2012
3. **Tom M. Mitchell**. 1986. Machine learning: An artificial intelligence approach, 1986.
4. **Andrew Ng**, Coursera Machine Learning. 2015
5. **Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani**. 2013. An introduction to statistical learnin, 2015

Additional References

1.

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3 hours 40 minutes) per week
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Edwin Riksakomara, S.Kom., M.T.
Lecturer :
Edwin Riksakomara, S.Kom., M.T.
Renny Pradina Kusumawardani, S.T., M.T.

Course Name

Database Management

Code: IS184621	Credit : 3	Semester: 6

Course Description

Database Management includes the concept and implementation of relational database management for organizational needs, especially in terms of how the database system is managed in order to provide competitiveness for the organization.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have knowledge in organization management, IT process and artifact for business continuity

Course Learning Outcomes

Special Skills :
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Integrate data & transform it into information which is used to improve organizational competitiveness
- Analyze data & information for important findings that support intelligent business decision making & solutions

Knowledge :
- Have knowledge of information asset security in the organization

Specific Learning Outcome

Cognitif :
- Students able to understand database architecture
- Students able to configure security on the database
- Students able to apply the transaction system to the database

Psychomotor :
- Students able to demonstrate Database Installation and Configuration
- Students able to demonstrate Database security configuration
- Students able to demonstrate Backups and Transactions
- Students able to demonstrate ETL techniques

Course Materials

- Database Architecture : Database Architecture, Database Components, Basic Installation and Configuration
- Database: Installation, File level configuration, Server level configuration, instance level configuration, Database level configuration,
- Database Security Aspects: Schema, Role, User, Permission,
- Backup dan Restore Database : Backup, Restore,
- Transaction: Stored Procedure, Function, Transaction, Isolation Level, Extraction Technique, Transformation,
- Loading : ETL Tools

Main References

1. Thomas M. Connolly dan Carolyn E. Begg, Database Systems: A Practical Approach to Design, Implementation, and Management , Sixth Edition, Addison-Wesley, 2015.
2. Adam Jorgensen, Bradley Ball, Steven Wort, Ross LoForte dan Brian Knight, Professional Microsoft SQL Server 2014 Administration

Additional References

1. Training Kit (Exam 70-462) Administering Microsoft SQL Server 2012 Databases (MCSA) (Microsoft Press Training Kit)

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week..

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Radityo Prasetianto Wibowo, S.Kom, M.Kom.
Lecturer :
Radityo Prasetianto Wibowo, S.Kom, M.Kom.
Rully Agus Hendrawan, S.Kom., M.Eng.

Course Name

User Experience Design

Code: IS184622	Credit: 3	Semester: 6

Course Description

This course provides knowledge to students about best practices about one of the stages in Software Development, namely the Design Stage. This lecture focuses on the aspects of User Experience Design or better known as User Experience Design (UX Design).

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Special Skills :
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Integrate data & transform it into information which is used to improve organizational competitiveness
- Exploring needs & designing system integrations that increase organizational competitiveness

General Skills :
- Use statistics to help find business solutions
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;
- Have innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge about optimization & automation of IT services with the best technology for the organization
- Have knowledge of current & future business environment (including management, organization, functions, business processes)

Attitude :
- Internalize the spirit of independence, struggle and entrepreneurship ;

Specific Learning Outcome

Cognitif :
- Students able to explain design principles and general design planning
- Students able to explain telemetry and analytics

Psychomotor :
- Students able to make wireframes and application mockups
- Students able to form application prototypes
- Students able to start user testing

Affective :
- Students can show the results of implementing user testing

Course Materials

- Design Principles and General Design Planning
- What Do Users Want? (and Where, and When, and Why?)
- Research - Learning from Your Users
- Telemetry and Analytics
- Exploring Ideas - Sketching
- Creative UX
- Patterns dan Best Practices
- Detail Your Solution - Wireframes and Mockups
- Prototyping - Bringing Your Ideas to Life
- Prototyping with Motion
- User Testing

Main References

1. U Pablo Perea & Pau Giner , X Design for Mobile , PACKT, 2017
2. Luke Hay , Researching UX: Analytics , SitePoint Pty. Ltd., 2017
3. David Platt , The Joy of UX - User Experience and Interactive Design for Developers, PACKT , 2016

Additional References

1. Scott Faranello , Practical UX Design , PACKT , 2016
2. Nicholas Leonard , The best user experience(UX) for mobile applications - Professional UI design , Addison-Wesley , 2016

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week..

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Faizal Johan Atletiko, S.Kom, M.T.
Lecturer :
Faizal Johan Atletiko, S.Kom, M.T.
Rully Agus Hendrawan, S.Kom., M.Eng.

Course Name

Information Asset Protection

Code: IS184623	Credits: 3	Semester: 6

Course Description

In this course students will learn the need to manage information assets and some management techniques. This includes physical and logical environmental security to ensure disaster recovery capabilities and business continuity. What students will get in this course is the management and identification of information security risks and mitigation strategies and security threats. The learning activities in the first half of the semester end with a mid-semester exam on the topic of management and identification of information security risks and topics of mitigation strategies and security threats in the last half of the semester

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity

Course Learning Outcomes

Spesific Skills :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable;

General Skills :
- Make decision to solve problems within the expertise fields, based on the results of information & data analysis;

Knowledge :
- Have knowledge of information availability assurance & IT risk management for business continuity
- Have knowledge of information asset security in the organization
- Have knowledge of IT infrastructure development, maintenance & evaluation in organizations

Specific Learning Outcome

Cognitive :
- Able to explain various Threat Analysis Models and Security Mechanisms
- Able to implement Cryptographic Algorithms

Psiycomotor :
- Able to make several recommendations and policies regarding security services
- Able to use Policies and Compliance to ensure the security of information assets

Affektive :
- Able to demonstrate the analysis results related to threats of information assets and demonstrate the response plan
- Able to report the analysis results related to threats of information assets and demonstrate the design response measures

Course Materials

- Security and Privacy
- Threat Analysis Model
- Vulnerabilities
- Fundamental Aspects
- Security Mechanisms (Countermeasures)
- Operational Issues
- Policy
- Attacks

- Security Domains
- Information States
- Security Services
- Foundations Information Security
- Cryptographic Algorithms
- Secure Programming
- Security Models
- Policies and Compliance

Main References

1. Canon, David L. CISA, Certified Information System Auditor, Study Guide, 2th edition. Wiley Publishing. 2008.
2. Pfleeger, Charles P and Pfleeger, Shari Lawrence. Security in Computing. Pearson Education International. 2003.
3. Strebe, Matthew. Network Security Foundations. SYBEX Inc. 2004.
4. Whitman, ME and Mattord, HJ. Principles of Information Security, 3th edition.Thomson Courses Technology. 2007.
5. Miller, Stewart S. Wi-Fi Security. McGraw-Hill. 2003.

Additional References

1. Steven Splaine, Testing Web Security-Assessing the Security of Web Sites and Applications, Wiley Publishing, Inc., 2002
2. Harold F. Tipton, Mick Krause, Information Security Management Handbook, Auerbach Publication, 2007
3. _____, Information Technology – Code of practice for Information Security Management (ISO/IEC 17799:2000)
4. Chris Davis, Mike Schillerand, Kevin Wheeler, IT Auditing: Using Controls to Protect Information Assets, McGraw-Hill, 2007

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week..

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Bekti Cahyo Hidayanto, S.Si., M.Kom.
Lecturer :
Bekti Cahyo Hidayanto, S.Si., M.Kom.
Dr. Bambang Setiawan, S.T., M.T.
Izzat Aulia Akbar, S.Kom., M.Eng., Ph.D

Course Name

IT Investment Management

Code: IS184624	Credit: 3	Semester: 6

Course Description

Along with the increasing portion of information technology (IT) costs for organizations, the current trend is that information technology is an investment. In contrast to investment in general, IT investment involves tangible and intangible costs and benefits. Therefore, it is important that IT managers do an investment analysis of alternative IT solutions to get the best solution by including tangible and intangible costs and benefits. IT solution alternatives include several IT resource models including IT outsourcing models. The Information Technology Investment Management (MITI) course provides students with experience in analyzing IT investments using financial and non-financial methods of tangible and intangible costs and benefits by providing options for IT solutions to solve organizational problems both individually and in team collaboration. **The learning method** used is inquiry, contextual, and final course projects to be completed in groups. **This course matter focuses** on the concept of IT investment and investment, needs analysis, IT investment performance measurement, financial techniques for IT investment, intangibility, cost benefit analysis, outsourcing, economic information, balanced score card, multi factor scoring, analytic hierarchy process, journal review, and final project. The final project of the course is intended to produce a work in the form of an IT investment analysis document and provide provisions for students to excel in the competition in the world of work.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase.
- Have intrapersonal and interpersonal skills.
- Have knowledge in organization management, IT process and artifact for business continuity.
- Able to practice all skills in the nation & state with integrity & ethics.
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era.

Course Learning Outcomes

Special Skills :
- Planning for investments and acquisition of a viable IT solution for the organization.

General Skills :
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis.
- Able to show independent, quality & measurable performance;

Knowledge :
- Having knowledge of optimization and automation of IT services in the organization

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently.
- Working together to be able to make the most of their potential.

Specific Learning Outcome

Cognitif :
- Students are able to understand the concept of investment and IT investment.
- Students are able to understand needs analysis and IT investment performance measurement.
- Students are able to understand alternative IT solutions.
- Students are able to understand intangibles in IT investment.

Course Name

IT Investment Management

Code: IS184624	Credit: 3	Semester: 6

Psychomotor :
- Students are able to understand financial and non-financial methods for IT investment.
- Students are able to apply the CBA and IE methods for IT investment analysis.
- Students are able to review developments in the latest investment analysis methods from scientific journals.
- Students are able to analyze the feasibility of investing in IT based on financial and non-financial considerations.

Affective :
- Students are able & willing to behave honestly and are responsible for their work.
- Students are able and willing to behave communicatively to work together in teams.

Course Materials

- **IT investment & investment concept:** IT investment & investment concept, needs analysis, and IT investment performance measurement.
- **Alternative IT solutions:** Various IT acquisition models including outsourcing.
- **Financial methods:** Intangible IT investments, financial techniques for IT investments, cost benefit analysis methods, & economic information.
- **Non-financial methods:** Balanced score card, multi factor scoring, and analytic hierarchy process.
- **ITIM journal review:** a review of the development of the latest investment analysis methods.
- **Practical IT investment feasibility analysis:** final project coursework.

Main References

1. Schniederjans, Marc J., Hamaker, Jamie L., Schniederjans, Ashlyn M. (2010). **Information Technology Investment: Decision-Making Methodology second edition, World Scientific Publishing Company**. Singapore: World Scientific Publishing.
2. Parker, Marilyn M & Benson, Robert J. (1990). **Information Economics: Linking Business Performance to Information Technology**. Prentice Hall College Div.

Additional References

1. Digrius, Jack M.Keen Bonnie. (2011). **Making Technology Investment Profitable, ROI Road Map to Better Business Cases second edition**. New Jersey: John wiley& Son.
2. Jurnal-jurnal manajemen investasi TI/SI.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week..

Examination :
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Sholiq, S.T., M.Kom.

Course Name

IT Investment Management

Code: IS184624	Credit: 3	Semester: 6

Lecturer :
Sholiq, S.T., M.Kom.
Dr. Apol Pribadi Subriadi, S.T., M.T.

Couse Name

Digital Startup

Code: IS184625	Credits: 3	Semester: 6

Course Description

The progress of a country can be identified from the number of entrepreneurs that exist. Currently, entrepreneurship in the digital field has become a favorite because it can grow fast and can exist in all sectors of life. This course will invite students to create digital entrepreneurship that can provide design solutions to society's actual problems. For this reason, the learning methods used in this course are in the form of expository, inquiry, contextual, problem solving and cooperation. This course material focuses on understanding the market and customers, business ideas and concepts, competitive advantage, product / service design, capitalization, marketing plans, positioning against competitors, business management and growth projections. The learning activities carried out include discussions, problem solving, guest lectures, pitching and exhibitions. At the end of the lesson, students have an innovative IT solution idea that is starting to be designed and realized in the form of a digital startup.

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Producing works, scientific works & IT entrepreneurship that are able to provide actual problem solutions
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

General Skills :
- Able to apply logical, critical, systematic and innovative thinking in the expertise field;
- Able to xhibit independent, high quality and measured works to organizations and peers;
- Able to examine the implication of knowledge implementation to humanity based on expertise field based on scientific principles, procedures & ethics in order to produce solutions, ideas, designs or art criticism;
- Able to make decision to solve problems within the expertise field based on information & data analysis;
- Able to maintain and nurture network within and outside organization
- Ablte to develop theirselves to compete at the national and international levels
- Able to implement IT & communication in the context of the implementation of the work;
- Able to apply & understand technology-based entrepreneurship.
- Able to produce IT based scientific and entrepreneurship products to solve actual problems

Knowledge :
- Have business knowledge (including management, organization, functions, business processes) of current & future;
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future;

Attitude :
- Contributes on improving the quality of life based on Pancasila;
- Internalizing values, norms, & academic ethics in life;

- Internalizing the spirit of independence and entrepreneurships;
- Strive for perfect results;
- Collaborate to take advantage of existing potential.

