CURRICULUM & SYLLABUS

MASTER OF INFORMATION SYSTEMS

Prepared by:

Master of Information Systems Curriculum Team

2018

2018 Curriculum

Course Structure

Master of Information Systems

	Semester 1	Credits
IS185101	Information Systems and Technology Infrastructure	3
IS185102	Systems Development and Implementation	3
IS185103	Information Systems Management and Operation	3
IS185104	Data and Information Management	2
	Total	11

No	Semester 2	Credits
IS185201	Research Method	2
IS185202	Information Systems Strategic Management	3
IS1859xx	Elective 1	3
	Total	9

No	Semester 3	Credits
IS185301	Seminar/Proposal	3
IS1859xx	Elective 2	3
IS1859xx	Elective 3	2
	Total	8

No	Semester 4	Credits
IS185401	Thesis	8
	Total	8

Code	Elective Courses	SKS
IS185901	Topics in e-Government & SmartCity Management	3
IS185902	Topics in Information Systems Audit and Governance	3
IS185903	Topics in Information Systems and Technology Investment and Productivity	3
IS185904	Topics in Database Technology	3
IS185905	Topics in Data Integration	3
IS185906	Topics in Semantic Web	3
IS185907	Topics in Data Mining and Business Analytics	3
IS185908	Topics in Optimization and Management Science	3
IS185909	Topics in Decision Support Systems	3
IS185910	Topics in Modelling and Simulation Systems	3
IS185911	Topics in System Dynamics and Its Application in Various Fields	3
IS185912	Topics in Enterprise Systems	3
IS185913	Topics in Corporate Information Technology Architecture	3
IS185914	Topics in System & Network Security	3
IS185915	Topics in Embedded Systems Development	3

Course

Information Systems and Technology Infrastructure

Code: IS185101	CREDIT: 3	Semester: 1

Course Description

In the current era, computers and communication technology have penetrated offices and homes. Organization distributes technology responsibilities to all levels of management and various geographical locations. This means all managers, from supervisors to CEOs, will have to deal with information technology in their daily lives. Organizations will have opportunities to be more efficient and competitive. Thus it is necessary to equip students so they can play an active role in developing the system, which will affect the productivity and competitiveness of their organizations. The course materials will include an introduction to IT infrastructure; including computers, architectural systems and communication networks. Emphasis is given to services and capabilities that are possible with IT infrastructure solutions and business continuity.

Expected Learning Outcome

Graduates will be able to:

- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.
- Design integrated communication networks; Specify requirements for large-scale network solutions, design an implementation architecture for organizational data processing and system solutions, using both internal hardware resources and external service

Course Learning Outcome

Specific Skills :
- Design and implement architecture for content management systems
- Designing, building and maintaining enterprise architecture
- Able to manage
- Able to explore needs & design
- Able to integrate data & transform it

General Skills :
- Able to describe how IT supports the implementation of business activities
- Develop an information architecture for organizations
- Develop an information certainty strategy

Knowledge :
- Has a current and future knowledge of the business environment (including management, organization, functions, business processes)
- Has knowledge on IT environment (including processes, organizations, applications, infrastructure, people IT, data) now and in the future
- Able to explain the components of the IT infrastructure

Specific Learning Outcome

Cognitive :
-

Psychomotor :
-

Affective :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Course Subjects

- Assess the role of IT infrastructure in modern organizations

- Analyzing the importance of Networking: WAN, and Mobile Technologies in a modern business
- Evaluate approaches to regulate workplace storage
- Check the best practices and the latest trends in the data center
- Formulate a comprehensive corporate approach to secure IT infrastructure
- Support management of the IT infrastructure of the organization through the use of IT
- Control and service management framework (COBIT, ITIL, etc.)
- Making high-level plans to ensure business continuity
- Compare and contract current trends such as Grid computing, Cloud computing, and
- Software as a Service (SaaS) with traditional architecture
- Analysis and management of system performance
- Managing the planning and purchasing of IT infrastructure and technology services
- Understand analysis and management of system performance
- Analyze the planning and purchasing of IT infrastructure and technology services

Main References

1. Turban, E. & Volonino, L. (2011). Information technology for management. Improving strategic and operational performance. Hoboken, NJ. Wiley Publishing. ISBN: 978-0470-91680-3
2. Henry C. Lucas, Jr., Information Technology for Management, 2009

Additional References

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Aris Tjahyanto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Systems Development and Implementation

Code: IS185102	CREDIT: 3	Semester: 1

Course Description

Although software developers have sufficient experience, many of them are still trying to improve understanding on how to document and manage the requirements of their products. Software project success are determined by the accuracy and completeness of user in defining the requirement and understanding and ability in managing requirement change. This course will provide an experience to understand the ways and methods of best practice in defining and documenting software requirements, generating designs of existing requirements, implementing and managing system releases. Students are expected to be able to document software requirements in accordance with existing software project problems in accordance with the best practice guidelines in the process and implement them. The learning method employed is by providing projects in groups to understand business requirements and realize the requirements of the right software according to these best practices. Students can produce documentation of requirements and software design and management of software releases. Students are also able to understand well the latest research in the field of Management development and application of software systems.