Specific Learning Outcome

Cognitive :
- Students able to dig market and customer needs (C2)
- Students able to express business ideas (C2)
- Students able to build business concepts (C3)
- Students able to rationalize business feasibility (C4)
- Students able to design digital entrepreneurship (C5)
- Students able to project business growth (C6)

Psychomotor :
- Students able to consider ideas and business concepts alternatives (P1)
- Students able to demonstrate ideas and business concepts (P2)
- Students able to summarize the concepts of digital entrepreneurship (P3)

Affective :
- Students able to question the market and customer needs (A1)
- Students able to compromise business concepts (A2)
- Students able to propose a digital entrepreneur plan (A3)
- Students able to negotiate making digital entrepreneurship (A4)

Course Materials

- **Understanding the Market and Consumers:** New era demand, customer connectivity and involvement, creative & sharing economy;
- **Business Concepts and Ideas:** Idea creation and brainstorming, Idea sketch and communication, focus on business opportunity, build model and team;
- **Competitive excellence:** look for a mix cultural excellence, support and break weakness in a balanced manner;
- **Product/service design:** business modelling, show product/service;
- **Modelling:** funding strategy, cashflow making, showing finance element, pitching preparation;
- **Marketing planning:** set customers, plan marketing, mixology marketing;
- **Positioning towards competitor:** know business competitors, compare with competitors;
- **Business Management:** organization structure, programs, operational and business activities;
- **Growth projections:** Startup success element,SMART art and innovation;

Main References

1. Steve Fisher & Ja-Nae Duane, The Startup Equation: A Visual Guidebook to Building Your Startup, 2016
2. Francisco S Homem de Mello, Hacking the Startup Investor Pitch: What Sequoia Capital's business plan framework can teach you about building and pitching your company, 2014
3. David S. Rose, The Startup Checklist: 25 Steps to a Scalable, High-Growth Business, John Wiley & Sons, 2016
4. Kevin D. Johnson, The Entrepreneur Mind: 100 Essential Beliefs, Characteristics, and Habits of Elite Entrepreneurs, Johnson Media, Inc, 2013

Additional References

Couse Name
Digital Startup

Code: IS184625	Credits: 3	Semester: 6

1. Adam Harrell , Creative Direction in a Digital World: A Guide to Being a Modern Creative Director 1st Edition, CRC Press, 2017

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week..

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom.
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom.
Radityo Prasetianto Wibowo, S.Kom, M.Kom.

Course Name

Pre Final Project

Code: IS184726	Credit: 2	Semester: 7

Course Description

This course aims to make students able to formulate a strong background in Final Project (FP), formulate problems, conduct literature reviews to support Final Project, choose the right Final Project methodology, and write and present Final Project proposals.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase.
- Have intrapersonal and interpersonal skills.
- Produce IT based scientific and entrepreneurship products to solve actual problems.
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Special Skills :

- Develop & implement IS in organizations based on best practice that appropraite to enhance performance and business competitiveness.

General Skills :

- Have innovative IT ideas as a solution to actual problems
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise.
- Able to show independent, quality & measurable performance;
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Able to maintain and develop networks with mentors, colleagues, peers both inside and outside the institution;
- Able to be responsible for the achievement of group work results & supervise & evaluate the completion of work assigned to workers who are under their responsibility;
- Able to carry out the self-evaluation process of the work group under their responsibility, & able to manage learning independently;
- Capable of documenting, storing, securing, & recovering data to ensure validity and prevent plagiarism;
- Able to implement the principles of sustainability in developing knowledge;
- Able to implement information & communication technology in the context of the implementation of their work;
- Have innovative IT ideas as a solution to actual problems
- Understand research methods & writing procedures in making scientific papers & IT entrepreneurship;

		• Creating works, scientific works & / IT entrepreneurship that provides design solutions to actual problems; • Compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
Knowledge	:	• Have business environment knowledge (including management, organization, functions, business processes) of current & future organizationsHave knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)
Attitude	:	• Upholding human values in carrying out duties based on religion, morals, and ethics; • Obeying the law and discipline in public and state life; • Demonstrate an attitude of responsibility for work in their field of expertise independently • Internalizing values, norms, and academic ethics • Make every effort to achieve perfect results.

Specific Learning Outcome

Cognitif	:	• Students are able to show their critical thinking skills in analyzing a scientific work. • Students are able to explain various choices of information system research methods. • Students are able to find a wide selection of Final Project topics in the Information System. • Students are able to explain correct Indonesian writing rules.
Psychomotor	:	• Students are able to write the Final Project proposal correctly. • Students are able to use Information Systems Research tools. • Students are able to present and / publish their scientific work.
Affective	:	• Students are able & willing to behave honestly. • Students are able & willing to behave communicatively. • Students are able & willing to comply with applicable rules & regulations. • Students are able & willing to behave responsibly

Course Materials

- Critical thinking in attitude, reading, and writing.
- Literature Review.
- Information Systems research methods.
- Information Systems research topics.
- Scientific Writing Methods and methods of avoiding plagiarism.
- Improved Spelling and common mistakes in Final Project writing.
- Introduction to Information Systems research tools.
- Final Project Proposal Writing.

Main References

1. **Critical Thinking: A Student's Introduction**, Gregory Bassham, Mc-Graw Hill, 2005

2. **Formulating Research Methods for Information Systems**, Chris Sauer, Leslie P. Willcocks, Mary C. Lacity, Palgrave Macmillan, USA, 2013.
3. **Research Methods: Information, Systems, and Contexts**, Kirsty Williamson, Graeme Johanson, Glyn Jones, 2018.
4. **Ejaan Yang Disempurnakan (EYD)**, Arvin Mahardika, Frasa Lingua, 2016.

Additional References

1. **Critical Thinking Skills: Effective Analysis, Argument and Reflection**, Stella Cottrell, Palgrave Macmillan, 2017.
2. **Scientific Research in Information Systems: A Beginner's Guide**, Jan Recker, Springer, 2013.
3. **Jurnal-jurnal di bidang Sistem Informasi.**

WorkLoad

1. Lectures: 2 x 50 = 100 minutes (1.66 hours) per week.
2. Private study: 2 x 60 = 120 minutes (2 hours) per week.
3. Discussion with final project supervisor: 3 x 60 minutes

Examination :

- Assignment 1-4
- Bachelor final project proposal presentation

Lecturer

Contact Person: Tony Dwi Susanto, S.T., M.T., Ph.D.
Lecturer :
Tony Dwi Susanto, S.T., M.T., Ph.D.
Dr. Retno Aulia Vinarti, S.Kom., M.Kom.

Course Name

IT Evaluation & Audit

Code: IS184727	Credits: 4	Semester: 7

Course Description

Information technology monitoring and evaluation (Monev TI) focuses on measuring the performance of IT organizations in managing IT processes and their evaluation. The results of IT Monev can provide information on the achievement of IT organizational performance and areas of IT process management that need to be improved. Based on these results, an IT audit can be carried out which is a control inspection activity in the information technology (IT) process in order to minimize the occurrence of IT risks. This activity is part of an IT evaluation that directs IT resources to be managed to meet business goals and IT goals.

This course focuses on 2 (two) things, namely: a) theory and practice of measuring organizational performance; and b) theory and practice of standardized IT audit tools arrangement. The material is presented in theory regarding the concept of M&E and IT Audit, as well as the practice of measuring the performance of the IT function and the preparation of IT Audit tools. Topics covered include: 1) The concept of IT monitoring and evaluation; 2) the concept of auditing in IT evaluation; 3) IT performance measurement method with IT Balanced Scorecard (IT BSC); and 4) Preparation of IT Audit (Audit Program) tools. At the end of this course, it is hoped that students will be able to apply the IT performance measurement method and evaluate its application and compile an IT Audit tool based on standardized IT Audit processes.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Monitor, evaluate, & audit organization's IT processes & artifacts to enhance organizations performance gradually and continuously

General Skills :
- Able to be responsible for team work achievement & do supervision & evaluation of the completion of work assigned to workers who are under their responsibility;

Knowledge :
- Have knowledge of optimization & automation of IT services in organizationswith best technologies for organizations
- Have knowledge of information availability assurance & IT risk management for business continuity
- Have knowledge of information asset security in the organization
- Have knowledge of IT infrastructure development, maintenance & evaluation
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future organizations

Attitude :
- Exhibit a godly attitude towards God Almighty and shows religious behavior;
- Upholding human values in carrying out duties based on religion, moral and ethics;
- Contribute to improving the quality of life based on Pancasila

- Proud and loving the homeland as the responsibility of the nation & state
- Respect the diversity of traditions, views, religions and beliefs, opinions and original findings of others
- Socially sensitive & care for the environment by working with the community;
- Discipline & law abiding in society & state;
- Internalizing values, norms, & academic ethics in life;
- Demonstrate independence & responsibility for their work;

Specific Learning Outcome

Cognitive :
- Students able to understand the concepts of monev and IT audits
- Students able to understand IT performance methods through IT BSC
- Students able to understand standard IT audit process

Psychomotor :
- Students able to plan Monev on IT functions
- Students able to arrange IT Audit devices
- Students able to execute monev on IT functions

Affective :
- Students are able & willing to be truthful
- Students are able & willing to be communicative
- Students are able & willing to be responsible
- Students are able & willing to obey rules & constitutions that exist

Course Materials

- **Monitoring & IT evaluation concepts:** monitoring and IT evaluations definitions; IT performance measurement & indicators/key performance indicators (KPI)
- **Audit concepts on IT evaluations:** IT audit definitions; IT risk management concepts and its relationship with IT audits
- **IT performance measurement methods using IT Balanced Scorecard (IT BSC):** cascading methods; IT department performance on IT BSC
- **Audit program:** standards and IT audit guides

Main References

BOOKS

1. Information Resources Management Association International Conference. (2006). IT Evaluation Methods and Management. In M. Khosrow-Pour, Emerging Trends and Challenges in Information Technology Management (p. 531). Idea Group Inc.
2. Luis, S. (2007). *Step By Step In Cascading Balanced Scorecard To Functional Scorecard*. Jakarta: Gramedia Main References.
3. Information Systems Audit and Control Association. (2007). *IS Standards, Guidelines and Procedures for Auditing and Control Professionals*. Rolling Meadows: Information System Audit and Control Association.
4. Senft, S., & Gallegos, F. (2009). *Information Technology Control and Audit.* Boca Raton: Taylor & Francis Group.

OTHER PUBLICATIONS

IT Governance Institute. (2007). IT Assurance Guide: Using COBIT ®. Rolling Meadows, USA.

Additional References

BOOKS

1. Chorafas, D. N. (2009). *IT Auditing and Sarbanes-Oxley Compliance: Key strategies for business improvement.* Broken Sound Parkway: Auerbach Publications.
2. Gregory, P. H. (2010). Appendix A: Conducting a Professional Audit. In *All In One: CISA ® Certified Information Systems Auditor.* The McGraw-Hill Companies.

OTHER PUBLICATIONS

1. United States General Accounting Office. (1998, 4). *GAO*. Retrieved 8 14, 2014, from Performance Measurement and Evaluation: Definitions and relationship: www.gao.gov/special.pubs/gg98026.pdf
2. Grembergen, W. V., & De Haes, S. (2005). *Measuring and Improving Information Technology Governance through the Balanced Scorecard*. ISACA Journal.
3. (2007). IT Governance and the Audit. In M. Gregg, *CISA Exam Prep.* Que Publishing.
4. Wright, C. (n.d.). *The IT Regulatory and Standard Compliance Handbook: How to Survive an Information Systems Audit and Assessment.* Retrieved from www.syngress.com

WorkLoad

1. Lectures: 4 x 50 = 200 minutes (3 hours 40 minutes) per week.
2. Private study: 4 x 60 = 240 minutes (4 hours) per week.
3. Assignment: 4 x 60 = 240 minutes (4 hours) per week.

Examination :

- Mid-term examination
- Final Examination

Lecturer

Contact Person: Anisah Herdiyanti, S.Kom., M.Sc.
Lecturer :
Anisah Herdiyanti, S.Kom., M.Sc.
Dr. Bambang Setiawan, S.Kom., M.T.

Matakuliah

IT Professional Ethics

Code: IS184728	CREDIT: 3	Semester: 7

Course Description

IT Professional Ethics provides knowledge and understanding of critical and responsible reflection on various issues in legal, ethical, and social aspects related to IS/IT.

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

General Skills :
- Able to study the implications of developing or implementing science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism;

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs;
- Have knowledge of information availability assurance & IT risk management for business continuity;
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Upholding human values in carrying out duties based on religion, morals, and ethics;
- Obeying the law and discipline in public and state life;
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitif :
- Students understand ethics in business and its relevance to ethics in IT/IS
- Students understand the code of ethics & ethical issues faced by IT professionals and users, professional IS/IT organizations
- Students understand the different types of ethical decisions that IS/IT professionals must make
- Students understand how the use of IT can affect privacy rights and understand some legal rules related to privacy rights
- Students understand the various problems that arise as a result of using the Internet as a tool for freedom of expression
- Students understand **various key issues related to scientific wealth**
- Students understand **ethics in software development and quality assurance**
- Students understand **the ethics associated with using social networks**
- Students understand **ethical issues faced by various IT organizations related to handling non-traditional workforce, work safety, environmental responsibility, and business efficiency.**

Psikomotor :
- Students can apply IS/IT professional rules ethically and responsibly

Matakuliah

IT Professional Ethics

Code: IS184728	CREDIT: 3	Semester: 7

Course Materials

- **Introduction:** Introduction to ethics in general, ethics in business, and the relevance of ethics to information technology (IT); A philosophical approach to ethical decision making
- **Ethics for IT Workers & IT Users**: Ethics in business for IT professionals; The role of certification and licensing ownership in providing legitimacy to standard IT professionalism; Various IT professional organizations and their accompanying codes of conduct
- **Computer and Internet Crime:** Ethical decisions that IT professionals have to make and define business needs that must be balanced when dealing with security issues; Types of computer crime and the existence of perpetrators
- **Privacy:** How the use of IT affects privacy rights; How personal information is collected by businesspeople using IT
- **Freedom of Expression:** Issues raised by the increasing use of the Internet as a tool for freedom of expression; Describe the various ways in which the ease and anonymity in which Internet users communicate can create problems for society as opposed to that way of communicating; Describe various attempts to control access to Internet content that can have a negative impact
- **Scientific Property:** Defines intellectual property and describes the various levels of protection against ownership protected by copyright, patent, and trade confidentiality laws; Describe several key issues relevant to ethics in IT, such as plagiarism, software reverse engineering, open-source code, competitive intelligence gathering, and cybersquatting.
- **Software Development:** Describes the overall software development process and the importance of software quality; Describe the issues that software manufacturers must pay attention to when deciding "how good is good enough" for software products made, especially those that are classified as "safety-critical" whose failure can lead to human death.
- **Social Networks:** Describes how people use social networks, Identifies common business uses of social networks; Discusses how various ethical issues are associated with the use of social networks
- **IT Organizational Ethics:** Discusses some of the ethical issues faced by various IT organizations, including issues that can be caused by the use of non-traditional workers; Discusses risks, protection, and ethical decisions relating to handling whistle-blowing; Addresses ethical issues faced by both IT manufacturers and IT users as companies consider how to transition to “green computing”; Discusses a code of conduct for the electronics and ICT industry which is designed to cover several issues related to worker safety, environmental responsibility, and business efficiency

Main References

1. George Reynolds, Ethics in Information Technology, 5th Edition, ISBN 9781285197159, Cengage Learning, 2015.
2. ACM: Code of Ethics and Professional Conduct, Online: https://ethics.acm.org/
3. Stephen Northcutt, Cynthia Madden, Cynthia Welti, IT Ethics Handbook: Right and Wrong for IT Professionals, Elsevier, 2004 - Computers

Additional References

1. UU RI No. 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik
2. Buku Panduan Untuk Memahami UU RI No. 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik, Depkominfo, 2008

WorkLoad

1. Lectures: 2 x 50 = 100 minutes (1.5 hours) per week.
2. Private study: 2 x 60 =120minutes (2 hours) per week.
3. Assignment: 2 x 60 = 120 minutes (2 hours) per week.

Examination :

- Quiz
- Paperwork
- Presentation
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Irmasari Hafidz, S.Kom., M.Sc.
Lecturer :
Nur Aini Rakhmawati, S.Kom., M.Sc.Eng., Ph.D

Course Name

Final Project

Code: IS184853	Credit: 4	Semester: 8

Course Description

Students plan and complete projects / research on the topics discussed with the supervisor according to the methodology / studied in the previous lecture. Students hold regular discussions to discuss topics that are important for research, make proposals and present research results. It is expected that students will be able to understand, explain, analyze and implement all knowledge and skills according to their interest in the field of expertise.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Specific Skills :
- Align IT & Business that contribute to the organization maximally and measureable
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Implementing the organization's business process cycle that more effective & efficient (including organizational behavior / culture, business models, business processes, business functions, business strategy) in order to increase business performance & competitiveness

General Skills :
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Prepare scientific descriptions in the form of a thesis or final report, and upload it on the college page

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently
- Collaborate with others to take advantage of existing potential.

Specific Learning Outcome

Cognitive :
- Students are able to design, plan, evaluate problems.
- Students are able to determine, formulate and understand problems

Psychomotor :
- Students are able to improve, innovate, by providing solutions.
- Students are able to make written scientific reports that follow the principles of research methodology and writing standard scientific papers.

Affective :
- Students are able to report and show the results of scientific work

	Course Name **Final Project**		
	Code: IS184853	Credit: 4	Semester: 8

Course Materials

- Actualization of students' abilities, skills and creativity.
- Determine, formulate and understand problems.
- Design, plan, evaluate problems.
- Improve, innovate, by providing solutions.
- Making written scientific reports that follow the principles of research methodology and writing standard scientific papers.

Main References

1. Panduan Tugas Akhir, Kantor Penjaminan Mutu ITS
2. Panduan Tugas Akhir, Sistem Informasi ITS

Additional References

1.

WorkLoad

1. Supervising : 8 times minimum

Examination :

- Final project presentation

Matakuliah

Database Technology

Code: IS184929	CREDIT: 3	Elective

Course Description

Database Technology contains how to optimize relational databases by tuning and applying the High Availability concept. In addition, it also provides an introduction to non-relational database technology that can increase system speed and reliability.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness

Course Learning Outcomes

Specific Skills :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Integrate data & transform it into information that is used to improve organizational competitiveness
- Analyze data & information to find critical findings that support intelligent business decision making & solutions

Specific Learning Outcome

Cognitive :
- Students are able to apply a good index design
- Students are able to apply graph-based analysis for organizational needs

Psychomotor :
- Students are able to correct the existing index design with a better index design
- Students are able to mimic the High Availability operations available on the database
- Students are able to activate cache technology to improve system performance
- Students are able to activate Message Broker Technology
- Students are able to activate Document-based Database Technology
- Students are able to activate Graph-based Database Technology

Course Materials

- **Database Index** : Anatomy Index, Where Condition, Join Condition, Soring and Grouping, Partial Result, Distributed Query,
- **High Availability** : Asynchronous Replication, Master – Slave Replication, Master – Master Replication, Cluster,
- **Teknology Cache** : Cache System,
- **Message Broker** : Message Queue System,
- **Document Oriented Database** : Document Oriented Database,
- **Graph Database** : Graph Database, Graph Query, FoF based Query

Main References

1. Markus Winand, SQL Performance Explained Everything Developers Need to Know about SQL Performance
2. Martin L. Abbott , The Art of Scalability: Scalable Web Architecture, Processes, and Organizations for the Modern Enterprise

3. Ian Robinson, Jim Webber, dan Emil Eifrem, Graph Databases: New Opportunities for Connected Data

Additional References

1. Training Kit (Exam 70-462) Administering Microsoft SQL Server 2012 Databases (MCSA) (Microsoft Press Training Kit)
2. Kristina Chodorow , MongoDB: The Definitive Guide: Powerful and Scalable Data Storage
3. Baron Scwartz, High Performance MySQL: Optimization, Backups, Replication, and More
4. Alvaro Videla dan Jasin J.W. Williams, RabbitMQ in Action: Distributed Messaging for Everyone

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Radityo Prasetianto Wibowo, S.Kom, M.Kom.
Lecturer :
Radityo Prasetianto Wibowo, S.Kom, M.Kom.

Course Name

Web Technology

Code: IS184930	CREDIT: 3	Elective

Course Description

We are surrounded by data everywhere. By helping us make better decisions, data plays a central role in our daily lives. An increasing number of data sources, driven by individuals and organizations, are contributing to this data flood by sharing their data with others. However, data is locked behind a proprietary, unreliable and even unstable programming interface which prevents us from making optimal use of it. Linked Data has the potential to revolutionize the way we find, access, integrate and use data; only in a way the World Wide Web has revolutionized the way we consume and connect documents. This course will introduce you to the basic principles and technologies of Linked Data to enable data sharing and reuse on a large scale. Accompanied by ontology, namely the representation of knowledge based on Semantic Web technology, Linked Data serves as the main building block of the emerging Web Data.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Integrate data & transform it into information which is used to improve organizational competitiveness
- Analyze data & information for important findings that support intelligent business decision making & solutions
- Implementing a more effective & efficient business process cycle (including organizational behavior/culture, business models, business processes, business functions, business strategy) in order to increase business performance & competitiveness.

General Skills
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Able to implement information & communication technology in the context of the implementation of their work; dan

Knowledge :
- Having knowledge about optimization & automation of IT services with the best technology for the organization

Attitude
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitive :
- Understand the basics of Semantic Web and Linked Data (C2)

Psychomotor :
- Students are able to make data in the form of semantic web (C2)
- Students understand simple vocabulary (C2)
- Students are able to use existing vocabulary (P2)
- Students are able to design and develop software based on Semantic Web and Linked Data (P2)

Affective :
- Students are able & willing to act as problem solvers

Course Materials

- Introduction Semantic Web
- RDFs, Ntriple, Turtle
- Ontology dan Vocabulary
- Linked Data, Mapping data
- JSON-LD
- SPARQL
- Aplikasi Linked data

Main References

1. Antoniou, Grigoris, and Frank Van Harmelen. A semantic web primer (Cooperative Information Systems) – 3rd edition". MIT press, 2012
2. Tom Heath and Christian Bizer (2011) Linked Data: Evolving the Web into a Global Data Space (1st edition). Synthesis Lectures on the Semantic Web: Theory and Technology, 1:1, 1-136. Morgan & Claypool.
3. DuCharme, B. St. Laurent, S. & Perez, J., ed. (2011), Learning SPARQL .

Additional References

1. Nur Aini Rakhmawati, Semantic Web dan Linked Data, 2015

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :
- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Radityo Prasetianto Wibowo, S.Kom, M.Kom.
Lecturer :
Radityo Prasetianto Wibowo, S.Kom, M.Kom.

Matakuliah

Pengolahan Bahasa Alami

Code: IS184931	CREDIT: 3	Elective

Course Description

Natural Language Processing includes the theoretical and technical basics of unstructured data processing in the form of communication carried out in natural language, especially in the form of text.

Program Learning Outcomes

- Enhance the quality of business and IT integration that gives the organization competitiveness
- Apply logic and mathematics, statistics, physics, chemistry to solve various business problems
- Have intrapersonal and interpersonal skills
- Produce works, scientific works and IT entrepreneurship that are able to solve actual problems
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Specific Skills

- Integrate data & transform it into information that is used to improve organizational competitiveness
- Analyze data & information to find critical findings that support intelligent business decision making & solutions

General Skills

- Apply logic & math for solving business problem
- Use statistics to help find business solutions
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise
- Able to show independent, quality & measurable performance
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to develop themselves & compete at national and international levels
- Able to implement information & communication technology in the context of the implementation of their work
- Have innovative IT ideas as a solution to actual problems
- Create works, scientific works & / IT entrepreneurship that provides design solutions to actual problems

Attitude

- Internalize the spirit of independence, struggle, and entrepreneurship
- Try its best to achieve perfect results

Specific Learning Outcome

Cognitive :

- Students are able to understand the basic concepts of NLP
- Students are able to understand computational techniques to implement NLP
- Students are able to extract information using NLP techniques

Psychomotor :

- Students are able to apply NLP techniques to data in accordance with the appropriate programming library
- Students are able to analyze the output of the techniques used and make adjustments to achieve the best performance
- Students are able to write the results of work and analysis into a scientific work

Course Materials

- **The basic components of NLP:** word, morphology, lexicon
- **Language modelling dan smoothing,**
- **Noisy channel model dan edit distance,**
- **Classification,**
- **Part-of-speech tagging,**
- **Hidden Markov Model,**
- **A syntactic representation of natural language,**
- **Treebanks,**
- **The latest techniques in NLP**

Main References

1. Jurafsky, D and J. H. Martin, *Speech and Language Processing, 3rd edition* (online 2017)

Additional References

1. Chris Manning and Hinrich Schütze, *Foundations of Statistical Natural Language Processing*, MIT Press. Cambridge, MA: May 1999.
2. Bird, S., E. Klein and E. Loper, *Natural Language Processing with Python*. O'Reilly Media: 2009.
3. Paper-paper yang relevan.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Renny Pradina K, S.T., M.T
Lecturer :
Renny Pradina K, S.T., M.T.

Course Name

Information Visualization

Code: IS184932	CREDIT: 3	Elective

Course Description

Information Visualization contains courses that focus on using visualization techniques to help people understand and analyze data.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT

Course Learning Outcomes

Ketrampilan Khusus :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable;
- Menganalisis data & informasi untuk memperoleh temuan penting yang mendukung pembuatan keputusan & solusi bisnis secara cerdas;

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;

Knowledge :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
-

Specific Learning Outcome

Cognitive :
- Students are able to understand the basic principles of information visualization
- Students are able to understand basic techniques in information visualization to support data analysis process and objectives

Psichomotor :
- Students are able to apply information visualization techniques for data analysis
- Students are able to design innovative information visualizations using selected toolkits (e.g. D3JS, Processing, R ggplot, Python pandas, etc.)

Course Materials

- **Introduction to Information Visualization:** understanding the definition & purpose, examples of application/use of information visualization, visualization components, areas/topics of interest in information visualization research, the process (pipeline) to build information visualization
- **Multivariate Data & Tables**: understanding data types, variable/category types, metadata, tables vs. graphs, analysis, modeling & the process of transforming raw data into tabular data
- **Visual Perception:** understand the definition of visual processing, visual perception factors to support various communication purposes, the boundaries of visual perception
- **The spectrum of toolkits for Information Visualization:** InfoVis focus vs. Simple graphics, e.g. Python pandas, R ggplot library (grammar of graphics), D3js (Javascripts), Processing (Java), Tableau, Lyra (Uni Washington), Polaris (Stanford), etc.

- **Interactions in Information Visualization:** understand the definition of interactions in information visualization, 7 categories of interactions in Yi's Framework

Main References

1. Robert Spence. (2001). Information visualization (Vol. 1). Reading: Addison-Wesley.
2. Tamara Munzner. (2014). Visualization Analysis and Design. A K Peters Visualization Series, CRC Press. Available online: http://www.cs.ubc.ca/~tmm/vadbook/

Additional References

1. Card, Stuart, J. D. Mackinlay, and Ben Shneiderman. "Information visualization." Human-computer interaction: Design issues, solutions, and applications 181 (2009).
2. Colin Ware. *Information visualization: perception for design*. Elsevier, (2012).
3. Wickham, Hadley. *ggplot2: elegant graphics for data analysis*. Springer, (2016).

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Rully Agus Hendrawan, S.Kom., M.Sc.
Lecturer :
Rully Agus Hendrawan, S.Kom., M.Sc.

Course Name

Mobile Technology

Code: IS184933	CREDIT: 3	Elective

Course Description

Mobile technology is a course that studies how to make use of mobile devices, for example cell phones or portable computers to access data or information through computer networks.
The learning methods used include lectures, discussions, project-based assignments, and practice coding. This course will focus on current problems that are developing, how to find alternative solutions, how to pour into simple application designs, followed by implementations that try to make the most of the capabilities of mobile devices.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Ketrampilan Khusus :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness

General Skills :
- Able to show independent, quality & measurable performance;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Able to implement information & communication technology in the context of the implementation of their work; and
- Have innovative IT ideas as a solution to actual problems

Attitude :
- Contributing to improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila;
- Try your best to achieve perfect results;

Specific Learning Outcome

Cognitive :
- Able to explain the basic concepts of mobile technology
- Able to decipher the app activity life cycle

Psichomotor :
- Able to design application storyboards
- Able to pour storyboard designs into application layouts
- Able to write program code for simple and medium applications
- Able to debug to get rid of "bugs and errors"
- Able to publish applications to the public

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with the prevailing rules & regulations
- Students are able & willing to behave responsibly

Course Name
Mobile Technology

Code: IS184933	CREDIT: 3	Elective

Course Materials

- **Activities and Intents:** Activity Lifecycle and Managing Status; Activities and Implicit Intents
- **Testing, debugging, and backward compatibility:** Using the Debugger; Application Testing; Using the Android Support Libraries
- **Intuitive user interaction and navigation**: Control User Input, Menu, Screen Navigation Using the App Bar and Tabs
- **Very pleasant user experience:** Drawables Resources, Themes and Styles; Support landscape, multi-screen size, and localization (language switching)
- **Behind the scenes:** AsyncTask and AsyncTaskLoader, connection to the Internet, Broadcast receiver, Web Services, HTTP Client, XML and JSON
- **Triggering, scheduling, and optimizing background activities:** Notifications, Alarm manager, Job scheduler
- **Save data with SQLite**: Store and query data in an Android SQLite database; Primary SQLite, Query SQLite databases
- **Additional material:** Excuse me, performance and safety; Firebase and AdMob

Main References

1. Google Inc, Android Developer Fundamentals Course, 2016 (https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-concepts/details)

Additional References

1. Bill Phillips & Brian Hardy, Android Programming: The Big Nerd Ranch Guide, The Big Nerd Ranch, Inc., ISBN 0321804333
2. Wei-Meng Lee., Beginning Android 4 Application Development, John Wiley & Sons, Inc. ISBN: 978-1118199541

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Dr. Eng. Febriliyan Samopa, S.Kom., M.Kom.
Lecturer :
Dr. Eng. Febriliyan Samopa, S.Kom., M.Kom.

Course Name

Internet of Things

Code: IS184934	Credits: 3	Elective

Course Description

This course looks at the "Internet of Things (IoT)" as the general theme of physical/real-world things becoming increasingly visible and actionable via Internet and Web technologies. The goal of the course is to look top-down as well as bottom-up, to provide students with a comprehensive understanding of the IoT.

By looking at a variety of real-world application scenarios of the IoT and diverse implemented applications, the various understandings and requirements of IoT applications become apparent. This allows students to understand what IoT technologies are used for today, and what is required in certain scenarios.

By looking at a variety of existing and developing technologies and architectural principles, students gain a better understanding of the types of technologies that are available and in use today and can be utilized to implement IoT solutions.

Finally, students will be given the opportunity to apply these technologies to tackle scenarios of their choice in teams of two or three, using an experimental platform for implementing prototypes and testing them as running applications. At the end of the semester, all project teams will present their completed projects.

Program Learning Outcomes

- Use an IT solution and its alternatives that improve business performance & competitiveness
- Produce scientific papers & IT entrepreneurship that can solve actual problems
- Recognize basic knowledge of business & IT
- Demonstrate all of the expertise for the nation & country

Course Learning Outcomes

Spesific Skills : • Plan an improvement of the quality of business & IT integration that deliver competitiveness to the organization

General Skills : • Produce scientific papers & IT entrepreneurship that can solve actual problems

Knowledge : • Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude : • Contribute on improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila

Specific Learning Outcome

Cognitif : • Students are able to explain Internet in generalMahasiswa mampu menerapkan Transport services

Psychomotor : • Students are able to create Mobile Networking
• Students are able to design real-time networking

Affective : • Students are able to discuss IoT Case studies examples
• Students are able to show performance measurements on local wireless and mobile networks

Course Materials

Course Name
Internet of Things

Code: IS184934	Credits: 3	Elective

- Internet in general and Internet of Things: layers, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia.
- Transport services: TCP, UDP, socket programming.
- Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers.
- Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular Internet access, and Machine-to-machine.
- Mobile Networking: roaming and handoffs, mobile IP, and ad hoc and infrastructure less networks.
- Real-time networking: soft and real time, quality of service/information, resource reservation and scheduling, and performance measurements.
- IoT definitions: overview, applications, potential & challenges, and architecture.
- IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.
- Lab: performance measurements on local wireless and mobile networks.

Main References

1. Massimo Banzi (2008) Getting Started with Arduino.

Additional References

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
2. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.
3. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Dr. Eng. Febriliyan Samopa, S.Kom., M.Kom.
Lecturer :
Dr. Eng. Febriliyan Samopa, S.Kom., M.Kom.

Course Name

Digital Forensics

Code: IS184935	CREDIT: 3	Elective

Course Description

Digital forensics is a field that is growing rapidly because of its importance and necessity as the use of information technology increases. This includes the process of maintaining, identifying, extracting, documenting, and interpreting digital data. Today, the need for information systems graduates who can investigate computer-related crimes and incidents is increasing. This course introduces the topics of computer crime and digital forensics. Students should explore different aspects of computer crime and ways to expose, protect and issue digital evidence. Students get the opportunity to improve their experience in the field of digital forensics. Students are also able to understand well the latest research in the field of digital forensics

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Spesific Skills :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable

General Skills :
- Able to show independent, quality & measurable performance;

Knowledge :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Internalize the spirit of independence, struggle, and entrepreneurship

Specific Learning Outcome

Cognitive :
- Understand the potential IS / IT data & infrastructure threats
- Understand alternative solutions to protect data & IS / IT infrastructure

Psychomotor :
- Able to build data security and system infrastructure

Affective :
- Able to demonstrate the development process of data security and system infrastructure
- Report on the process of building data security and system infrastructure

Course Materials

- Foundation of Investigations
- Data Analysis
- Acquisition Techniques
- Authentication Techniques
- Volume Analysis
- File System Analysis
  - Windows File System
  - Mac and Unix/Linux File System

- Common Forensics Techniques
- Data Hiding Techniques
- Recovering Graphic Files
- Virtual Machines
- Network Forensics
- E-mail Forensics
- Web-Browsing Reconstruction
- Cell Phone and Mobile Device Forensics
- Steganography

Main References

1. Brian Carrier. File System Forensic Analysis. Addison Wesley, 2005. (ISBN:0-32-126817-2)

Additional References

1. George Mohay, et al. Computer and Intrusion Forensics. Artech House, 2003. (ISBN:1-58053-369-8)
2. Eoghan Casey. Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet.
3. Sammes, Tony, Jenkinson, Brian; Forensic Computing; Springer-Verlag, Ltd.; 2000 (ISBN 1-85233-299-9)

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Bekti Cahyo Hidayanto, S.Si., M.Kom.
Lecturer :
Bekti Cahyo Hidayanto, S.Si., M.Kom.

Course Name

Cyber Security

Code: IS184936	Credit: 3	Elective Course

Course Description

The challenges of securing information in modern companies and organizations are increasing. Information security threats are increasingly sophisticated, comprehensive and powerful. The cybersecurity course presents several topics related to how to secure modern companies and organizations. These topics include design and policy making, organizational roles, security measures, risk management, standards and regulations, physical security, and business continuity.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in business and IT
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Spesific Skills :
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable

General Skills :
- Able to show independent, quality & measurable performance;

Knowledge :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Internalizing the spirit of independence, struggle and entrepreneurship

Specific Learning Outcome

Cognitif :
- Be able to explain several security models.
- Students are able to apply Physical and Environmental Security

Psychomotor :
- Students are able to make Communications and Operations Management according to existing problems.
- Using security methods in applications such as databases, email and the internet

Affective :
- Students are able to show the results of the analysis of the use of security methods in applications such as databases, email and the internet.
- Report the results of analysis of the use of security methods in applications such as databases, email and the internet

Course Materials

- Security Policies and Management: Security Policy Design, Designing Security Procedures, Risk Assessment Techniques, Security standards
- Security Models: Biba Model, Chinese Wall, Bell La Pedula Model
- Physical and Environmental Security: Server Room Design, Fire fighting equipment, Temperature/humidity Control etc
- Application Security: Databases, Email and, Internet etc
- Communications and Operations Management: Network Architecture, Network Operations, Security Devices (Firewalls, IDS/IPS, Antivirus etc), Routers/Switches

- Business Continuity Planning and Management: Business Impact Analysis, Business Continuity/ Disaster Recovery Plans
- Access Control: Logical and Physical Access Control
- Software development, maintenance and support: Security in development methodology, Security testing, Segregation of duties

Main References

1. Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, . Information Security Management: Concepts and Practice. New York, McGraw-Hill, 2013.

Additional References

1. Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology, 2011.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Bekti Cahyo Hidayanto, S.Si., M.Kom.
Lecturer :
Bekti Cahyo Hidayanto, S.Si., M.Kom.

Course Name

IT Risk & Quality Management

Code: IS184937	Credit: 3	Elective Course

Course Description

As a support for the organization's business, IT is expected to always be reliable in any condition, so that the organization can consistently meet customer needs / expectations by controlling the main processes that affect the quality of the products / services produced. However, there are many risks that can interfere with the sustainability of IT in supporting business continuity and achieving organizational goals. These risks must be identified as early as possible so that the organization can develop strategies and mitigation plans so that these risks do not interfere with its performance in achieving goals. This course will provide students with an understanding of the concepts of quality and quality management as well as the processes for identifying risks and planning mitigation measures. The learning methods used include introducing students to various standards for quality management and risk management and how to implement them with real case studies in IT organizations. After studying this course, students are expected to be able to make a check list document for quality management as well as a document on risk management results, including the risk identification process to determining the appropriate risk response measures.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Ketrampilan Khusus :
- Align IT & Business that contribute to the organization maximally and measureable
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Analyze data & information for the creation of organizational business solutions for important findings that support intelligent business decision making.

General Skills :
- Able to show independent, quality & measurable performance
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to be responsible for the achievement of group work & supervise & evaluate the completion of work assigned to workers who are under their responsibility.
- Able to carry out the self-evaluation process of the work group under their responsibility, & able to manage learning independently.
- Having innovative IT ideas as a solution to actual problems.

- Creating works, scientific works & / IT entrepreneurship that provides design solutions to actual problems

Knowledge :
- Have knowledge of information availability assurance & IT risk management for business continuity
- Have knowledge of information asset security in the organization
- Have knowledge of IT infrastructure development, maintenance & evaluation in organizations
- Have business environment knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Upholding human values in carrying out duties based on religion, morals, and ethics
- Respect the diversity of cultures, views, religions and beliefs, as well as the original opinions or findings of others.
- Work together and have social sensitivity and care for the community and the environment.
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitif :
- Students are able to understand the concept of organizational goals and obstacles in their achievement.
- Students are able to understand how the process is to identify IT risks.
- Students understand how the process is to improve the effectiveness of the quality management system in organizations

Psychomotor :
- Students are able to identify IT risks and their effects on achieving organizational goals.
- Students are able to determine the appropriate actions to handle each risk in order to avoid unwanted impacts.
- Students are able to formulate processes to increase the effectiveness of the quality management system in the organization.

Affective :
- Students are able and willing to behave honestly.
- Students are able and willing to behave communicatively.
- Students are able and willing to behave responsibly

Course Materials

- Quality concept and quality management;
- Quality management components: quality planning, quality assurance, quality control and quality improvement;
- Methods for quality improvement and standards for quality;
- The concept of goals in the context of the organization as well as threats to achieving its goals;
- Basic concepts of risk and risk management as well as the importance of risk management in achieving organizational goals;
- Identification and analysis of possible risks;

- Evaluating the risks that have been identified and determining the risks that need to be controlled and the risks that are acceptable;
- Recommend actions to control risk based on standards;
- Establish procedures to review, monitor and verify risks;

Main References

1. Joseph Berk and Susan Berk. 2000. Quality Management for Information Technology Sector. Newnes: Butterworth-Heinemann. ISBN 0-7506-7316-8
2. Jake Kouns and Daniel Minoli. 2010. Information Technology Risk Management In Enterprise Environments. John Wiley & Sons, Inc: Hoboken, New Jersey. ISBN 978-0-471-76254-6

Additional References

1. Howard S Gitlow. 2001. Quality Management Systems: A Practical Guide. CRC Press: Florida, USA. ISBN 1-547-44261-9
2. Dhanasekharan Natarajan. 2017. ISO 9001 Quality Management Systems. Springer: Cham, Switzerland. ISBN 978-3-319-54382-6
3. John Pryor. 2014. Quality Risk Management Fieldbook. IRMI (International Risk Management Institute). ISBN 978-1-933686-40-0
4. ISO 27001 risk assessment & treatment.
5. ISO 9000:2015 Quality management systems -- Fundamentals and vocabulary

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Anisah Herdiyanti, S.Kom., M.Sc.
Lecturer :
Anisah Herdiyanti, S.Kom., M.Sc.

Course Name

IT Governance

Code: IS184938	Credit: 3	Elective Course

Course Description

IT governance is a necessity for organizations that support their success in IT. The emergence of risks for the use of IT in organizations cannot be denied and must be anticipated through the arrangement of IT management by the international standard IT framework & best practices. This course will **provide students with knowledge of the framework & best practices that are widely used by world-class organizations in IT management & experience in compiling IT governance documents.** For this reason, the **learning methods** used are Articulation, Problem Based Instruction, and Project-Based Learning, both involving individuals and groups. **This course** will focus on the Concept of IT Governance; IT control-based risk management; IT Governance Framework; & IT Governance Documents. Understanding of IT governance concepts & experience in compiling IT governance documents in this course will provide added value for students to be able to manage IT in the organization where they work later.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Ketrampilan Khusus :
- Monitor, evaluate, & audit organization, IT processes & artifacts to gradually & continuously improve organizational performance

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;
- Able to implement the principles of sustainability in developing knowledge;
- Able to implement information & communication technology in the context of the implementation of their work;

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs
- Have knowledge of optimization & automation of IT services with the best technology for the organization
- Have knowledge of information availability assurance & IT risk management for business continuity
- Have knowledge of information asset security in the organization
- Have knowledge of IT infrastructure development, maintenance & evaluation
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Contributing to improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila;
- Obeying the law and discipline in public and state life;

- Internalizing academic values, norms, and ethics;

Specific Learning Outcome

Cognitif :
- Students can understand the concept of IT governance
- Students can understand IT governance frameworks & standards

Psikomotor :
- Students can build IT governance

Afektif :
- Students can build IT governance
- Students are able & willing to behave critically, analytically & systematically
- Students are able & willing to behave unyielding & flexible
- Students are able & willing to act as problem solvers
- Students are able & willing to behave responsibly
- Students are able & willing to behave obediently and obey the agreed rules and standards

Course Materials

- **IT Governance Concept:** definition and scope of IT governance, IT governance pillars, the importance of IT governance, the advantages and disadvantages of IT governance and the values of IT governance;
- **IT governance foundations:** establishing IT governance goals, Structural Issues, IT governance maturity, IT governance achievements;
- **Elements & Goals of IT governance:** structure, framework & processes; strategic alignment, value delivery, risk management, resource management, performance measurement;
- **Understanding & establishing the IT governance framework:** understanding the IT governance framework, building IT governance structures, building IT governance processes, benefits of IT governance framework;
- **IT governance frameworks & standards**: existing frameworks, COBIT, ITIL, VAL IT, ISO 27001, ISO 385000, CMM / CMMI;
- **Effectiveness & future of IT governance**: Stages for better IT governance, Building effective IT governance, future IT governance

Main References

1. **Robert R. Moeller,** Executive's Guide to IT Governance: Improving Systems Processes with Service Management, COBIT, and ITIL, Wisley, 2013.

Additional References

1. **Ali, S.** (2014, 4). Strategic Planning Using COBIT 5. COBIT® Focus, 2.
2. **ISACA.** (2012). COBIT 5: A Business Framework for the Governance and Management of Enterprise IT. ISACA. IL: ISACA.
3. **ISO/IEC**. (2008). ISO/IEC 38500: Corporate governance of information technology. Geneva, Switzerland.**ISO/IEC.** (2008). ISO/IEC 27000: Information technology — Security techniques.
4. **The IT Service Management Forum (itSMF International)**. (2005). IT Governance based on CobiT® 4.1: A Management Guide. IT Governance Institute.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Tony Dwi Susanto, S.T., M.T., Ph.D
Lecturer :
Tony Dwi Susanto, S.T., M.T., Ph.D

Course Name

Organization Change Management

Code: IS184939	Credits: 3	Optional

Course Description

Change is often a complex, difficult and unavoidable process. Managing change on a personal and organizational level requires new thinking, new models for change and new frameworks and tools to enable the smooth implementation of the desired changes. The course in Organizational Change Management will provide students with experience in being able to manage change in an organization, as well as being able to apply it to changes in individual behavior and thinking. The Organizational Change Management course will provide an understanding of the concepts of change and change management best practices that can be applied to a variety of changes to drive change success.

Program Learning Outcomes

- Implement various alternative IT solutions that are compromised in order to increase organizational performance & competitiveness
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Align IT & Business that contribute to the organization maximally and measurably

Knowledge :
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future organizations

Attitude :
- Upholding human values in carrying out duties based on morale, religion and ethics;
- Discipline & law abiding in society & state;
- Demonstrate responsibility for their work;

Specific Learning Outcome

Cognitive :
- Students able to understand the concepts of Organization's Change Management.
- Students able to understand the dynamics suitability of change demands and goals.
- Students able to understand the concepts of flexibility as the core of change management.
- Students able to manage the stages of awareness, desire, knowledge, ability and reinforcement on change policy within organization.

Psychomotor :
- Students able to arrange and manage a strategy to implement organizational change management to achieve organizational goals

Affective :
- Students are able & willing to behave critically, analytically and sistematic
- Students are able & willing to behave unyielding and flexible
- Students are able & willing to behave as problem solver
- Students are able & willing to behave responsibly
- Mahasiswa mampu & mau berprilaku bertanggung jawab

Course Name

Organization Change Management

Code: IS184939	Credits: 3	Optional

Course Materials

- Change and Change Management,
- Need and willingness to change,
- Flexibility Management,
- Management and Organization Behaviour,
- Individual Behaviour,
- Value and Behaviour,
- Perception and Individual and Group Decision,
- Understanding Group Work,
- Communication,
- Leadership and Trust,
- Conflict and Negotiation,
- Power and Politics,
- Organization Culture,
- Technology and Work Design,
- Organization Dynamics,
- Organization Change and Stress,
- Best practice and framework on managing change management: awareness, willingness, knowledge, ability, reinforcement (ADKAR),
- Efective Ways to Build Awareness for Change,
- Ways to Positively Influence People's Willingness to Embrace Change,
- Effective Ways to Build Knowledge on Individual,
- Build Ability to Perform Change,
- Strengthen and Maintain Change.

Main References

1. Stephen P. Robbins and Timothy A. Judge, Oragizational Behavior, Seventeenth Edition, Perason Education Limited, 2017
2. Prosci ADKAR Model, A Goal Oriented Change Management Model to Guide Individual and Organizational Change, Prosci Inc, 2017

Additional References

1. Related journals which explains about best change management such as framework or best practices about awareness, desire, knowledge, ability and reinforcement (ADKAR)

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Course Name

Organization Change Management

Code: IS184939	Credits: 3	Optional

Lecturer

Contact Person: Dr. Apol Pribadi Subriadi, S.T., M.T.

Lecturer :

Dr. Apol Pribadi Subriadi, S.T., M.T.

Course Name

Business Continuity Management

Code: IS184940	Credits: 3	Optional

Course Description

Business continuity is very crucial. In general, there are two challenges when an organization or company is running. External challenges are often in the form of competition and internal challenges in the form of disruption to business processes. This course will provide knowledge and skills to ensure the company and its business processes can continue when external or internal changes occur. Management actions to ensure business continuity based on a resource-based approach will be discussed to face the challenges of external competition, while an IT risk management-based approach will be studied to respond to internal business process disruptions. Documents for these two types of management action are known as business continuity plans or strategies.

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Spesific Skills :
- Elicit the needs & designing system integration in organizations which increases organizational competitiveness

Knowledge :
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future organizations

Attitude :
- Upholding human values in carrying out duties based on religion, morals and ethics
- Discipline & law abiding in society & state
- Demonstrate independence & responsibility for their work in their field of expertise independently

Specific Learning Outcome

Cognitive :
- Able to identify and manage company resources (Resource-Based View of the Firm) to ensure business continuity
- Able to determine the company competency which supported by IT resources
- Able to identify and manage IT riCredits into IT disaster repair planning
- Able to quantify the business impact of an IT disaster
- Able to create a business continuity plan
- Able to adopt the PDCA cycle for a continuous improvement to achieve business continuity;

Psycomotor :
- Able to create, implement, and conduct business continuity experimental scenarios;

Affective :
- Able & willing to behave honestly
- Able & willing to behave communicatively
- Able & willing to obey the applicable rules and regulations
- Able & willing to behave responsibly

Course Materials

Course Name

Business Continuity Management

Code: IS184940	Credits: 3	Optional

- The role of IS/IT in the organization
- The need for business continuity
- Business continuity committee in the organization
- Definition and concept of business continuity
- The difference between Disaster Recovery Plan and Business Continyuity Plan
- Business components and business processes
- Critical company resources and its identification
- The theory of resource-Based View of the Firm and its use for business continuity
- IT use risk analysis
- Development of a disaster recovery plan
- Business impact analysis due to IT disasters
- Analysis and synthesis of management actions as a response to business impacts
- Continuous improvement cycle (Plan Do Check Action)
- The framework relevant to business continuity (ISO 22301, Business Continuity Management/BCM, COBIT5)
- Best practices for business continuity in similar industries
- Planning business continuity trial scenarios

Main References

1. James C. Barnes, A Guide to Business Continuity Planning, John Wiley and Sons, 2011
2. Asis International Advancing Security Worldwide, Business Continuity Guideline: A Practical Approach For Emergency Preparedness, Crisis Management, and Disaster Recovery, 2005, Asis International

Additional References

1. ISO 22317:2015, COBIT 5, Business Continuity Management Systems

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Dr. Mudjahidin, S.T., M.T.
Lecturer :
Dr. Mudjahidin, S.T., M.T.

Course Name

Forecasting Technique

Code: IS184941	Credits: 3	Optional

Course Description

Forecasting technique is an alternative that can be used to produce information related to the situation in the future. This information is used as a basis for taking actions or decisions that can be used as an early warning system. This course provides the ability to use forecasting (quantitative) methods to support decision making. For this reason, the learning methods used in this course are mostly case studies which are then practiced to be completed with the support of existing and appropriate forecasting techniques or methods. The material of this course includes the concept of forecasting, various techniques or methods in forecasting (quantitative) which include the characteristics and how to use it, and analysis of the forecasting results obtained.

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Integrate data & transform it into organizational information to enhance organization's competitiveness
- Analyze data & information for the creation of organizational business solutions that supports decision making & business solution

General Skills :
- Able to make decision to solve problems within the expertise field based on information & data analysis results
- Able to document, save, secure and retrieve data to guarantee its correctness and prevent plagiarism

Knowledge :
- Have knowledge of best practice IT process management to meet business needs
- Have knowledge of information availability assurance & IT risk management for business continuity
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations
- Have knowledge of IT (including processes, organizations, applications, infrastructure, people IT, data) of current and future organizations

Attitude :
- Be devoted to God Almighty and able to show religious attitudes
- Demonstrate independence & responsibility for their work;

Specific Learning Outcome

Cognitive :
- Students able to understand forecasting concepts
- Students able to understand the concepts on how forecasting methods may be implemented on certain IT components (data)

Psychomotoric :
- Students able to dig deeper on various types of data patterns
- Students able to use forecasting methods/techniques
- Students able to predict data by using the right methods/techniques and in accordance with the characteristics and patterns of existing data.

Affective :
- Students able to provide analysis in connection with the conditions of forecasting results in the future
- Students are able & willing to behave critically, analytically and systematic
- Students are able & willing to behave unyielding and flexible
- Students are able & willing to behave as problem solver

Course Materials

- **Forecasting concepts:** data form (time series, cross sectional), technique category (qualitative, quantitative), quantitative model (explanatory, time series), qualitative model (explanatory,normative);
- basic forecasting, forecasting accuracy measurement;
- forecasting resource (software, association, seminar, journal);
- **Forecasting methods, consists of: moving average:** simple, centered, double, weighted;
- **Exponential smoothing :** single, double, triple, adaptive**;**
- **Decomposition:** additive, multiplicative;
- **Regression :** simple, multiple liniear;
- **Box-jenkins :** ARIMA model, seasonal, non-seasonal **and ARIMA improvements** (ARIMAX, SARIMAX, ARIMA ARCH, ARIMA GARCH);
- **Artificial Neural Network (ANN);**
- **Fuzzy;**
- **Collaborations previouse methods.**

Main References

1. **Galith Shmueli, Kenneth C. Lichtendahl Jr.**, *Practical Time Series Forecasting with R: A Hands-On Guide 2th edition*, Axelrod Schnall Publishers, 2016
2. **Richard A. Davis, Peter J. Brockwell.**, *Introduction to Time Series and Forecasting 3th edition*, Springer, 2016
3. **Rob J. Handyman, George A.**, *Forecasting Principles and Practice, 9th edition*, Otexts, 2013
4. **Hanke, John E., Wichern, Dean W.**, *Business Forecasting 9th edition*, Prentice Hall, 2008
5. **Makridakis, Spyros., Wheelwright, Steven C., Hyndman, Rob J**. *Forecasting : Methods and Applications 3rd edition*, John Wiley & Sons, 2008
6. **Bowerman, Bruce L., O'Connell, Richard T., Koehler, Anne B.** *Forecasting, Time Series and Regression* 4th edition, Thomson Brooks/Cole, 2005

Additional References

1. **John E., Silvia, Sarah Watt, Kaylin S, et.al.** Economic and Business Forecasting: Analyzing and Interpreting Economic Result. Wiley. 2014
2. **Francis X. Diebold.** Element of Forecasting. South-Western Thomson Learning, 2nd edition, 2000
3. **Robert Yaffee, Monnie McGee.** Intorduction to Time Series Analysis and Forecasting, with Application of SAS and SPSS. Academic Press Inc. 2000

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.

3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Wiwik Anggraeni, S.Si., M.Kom.
Lecturer :
Wiwik Anggraeni, S.Si., M.Kom.
Raras Tyasnurita, S.Kom., M.Sc., Ph.D

Course Name

Decision Support System

Code: IS184942	Credits: 3	Elective Course

Course Description

The availability of information is needed by businesses in line with the rapid development of information technology. This allows business people to process their data so that it becomes very useful information to support business decision making. Business actors who are unable to meet the need for information will be crushed by their competitors. The sis course will provide students with experience in understanding the business needs of information for decision making and how this information is processed from existing raw data. In addition, students are also directed to create a system that can be used to process data into information using methods that have been previously studied and can be applied to real problems. For this reason, the learning method used is to provide projects in groups to solve problems in decision making and create systems that can be used to solve these problems. This course matter is the basis of decision theory, computerized decisions, data analysis problems with certain methods and their implementation. Students can produce a work of a decision support system that can be used by students as a portfolio and provision to excel in competition in the working world.

Program Learning Outcomes

- Enhance the quality of business & IT integration that gives the organization competitiveness
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have knowledge in business and IT
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Specific Skills :
- Integrate data & transform it into information that is used to improve organizational competitiveness.
- Analyze data & information for critical findings that support intelligent business decision making & solutions

General Skills :
- Apply logic & math for solving business problem
- Use statistics to help find business solutions

Knowledge :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Internalizing the spirit of independence, struggle, and entrepreneurship.
- Strive to achieve perfect results.
- Collaborate to be able to make the most of their potential.

Specific Learning Outcome

Cognitif :
- Students are able to understand by explaining various DSS approaches to solve specific problems.
- Students are able to identify Simon's model and DSS components

Psychomotor :
- Students are able to create scenarios and weigh the supporting factors and side effects.
- Students are able to produce solutions to decision support problems on scientific papers into a software system or library.
- Students are able to use various methods to solve decision support problems appropriately

Course Name
Decision Support System

Code: IS184942	Credits: 3	Elective Course

Affective : • Students are able to negotiate methods for problem solutions, prove and report that these methods are proven to be able and appropriate to solve problems

Course Materials

- Decision Making and Decision Support System,
- Decision Making Concept,
- Identify Simon's Model,
- Identification of DSS Components,
- Implementation of Fuzzy Logic Theory for DSS,
- Implementation of Knowledge Management for DSS,
- Implementation of the Decision Tree for DSS,
- Implementation of a Rule-based system for DSS,
- Implementation of Process Mining and Forecasting for DSS,
- Implementation of Optimization and Metaheuristics Algorithms for DSS,
- Implementation of Data and Text Mining for DSS

Main References

1. Turban, Aronson, and Liang. Decision Support Systems and Intelligent Systems, Seventh Edition
2. Paul Browne, JBoss Drools Business Rules
3. Michael Rovatsos, Lecture Notes Professor of Knowledge Management from Edinburgh University, Concept of Knowledge Management and Knowledge Management in Information Technology.

Additional References

1.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Final Project

Lecturer

Contact Person: Dr. Retno Aulia Vinarti, S.Kom., M.Kom.
Lecturer :
Dr. Retno Aulia Vinarti, S.Kom., M.Kom.

	Matakuliah **Data Mining**		
	Code: IS184943	CREDIT: 3	Elective

Course Description

Data mining is a process used to extract and identify useful information and related knowledge from various large databases. This process finds meaningful information from a new correlation, existing patterns and trends by sorting large data which is then stored in a repository using various techniques. This course provides the ability to take advantage of the main principles and techniques used in extracting data from an algorithmic and business perspective. For this reason, in addition to lectures, lectures, and class discussions, this course also uses learning methods in the form of practical implementation of several data mining techniques. The course matter of this course includes data and its exploration, classification, cluster analysis, anomaly detection, association analysis, and text mining.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness

General Skills :
- Apply logic & math for solving business problem
- Take advantage of statistics to help find business solutions
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise
- Able to show independent, quality & measurable performance
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Have innovative IT ideas as a solution to actual problems

Knowledge :
- Have knowledge of best practice IT process management related to meeting business needs
- Having knowledge about IT service optimization & automation with the best technology for organizations
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitive :
- Students are able to explain the basic understanding, motivation and challenges, the origins of data mining, data mining tasks

Matakuliah
Data Mining

Code: IS184943	CREDIT: 3	Elective

		• Students are able to explain data types, data quality, data preprocessing, measurement of similarity and dissimilarity • Students are able to present summary statistics, visualization, and analysis of mutidimensional data • Students are able to identify classification methods and problems
Psychomotor	:	• Students are able to use several data mining techniques
Affective	:	• Students are able to report the use of several data mining techniques

Course Materials

- **Overview:** basic understanding, motivation and challenges, the origin of data mining, data mining tasks
- **Data:** data types, data quality, data preprocessing, similarity and dissimilarity measurements
- **Data exploration:** summary statistics, visualization, and analysis of multi-dimensional data
- **Classification:** general approach to solving classification problems, decision tree induction, overfitting models, classification performance evaluation, methods for comparing various classifiers, rule-based classifiers, nearest-neighbor algorithm-based classifiers, Bayesian classifiers, neural network-based classifiers, support vector machines (SVM), ensemble methods, class imbalance problems
- **Cluster analysis:** introduction, K-means, agglomerative hierarchy clustering, density based clustering algorithm, prototype based clustering algorithm, cluster evaluation
- **Anomaly detection:** introductory, statistical based approach, density based outlier detection, cluster based techniques
- **Association analysis:** problem definition, frequent itemset generation, rule generation, representation of frequent itemsets, alternative methods for generating frequent itemsets, FP-Growth algorithm, evaluation of association patterns, handling of categorical and continuous attributes, handling of hierarchical concepts, sequential patterns
- **Text mining**: information extraction, information retrieval, topic tracing, text categorization, text clustering, concept linkages, text summaries

Main References

1. Pan-Ning Tan, Michel Steinbach, dan Vipin Kumar, "Introduction to Data Mining", Pearson, Adison Wesley, 2006

Additional References

1. Yanchang Zao, "R and Data Mining: Examples and Case Studies", Published by Elsevier, 2013 (e-book)
2. Luis Torgo, "Data Mining with R: Learning with Case Studies", CRC Press, 2011 (e-book)

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination

- Final Examination

Lecturer

Contact Person: Prof. Dr. Ir. Arif Djunaidy, M.Sc.
Lecturer :
Prof. Dr. Ir. Arif Djunaidy, M.Sc.

Course Name

Combinatoric & Heuristic Optimization

Code	Credits: 3	Optional
Code: IS184944		

Course Description

In this course, students will learn to solve combinatoric optimization problems using an approximation algorithm / non-deterministic algorithm. The combinatoric optimization problems studied include Boolean Satisfiability Problem, Bin Packing Problem, Traveling Salesman Problem (TSP), Vehicle Routing Problem (VRP), and Timetabling & Scheduling Problem. Meanwhile, the algorithm studied includes hill-climbing, meta-heuristics: taboo search, neighborhood search-based algorithm: simulated annealing, great deluge, iterated local search; population-based algorithms: genetic algorithm, ant colony; hyper-heuristics.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Have knowledge in organization management, IT process and artifact for business continuity

Course Learning Outcomes

Spesific Skills :
- Develop & implement IS in organizations based on best practice to improve performance & provide organizational competitiveness

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values in accordance with their field of expertise

Knowledge :
- Have knowledge about optimization & automation of IT services with the best technology for the organization

Specific Learning Outcome

Cognitive :
- Able to explain computationally combinatoric optimization problems
- Able to explain the complexity of combinatoric optimization problems
- Able to identify the right approximation algorithm / heuristics according to the complexity of the optimization problem
- Able to analyze the performance of the approximation algorithm / heuristics.

Psycomotor :
- Able to apply the approximation algorithm in the programming language to solve combinatoric optimization problems

Affektive :
- Able to think logically and computationally

Course Materials

- **Combinatoric Optimization Problems**: Boolean Satisfiability Problem, Bin Packing Problem, Travelling Salesman Problem (TSP), Vehicle Routing Problem (VRP), and Timetabling & Scheduling Problem.
- **Multi Purpose Optimization, Computability.**
- **Approximate Algorithm**
- **Heuristics and Meta-heuristics Methods:** Hill climbing, meta-heuristics: tabu search, neigbourhood search based algorithm: simulated annealing, great deluge, iterated local search; population-based algorithms: genetic algorithm, ant colony.
- **Hyper-heuristics Mehods**

	Course Name **Combinatoric & Heuristic Optimization**		
	Code Code: IS184944	Credits: 3	Optional

Main References

1. Burke, Edmund K., and Graham Kendall. Search methodologies. Springer Science+ Business Media, Incorporated, 2005.

Additional References

1. Papadimitriou, C.H. and Steiglitz, K. Combinatorial optimization: algorithms and complexity. Courier Corporation. 1998.

WorkLoad

- Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
- Private study: 3 x 60 =180 minutes (3 hours) per week.
- Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Coursework Assesment 1, 2, 3, 4, 5
- Computing Assesment 1, 2, 3, 4, 5, 6
- Mid-term examination
- Final project

Lecturer

Contact Person: Ahmad Muklason, S.Kom., M.Sc., Ph.D.
Lecturer :
Ahmad Muklason, S.Kom., M.Sc., Ph.D.
Raras Tyasnurita, S.Kom., M.BA, Ph.D.

Course Name

Supply Chain Management

Code: IS184945	Credits: 3	Elective

Course Description

To increase competitive advantage in today's business environment, organizations cannot only judge by the organization itself, but must consider and cooperate with other organizations in supply chain network. Supply chain network management involves the flow of materials, information and money and thus requires a variety of approaches. The ability of all supply chain flows at various levels, namely strategic, tactical and operational by utilizing the latest information technology, is the key to organizational excellence. This course will provide students with knowledge about the main processes of supply chain management and management of information flow in the supply chain with the latest IS / IT to improve supply chain performance. For this reason, the learning methods used are lectures, discussions, presentations, supply chain problem solving and project-based assignments to solve real supply chain problems. This course matter will focus on the concept of supply chain management; supply chain management business processes, the role of information, as well as information technology and systems in supporting supply chains & management experience in identifying problems as well as IT components in solving problems in real supply chains.

Program Learning Outcomes

- Use an IT solution and its alternatives that improve business performance & competitiveness
- Plan an improvement of the quality of business & IT integration that deliver competitiveness to the organization
- Use basic of logic & mathematics, statistics, physics, chemistry to solve various business problems
- Demonstrate intrapersonal & interpersonal skills in business environment
- Produce scientific papers & IT entrepreneurship that can solve actual problems
- Recognize basic concept of managing IT organizations, processes & artifacts for business continuity
- Recognize basic knowledge of business & IT
- Demonstrate all of the expertise for the nation & country
- Demonstrate the spirit of entrepreneurship in accordance with his expertise

Course Learning Outcomes

Specific Skills :
- Align IT & Business that contributes to the organization in a maximum & measurable manner
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Exploring needs & designing system integrations that enhance organizational competitiveness
- Integrate data & transform it into information that is used to improve organizational competitiveness..

General Skills :
- Apply logic & math for solving business problem;
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;

		• Able to be responsible for the achievement of group work results & supervise & evaluate the completion of work assigned to workers who are under their responsibility; • Able to implement information & communication technology in the context of the implementation of their work; • Having innovative IT ideas as a solution to actual problems • Understand research methods & writing procedures in making scientific papers & IT entrepreneurship • Compile a scientific description of the results of the above study in the form of a thesis or final project report, and upload it on the college page;
Knowledge		• Having knowledge about optimization & automation of IT services with the best technology for organizations • Have knowledge of current & future business environment (including management, organization, functions, business processes) • Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)
Attitude	:	• Work together and have social sensitivity and care for the community and the environment; • Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitive	:	• Able to explain the basic concepts of SCM • Able to map common business processes in SCM • Able to apply demand management methods • Able to apply the aggregate planning method • Able to apply inventory management methods • Able to describe logistic processes and order fulfillment • Able to describe the role of information in the supply chain • Able to analyze real supply chain problems and propose appropriate IS / IT solutions
Psychomotor	:	• Able to explain the basic concepts of SCM • Able to map common business processes in SCM • Able to apply demand management methods • Able to apply the aggregate planning method • Able to apply inventory management methods • Able to describe logistic processes and order fulfillment • Able to describe the role of information in the supply chain • Able to analyze real supply chain problems and propose appropriate IS / IT solutions
Affective	:	• Students are able & willing to behave honestly • Students are able & willing to actively communicate • Students are able & willing to comply with the prevailing rules & regulations • Students are able & willing to act responsibly

Course Materials

Course Name
Supply Chain Management

Code: IS184945	Credits: 3	Elective

- Basic concepts of supply chain management: definition of supply chain and supply chain management, drivers, flow in the supply chain, supply chain activities;
- Common business processes in supply chain management: scope, general business processes, Supply Chain Operations Reference (SCOR);
- Demand management process: The role of demand management and forecasting, Forecasting Characteristics, Data types and forecast types, Time series forecasting, demand management instruments;
- Aggregate planning process: Hierarchy of operational planning process, Aggregate planner with level and chase strategy, Available-to-promise, Inventory dependent and independent demand, Effect of demand management on aggregate plan;
- Inventory management process: The type of inventory in the company, costs, risk and value of inventory, Classification of inventory (ABC Classification), Measures of inventory management performance, Simple model for determining inventory levels (EOQ, ROP), inventory level taking into account seller costs buyer;
- Logistics and order fulfillment processes: Determining customer service objectives from the logistics point of view, planning and selecting transportation, order fulfillment processes, warehousing management, planning logistic networks, developing logistic strategies, considerations in order fulfillment and logistics;
- Information management in the supply chain: The role of information in supply chain management, information distortion, causes, ways to reduce, measure information distortion;
- Information technology and systems to support supply chain management: information technology in the supply chain, IT infrastructure, IT components in the supply chain, IT development issues for the supply chain.

Main References

1. Pujawan, N., dan ER, Mahendrawathi, 2017, *Supply Chain Management: Edisi III*, Andi Offset
2. Chopra, Sunil., & Meindl, Peter., 2007, *Supply Chain Management: Strategy, Planning and Operation*, Prentice-Hall.
3. Simchi-Levi, David, Kaminsky, P., and Simchi-levi, E., 2003, *Designing and Managing the Supply Chain: Concepts, Strategy, and Case Studies*, Second Edition, McGraw-Hill.
4. Laudon, K and Laudon, J. P., *Management Information Systems: Managing the Digital Firm 15th Ed*, Prentice-Hall.
5. Croxton, K. L., Garcia-Dastugue, S., Lambert, D.M., Rogers, D.S., (2001), *The Supply Chain Management Processes*, International Journal of Logistics Management, Vol. 12, No. 2.
6. Wisner, J. D. and Stanley, L. L. (2008), *Process Management: Creating Value along the Supply Chain*, Thomson Higher Education.

Additional References

1. Supply Chain Operations Reference Model Version 10.0, The Supply Chain Council, 2010.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Mahendrawathi Er. S.T., M.Sc., Ph.D
Lecturer :
Mahendrawathi Er. S.T., M.Sc., Ph.D
Ika Nurkasanah, S.Kom., M.Sc.

Course Name

Customer Relationship Management

Code: IS184946	Credits: 3	Elective

Course Description

Customer relationship management answers customer management needs by using information technology tools. In the era of social media like now, customer management is very important. New and old companies continue to appear offering goods and services. That is why customer management is very important to win the competition outside of product and service development. This course discusses various aspects of customer relationship management, including: business processes in customer relationship management, customer relationship management in marketing, customer relationship management in customer service, sales force automation, analytical customer relationship management, and management of customer relationship programs.

Program Learning Outcomes

- Demonstrate intrapersonal & interpersonal skills in business environment
- Produce scientific papers & IT entrepreneurship that can solve actual problems
- Recognize basic concept of managing IT organizations, processes & artifacts for business continuity
- Recognize basic knowledge of business & IT
- Demonstrate all of the expertise for the nation & country
- Demonstrate the spirit of entrepreneurship in accordance with his expertise

Course Learning Outcomes

General Skills :
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to be responsible for the achievement of group work results & supervise & evaluate the completion of work assigned to workers who are under their responsibility
- Able to implement information & communication technology in the context of the implementation of their work
- Have innovative IT ideas as a solution to actual problems
- Understand research methods & writing procedures in making scientific papers & IT entrepreneurship
- Compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;

Knowledge :
- Have knowledge about optimization and automation of IT services with the best technology for organizations
- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Work together and have social sensitivity and care for the community and the environment;
- Work together to be able to make the most of their potential .

Specific Learning Outcome

Cognitive :
- Able to explain the basic concepts of customer relationship management

- Able to diagram common business processes in customer relationship management ;
- Able to describe the stages of identification, differentiation, interaction and customization in customer relationship management
- Able to analyze customer relationship management initiatives in marketing
- Able to analyze customer relationship management initiatives in customer service
- Able to classify sales force automation software
- Able to adapt analytical approach to customer relationship management in real cases
- Able to compare various collaboration initiatives with customers
- Able to nominate various customer relationship management tools
- Able to describe the stages of managing a customer relationship management program

Psychomotor :

- Able to identify customer relationship management business processes in real cases
- Able to demonstrate analytical customer relationship management solutions in real cases
- Able to design appropriate customer relationship management tools in real cases
- Able to demonstrate a customer relationship management program in real cases

Affective :

- Able to report on customer relationship management business processes in real cases orally and in writing
- Able to report the execution of customer relationship management programs in real cases
- Able to report analytical customer relationship management solutions in writing and orally
- Able to report on appropriate customer relationship management tools in writing and orally

Course Materials

- Basic concept of customer relationship management
- General business processes in customer relationship management
- Identification, Differentiation, Interaction and Customization
- Customer relationship management in marketing
- Customer relationship management in customer service
- Sales Force Automation
- Customer relationship management analytics
- Collaboration with customers via social media, blogs, wikis
- Choose a customer relationship management tool
- Manage customer relationship management programs

Main References

1. Peppers, D and Rogers, M., 2017, Managing Customer Relationships: A Strategic Framework, Wiley.

Additional References

1. Dyche, J., 2016, The CRM Handbook, Addison-Wesley.
2. Greenber, P., 2008., CRM at the Speed of Light, Fourth Edition: Social CRM 2.0 Strategies, Tools, and Techniques for Engaging Your Customers, McGraw-Hill

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Arif Wibisono, S.Kom., M.Sc
Lecturer :
Arif Wibisono, S.Kom., M.Sc

Course

Model Driven DSS

Code: IS184947	Credit: 3	Optional

Course Description

Model-Based Decision Support Systems focus on access to manipulating simulation models whose outputs can be used as a basis for decision making. Model-Based Decision Support Systems use data and parameters provided by decision makers to assist decision makers in analyzing several situations required in decision making. Simulation is done as a technique for conducting several experiments that test the various outputs that are generated from the model. Simulation models can help in projecting future system conditions to improve the performance of the system being explored. Model-based Decision Support Systems provide managers with simulation models and analytical skills that can be used during the decision-making process. Comprehensive and accurate analysis is required in decision making. Decision makers need to understand analysis and modeling tools. Building several types of models requires systems understanding skills as a basis for building models. This course provides provisions in conducting system analysis, model development, model simulation, model validation, and development of several scenarios to select alternatives in decision making. The selection of alternatives is based on a scenario that can produce optimal benefits, with minimal costs and risks. The scenario model output can be used as input in the development of a decision support system. Furthermore, this course can produce a simulation model that can increase effectiveness and efficiency in decision making so that it can provide provisions for prospective graduate students in conducting supervision, managerial, and competence in competition in the world of work.

Program Learning Outcomes

- Implement various alternative IT solutions that are compromised in order to increase business performance and competitiveness
- Implement logic and math, statistics, physics, chemistry to solve business problems
- Produce works, scientific works and IT entrepreneurship that are able to solve actual problems
- Have knowledge of business, organization & IT management details to produce superior scientific or entrepreneurial work in the IT field that is competitive in the national / global market
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :
- Align IT and Business that contribute to the organization in a maximum and measurable way
- Managing various resources to achieve safe, quality, fast and affordable IT solutions

General Skills :
- Apply logic & math for solving business problems
- Use statistics to help find business solutions
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis

Knowledge :
- Have knowledge of business, organization and IT management details to produce superior scientific or entrepreneurial work in the IT field that is competitive in the national / global market

Attitude :
- Able and willing to dedicate all of his expertise with integrity, entrepreneurial spirit and societal ethics in accordance with the times

- Demonstrate an attitude of responsibility for work in their field of expertise independently

Specific Learning Outcome

Cognitive :
- Students are able to understand the concept of system modeling
- Students are able to understand the framework for developing simulation models
- Students are able to understand the internal and external environment that affects decision making
- Students are able to understand various alternatives in decision making
- Students are able to apply simulation models in increasing the effectiveness and efficiency of decision making

Psychomotor :
- Students are able to develop simulation models
- Students are able to do model validation
- Students are able to identify various alternatives in decision making
- Students are able to develop several scenarios for decision making
- Students are able to develop model-based decision support systems
- Students are able to develop decision support systems effectively and efficiently

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with applicable rules & regulations
- Students are able & willing to behave responsibly

Course Materials

- **Basics of modeling and simulation:** Model making process, Definition of simulation, Benefits of simulation, Process of working on simulation, Strengths and weaknesses of simulation models, Classification of simulation models
- **The basic concept of the simulation system:** Simulation model basic structure, Simulation steps
- Modeling decision situation: Dynamic system simulation models: Characteristics of Dynamic System Models, Stages of Dynamic System Model Development, Dynamic System Model Variables, Dynamic System Model Flow Diagrams, Examples of Dynamic System Models, Ventana Simulation
- **Project Dynamics:** Application of dynamic system simulation models in various fields;
- **Model Validation:** Basic Concepts of Validation; Types of Validation, Validation Steps, Percentage of Error Rate (E1), Percentage of Error Variance (E2);
- **Model Scenario:** Structural scenario and parameter scenario, Sensitivity analysis; Decision analysis model, Performance of decision alternatives, Prediction model;
- **Model Implementation Plan**: Selection of alternative scenarios to increase the effectiveness and efficiency of decision making

Main References

1. **Suryani, E.,** Pemodelan dan Simulasi**, Graha Ilmu**, 2005.
2. **Sterman, J. D**., Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000.
3. **Barlas**, **Y**.,Multiple tests for validation of system dynamics type of simulation models, European Journal of Operational Research 42 (1989) pp. 59-87.
4. **Hague, P,** Forecasting & Scenario Planning, B2B International, 2010.

5. **D. J. Power**, 2001, Building Model-Driven Decision Support Systems
6. **Ptolemaeus**, C., 2014, System Design, Modelling, and Simulation

Additional References

1. **Daniel J. Power**, 2002, Decision Support Systems, Greenwood Publishing Group
2. Systems simulation articles and journals
3. Decision support systems articles and journals

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Prof. Erma Suryani, S.T., M.T., Ph.D
Lecturer :
Prof. Erma Suryani, S.T., M.T., Ph.D

Matakuliah

Bisnis Digital

Code: IS184948	CREDIT: 3	Elective

Course Description

Organizations cannot escape the fact that digital technology has changed traditional business models. Digital technology offers both advantages and challenges for organizations. Therefore, organizations must understand how to take advantage of the opportunities that digital technology offers to support their operations, while at the same time addressing the challenges and changes brought about by digitalization. This course will provide students with knowledge of digital business concepts and experiences to analyze online markets and create digital business strategies. For this reason, the learning methods used are lectures, discussions, case studies, project-based assignments to implement digital business. This course material will focus on digital business concepts as well as electronic commerce, online markets, digital business environments and strategic process models that are right for digital businesses.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business and IT integration in organizations
- Have intrapersonal and interpersonal skills
- Produce works, scientific works, & IT entrepreneurship that are able to solve actual problems
- Have knowledge in organization management, IT process and artifact for business continuity
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Specific Skills :
- Align IT & Business that contributes to the organization in a maximum & measurable manner
- Develop & implement IS based on appropriate methodology to improve performance & provide organizational competitiveness
- Exploring the needs & designing system integrations that increase organizational competitiveness

General Skills :
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to be responsible for the achievement of group work & supervise & evaluate the completion of work assigned to workers who are under their responsibility
- Able to implement information & communication technology in the context of the implementation of their work
- Compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page

Knowledge :
- Having knowledge about optimization & automation of IT services with the best technology for organizations
- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Attitude :
- Work together and have social sensitivity and care for the community and the environment
- Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitive :
- Able to describe digital business concepts and electronic commerce
- Able to analyze online marketplaces
- Students are able to identify and assess various elements in the macro environment of the organization that influence digital business and marketing strategies
- Able to apply the right strategy process model for digital business
- Able to explain the concept of system integration
- Able to describe the evolution of system integration
- Be able to explain the concept of data integration
- Able to understand the concept of business process change

Psychomotor :
- Make an online market analysis
- Create a digital business strategy
- Able to plan system integration projects
- Able to configure EAI tools

Affective :
- Students are able & willing to behave honestly
- Students are able & willing to behave communicatively
- Students are able & willing to comply with applicable rules & regulations
- Students are able & willing to behave responsibly

Course Materials

- **Basic Concepts of e-Business and e-Commerce:** coverage of digital business and electronic markets, reasons for adoption and non-adoption of mobile business, challenges of managing digital businesses
- **Marketplace analysis for e-commerce:** online market analysis, the main business model in the online market, evaluation of models and income from digital business
- **E-environment:** macro environmental elements, legal constraints, provocation and ethics, the role of macro factors (economy, government digital business policies, taxation, law)
- **Business Digital Strategy**: digital business strategy process models, tools for developing and selecting digital business strategies, strategic approaches to achieve digital business
- **Introduction about system integration:** what is application integration, Level in service integration, Type of integration project, Application integration tools, Understanding failure in integration
- **SOA:** basic concepts of SOA, Remote Procedure Call (RPC), Distributed objects and application servers, Web services, SOAP, WSDL, UDDI, Web Services Implementation

Main References

1. Chaffey, D., 2015, Digital Business and e-Commerce Management: Strategy, Implementation and Practice, Pearson Education Limited.
2. Manouvrier, Bernard and Menard, Laurent (2007), *Application Integration: EAI, B2B, BPM, and SOA*, John Wiley & Sons, Inc.

3. Roshen, Waseem (2009), *SOA-Based Enterprise Integration: A Step-by-Step Guide to Services-Based Application Integration*, McGraw-Hill Companies

Additional References

1.

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom

Matakuliah

Digital Creative

Code: IS184949	CREDIT: 3	Elective

Course Description

Many do not imagine that established traditional businesses will be replaced by digital businesses. The development of the digital business is so fast, it is expanding to meet the needs of all sectors of human life. This course will challenge students to have ideas and innovate to make digital products that can answer the needs of some people. For this reason, the material to be studied in this course includes audience introduction, brand strategy, process & conceptualizing ideas, elements of digital products, changing the environment with product design, designing product contents, creating & spreading messages. The learning method for this course uses inquiry, contextual, problem solving, and projects with learning activities in the form of discussions, problem-solving, guest lectures, and exhibitions. At the end of the lesson, students are expected to have a digital product innovation portfolio that is needed by the community.

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Produce works, scientific works & IT entrepreneurship that are able to provide actual solutions to problems
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

General Skills :

- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values by their field of expertise;
- Able to show independent, quality & measurable performance;
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Able to develop themselves & compete at national and international levels;
- Able to implement information & communication technology in the context of the implementation of their work;
- Able to apply entrepreneurship & understand technology-based entrepreneurship.
- Have innovative IT ideas as a solution to actual problems
- Creating works, scientific works &/or IT entrepreneurship that provides design solutions to actual problems

Knowledge :

- Have knowledge of current & future business environment (including management, organization, functions, business processes)
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)

Matakuliah

Digital Creative

Code: IS184949	CREDIT: 3	Elective

Attitude :
- Contributing to improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila;
- Acting as citizens who are proud and love the country, have nationalism and a sense of responsibility to the state and nation;
- Respect the diversity of cultures, views, religions, and beliefs, as well as the original opinions or findings of others
- Cooperate and have social sensitivity and concern for the community and the environment;
- Internalizing academic values, norms, and ethics;
- Demonstrate an attitude of responsibility for work in their field of expertise independently
- Internalizing the spirit of independence, struggle, and entrepreneurship;
- Try your best to achieve perfect results;
- Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitif :
- Understand the elements of digital products
- Interpret market needs
- Detail the advantages & disadvantages of digital product innovation
- Presents the concept of digital product innovation

Psikomotor :
- Designing digital product innovations
- Sharpen the excellence of digital product innovation

Afektif :
- Build teams and maintain team motivation
- Delivers digital product ideas

Course Materials

- Recognizing the audience,
- Brand Strategy,
- Process & conceptualize ideas,
- The elements of a good digital product,
- Changing the environment with product design,
- Designing product contents,
- Create & share messages,
- Presenting the results of product innovation;
- Develop and maintain team motivation

Main References

1. Adam Harrell, Creative Direction in a Digital World: A Guide to Being a Modern Creative Director, CRC Press 2017
2. Paul Wyatt, The Digital Creative's Survival Guide: Everything You Need for a Successful Career in Web, App, Multimedia and Broadcast Design, 2013

Additional References

1.

Matakuliah

Digital Creative

Code: IS184949	CREDIT: 3	Elective

WorkLoad

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2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom

Lecturer :

Ir. Achmad Holil Noor Ali, M.Kom

Course Name

Digital Marketing

Code: IS184950	Credits: 3	Elective

Course Description

Since the rapid development of digital world, it provides a lot of alternative way of marketing massive products through the internet, Facebook, YouTube, or other social media. This alternative becomes business actors' favorite because it is cheap, fast and relatively right on the target audience. This course invites students to plan digital marketing strategies and practice them in business to customer and business to business. This course material is an introduction to digital marketing; online marketplace micro & macro environment; digital marketing strategy: the influence of digital media & technology on the marketing mix; relationship marketing with digital platforms; provide experiences to online customers; planning campaigns in digital media; marketing communications using digital media channels; evaluate & improve digital channel performance. The learning methods of this course are in the form of expository, inquiry, contextual, problem solving and cooperation with discussion learning activities, problem solving, guest lectures and practice for marketing products digitally. At the end of the lesson, students have a portfolio of various digital marketing designs.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Have intrapersonal and interpersonal skills
- Producing works, scientific works & IT entrepreneurship that are able to provide actual solutions to problems
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics

Course Learning Outcomes

Specific Skills :

- Able to plan investment & acquisition of IT solutions that are viable fot the organizations to enhance organization's competitiveness;
- Able to develop & implement IS in organizations based on best practiceto enhance performance & gives organization's competitiveness.

General Skills :

- Able to apply logical, critical, systematic and innovative thinking in the expertise field;
- Able to exhibit independent, high quality and measured works to organizations and peers;
- Able to examine the implication of knowledge implementation to humanity within the expertise field based on scientific principles, procedures & ethics in order to produce solutions, ideas, designs or art criticism;
- Able to make decision to solve problems within the expertise field based on information & data analysis;
- Able to Implement the principle of sustainability in developing knowledg
- Able to implement IT & communication in the context of the implementation of the work;
- Able to implement entrepreneurship & understand digital based enterpreneurship
- Have innovative IT ideas as a solution to actual problems
- Create scientific work & entrepreneurial IT that provides design solutions to actual problems

Course Name
Digital Marketing

Code: IS184950	Credits: 3	Elective

Knowledge :
- Have business knowledge (including management, organization, functions, business processes) of current & future organizations

Attitude :
- Contribute to improving the quality of life based on Pancasila
- Act as a citizen who is proud and love the homeland as the responsibility of the nation & state;
- Respect the diversity of cultures, point of views, religions beliefs, opinions or other original findings;
- Socially sensitive & care for the environment by working with the community;
- Internalizing values, norms, & academic ethics in life;
- Demonstrate independence & responsibility for their work;
- Internalizing the spirit of independence and enterprenuership;
- Strive for perfect results; and
- Collaborate with others to take advantage of existing potential.

Specific Learning Outcome

Cognitive :
- Students able to understand micro and macro online marketplace environment
- Students able to express how digital marketing works
- Students able to understand the intimacy of digital customer
- Students able to design digital marketing channel
- Students able to project digital marketing performance

Psychomotor :
- Students able to arrange digital marketing strategic plan
- Students able to demonstrate digital marketing for B2B or B2C business

Affective :
- Students able to question the form of relationships with customer in digital platform
- Students able to compromise activities and digital marketing channel
- Students able to propose digital marketing strategic plan
- Students able to measure digital marketing performance

Course Materials

- **Fundamental digital Marketing**: Introduction of Digital Marketing; Micro & Macro Marketplace Environments;
- **Build Digital Strategy Marketing**: Digital Strategy Marketing; Media & Digital Technology Impact on Mix Marketing; Marketing Relationship with Digital Platform;
- **Practice & Impementation on Digital Marketing**: Gives experience to Online Customers; Campaign planning on digital media; Marketing communication using digital media channel; Evaluation & improvement on digital channel performance; Business to customer digital marketing practice; business to business digital marketing practice

Main References

1. Dave Chaffey, Fiona Ellis-Chadwick, Digital Marketing 6th Edition, Person, United Kingdom, 2016
2. Damian Ryan, Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, CPI Group, 2014

Additional References

1. Ryan Deiss, Russ Henneberry, Digital Marketing For Dummies (For Dummies (Business & Personal Finance)), 2017

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom

Matakuliah

Digital Brand Management

Code: IS184951	CREDIT: 3	Elective

Course Description

With the rapid advancement of Information and Communication Technology, internet adoption has increased sharply and has now become an integral part of life. Social media based on images, audio, and video not only revolutionizes the way individuals interact but also revolutionizes the business environment in various parts of the world. It cannot be denied that digital media is a real challenge for all types of organizations to be able to win competitions in the millennial era. This course aims to provide students with an understanding of digital media and digital branding, their perspectives, and tools and strategies for companies to succeed in the digital era. For this reason, the learning method used is the discussion, case resolution, observation, and practice which is done independently or in groups. This course material focuses on the concepts, tools, strategies, and measurements of digital branding media. It is hoped that an understanding of the digital world and branding will be a provision for students to succeed in their future careers, both as entrepreneurs and as an integral part of a company.

Program Learning Outcomes

- Have intrapersonal and interpersonal skills
- Producing works, scientific works & IT entrepreneurship that are able to provide actual solutions to problems
- Have knowledge in business and IT
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

General Skills :
- Able to apply logical, critical, systematic, & innovative thinking in the context of developing or implementing science & technology that pays attention to & applies humanities values in accordance with their field of expertise;
- Able to show independent, quality & measurable performance;
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism;
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis;
- Able to develop themselves & compete at national and international levels;
- Able to implement the principles of sustainability (sustainability) in developing knowledge;
- Able to implement information & communication technology in the context of the implementation of their work;
- Able to apply entrepreneurship & understand technology-based entrepreneurship.
- Creating works, scientific work & / or IT entrepreneurship that provides design solutions to actual problems

Knowledge :
- Have knowledge of current & future business environment (including management, organization, functions, business processes)

Matakuliah

Digital Brand Management

Code: IS184951	CREDIT: 3	Elective

Attitude :
- Have knowledge of current & future IT environment (including processes, organizations, applications, infrastructure, IT people, data)
- Contributing to improving the quality of life in society, nation, state, and advancement of civilization based on Pancasila;
- Acting as citizens who are proud and love the country, have nationalism and a sense of responsibility to the state and nation;
- Respect the diversity of cultures, views, religions, and beliefs, as well as the original opinions or findings of others
- Cooperate and have social sensitivity and concern for the community and the environment;
- Internalizing academic values, norms, and ethics;
- Demonstrate an attitude of responsibility for work in their field of expertise independently
- Internalizing the spirit of independence, struggle, and entrepreneurship;
- Try your best to achieve perfect results;
- Working together to be able to make the most of their potential

Specific Learning Outcome

Cognitif :
- Students can understand the concept of digital branding and its perspectives
- Students can understand various types of digital toolkits
- Students can understand digital branding strategies and measurements
- Students can understand digital branding measurement

Psikomotor :
- Students can plan digital branding for various cases
- Students can operate various digital toolkits
- Students can execute digital branding strategies according to the relevant toolkit
- Students can measure the achievement of digital branding execution

Afektif :
- Students are willing and able to behave honestly
- Students are willing and able to behave communicatively
- Students are willing and able to behave responsibly
- Students are willing and able to comply with applicable rules and regulations

Course Materials

- Point of view in digital branding: What does digital branding mean? Focus on values, remember user habits, purpose, and validity;
- Branding Toolkit: Social media, search, mobile, online advertising, email marketing, auto marketing, Transmedia campaigns;
- Digital branding strategy & measurement: digital branding measurement, the main indicator of branding, the role of analysis, bridging differences

Main References

1. Daniel Rowles, Digital Branding: A Complete Step-by-Step Guide to Strategy, Tactics and Measurement, CPI Group, 2017
2. Ahava Leibtag, The Digital Crown: Winning at Content on the Web, Elsevier, 2014
3. Ian Cocoran, The Art of Digital Branding, 2007

Additional References

1. Robert Jones, Branding: A Very Short Introduction (Very Short Introductions), Oxford University Press 2017

WorkLoad

1. Lectures: 3 x 50 = 150 minutes (2.5 hours) per week.
2. Private study: 3 x 60 =180 minutes (3 hours) per week.
3. Assignment: 3 x 60 = 180 minutes (3 hours) per week.

Examination :

- Quiz
- Mid-term examination
- Final Examination

Lecturer

Contact Person: Ir. Achmad Holil Noor Ali, M.Kom
Lecturer :
Ir. Achmad Holil Noor Ali, M.Kom

	Matakuliah **Internship**		
	Code: IS184952, IS184953, IS184954, IS184955	Credit: 3,6,9, 12	Elective

Course Description

This course aims to apply critical, constructive and analytical skills and provide real work experience. Including combining competence and communication, professionalism, and career. This course is expected to be able to provide an overview of the challenges and steps that must be taken to achieve a career as expected. At the time of carrying out this course students will complete assignments / projects armed with experience and background knowledge and academic skills that they have professionally and intellectually.

Program Learning Outcomes

- Implement IT solution alternatives that are compromised so that business performance and competitiveness increase
- Enhance the quality of business & IT integration that gives the organization competitiveness
- Have intrapersonal and interpersonal skills
- Produce IT based scientific and entrepreneurship products to solve actual problems
- Apply expertise to the nation and country with integrity and ethics
- Able and willing to internalize entrepreneurial spirit that suitable with the expertise in the current era

Course Learning Outcomes

Specific Skills :
- Aligning TI & Business that provides maximum & measurable contribution to the organization
- Manage various resources to realize IT solutions that are safe, high quality, fast & affordable
- Implement a more effective & efficient business process cycle (including organizational behavior / culture, business models, business processes, business functions, business strategy) to increase business performance & competitiveness

General Skills :
- Able to show independent, quality & measurable performance
- Able to study the implications of the development or implementation of science technology that pays attention to & applies humanities values according to their expertise based on scientific principles, procedures & ethics to produce solutions, ideas, designs, or art criticism
- Able to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information & data analysis
- Able to maintain and develop networks with mentors, colleagues, peers both inside and outside the institution
- Able to documenting, storing, securing, & recovering data to ensure validity and prevent plagiarism
- Able to develop themselves & compete at national and international levels
- Compile a scientific description of the results of the above study in the form of a thesis or final project report, and upload it on the college page

Attitude :
- Demonstrate an attitude of responsibility for work in their field of expertise independently

	Matakuliah **Internship**		
	Code: IS184952, IS184953, IS184954, IS184955	Credit: 3,6,9, 12	Elective

- Work together to be able to make the most of its potential

Specific Learning Outcome

Psychomotor : • Students are able to do practical field work

Course Materials

Following company needs

Main References

1. Internship Guide, ITS Information System
2. Practical Work Guidelines, ITS Information Systems

Additional References

1.