Expected Learning Outcome

- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.
- Apply sustainable approaches for IT solutions development, IT procurement, IT operations, IT resources management, and other IT practices; Ensure safety and avoid health hazards for contract arrangements with external parties; Ensure that privacy and integrity guide all IT practices; Interpret and comply with legislative requirements.
- identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.
- Integrate iterative processes consisting of analysis, design, implementation, and operations, develop and deploy IT applications that satisfy user needs.
- Understand concept and methods systems implementation and the deployment of systems to organizational use.
- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions

Course Learning Outcome

Specific Skills :

- Develop and implement organizational information management policies and processes
- Maintain compliance with laws, regulations and standards
- Ensuring protection of privacy and integrity guiding all SI practices
- Monitor the technology environment
- Analyze and document domain activity
- Monitoring emerging technologies to understand the potential of its support for the domain

Knowledge :
- Determine and document system requirements
- Manage planning, hybrid and agile-based development processes
- Know the system development life cycle
- Capture and structure data and information with the right conceptual modeling techniques

Specific Learning Outcome

Cognitive :
- Analyze business objectives and processes
- Analyze users and identify the user class of software
- Select product champion of each user class
- Analyze user requirement and transforms into functional requirement
- Able to analyze system requirements into system design.
- Able to implement system design into the Code program
- Able to manage software releases

Psychomotor :
- Make documentation of software requirements

Affective :
- Shows the results of analyzing user requirements to become functional requirements and documentation
- Propose and make documentation regarding the latest topics regarding the development of software requirements management, software development and design and software implementation

Course Subjects

1. Introduction to software requirement specification: Identify users, Define Vision & Scope, Understand User Needs, Derive Functional Requirements, Analyze & Verify Requirement, Manage Requirement Changes
2. OOAD Concepts and UML diagrams: object technology, Object-Oriented Analysis and Design.
3. BOOM: Steps of BOOM, Analyzing End-to-End Business Processes.
4. Software analysis and design using 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.
5. Tool UML: star UML and demo using small study case.
6. Basic of sofware construction: introduction to software construction, Methaphors in software development, Prerequisites, design process, symplicity, bug security, ease of understanding, change readiness, and design in construction.
7. UML diagram to program code translation: Overview of UML for Java Programmers, Working with Diagrams, Class Diagram, Sequence Diagram, Use Case, OOD, Packages, Object Diagram, dan state machine, and reverse engieering.
8. Design Pattern: Delegation , Interface, Adapter, Singleton, Visitor, Observer, Template method, Abstract factory, and Decorator.
9. Software testing: Test-Case Design, Module (Unit) Testing, Higher-Order Testing, Usability (User) Testing, and Debugging.
10. Software implementation process: software implementation planning; software implementation execution; software implementation evaluation and control.
11. Software implementation for software package: planning, execution, evaluation and control.
12. Requirement management, design and implementation in enhanced software development

- Agile Software Development
- eXtreme Programming

Main References

1. **Karl Wiegers**, Software Requirements, Microsoft Press; 3 edition, 2013
2. Rambaugh, J., M. Blaha, W., Object Oriented Modeling and Design, Prentice-Hall, 1991. (chapters 3 & 4)
3. **Christine B. Tayntor**, *Successful Packaged Software Implementation*, Auerback Publications

Additional References

1. The Software Engineering Body of Knowledge (SWEBOK) V3, IEEE Computer Society (IEEE) (Knowledge Area 1)
2. Craig Larman, Applying UML and patterns, Prentice-Hall, Englewood Cliffs, NJ, 1998

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Faisal Mahananto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Information Systems Management and Operation

Code: IS185103	CREDIT: 3	Semester: 1

Course Description

This course teaches students competencies to manage the development and operational processes of Information System systems and services from the planning stage to continuous improvement.

Expected Learning Outcome

Graduates will be able to:

- Implement concepts and methods to develop and implement long-term plans for designing, delivering, and using organizational information
- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy.
- Apply concepts and methods to develop, maintain, and consistently improve organization performance while providing appropriate information systems, services, and infrastructure.
- Apply professional management skills to design and manage an effective IS, ensure operational efficiency and effectiveness in service delivery, govern IS project management principles and manage information systems use.

Course Learning Outcome

Specific Skills	:	• Able to make IT project plans • Able to use IT project management tools • Able to produce product documents related to IT Service Management
General Skills	:	• Able to describe organization's business activities that use IT • Able to explain the structure of business activities within the organization • Able to explain the components of business processes • Able to describe how IT supports the implementation of business activities • Able to develop business sustainability concepts • Able to formulate IT solutions to support business objectives • Able to manage IT services
Knowledge	:	• Able to explain the life cycle of IT services • Able to explain IT Service Management processes • Able to explain the concepts and methods of IT Project Management
Attitude	:	• Uphold human values in carrying out tasks based on religion, morals, and ethics; • Obey the law and discipline in community and state life; • Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Kognitif	:	• Students are able to understand theoretical concepts and IT project management methods • Students are able to understand concepts, processes, activities, functions, and products in IT service management.
Psychomotor	:	• Students are able to make IT project management plans

- Students are able to make IT Service Management products

Affective :

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

Course Subjects

- Concepts, Frameworks & IT Service Management Standards
- IT Service Life Cycle
- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement
- Project Management Concepts
- IT Project Management Methodology
- IT Project Management Team
- Activities for each Phase of IT Project Management

Main References

1. Tony Dwi Susanto, Sukses Mengelola Layanan Teknologi Informasi & Kiat Lulus Ujian Sertifikasi ITIL Foundation, AISINDO, 2017
2. Jan Van Bon et.al., Foundation of IT Service Management based on ITIL V3, Van Haren Publishing,2007
3. Robb A, Effective IT Service Management, Springer Verlag, 2007
4. ITIL For Dummies, Peter Farenden, 2012
5. Kathy Schwalbe, Information Technology Project Management, Cengage Learning, 2016.

Additional References

1. Jurnal – Jurnal internasional dan artikel terkait “IT Service Management” dan “IT Management Project”.
2. The Project Management Body of Knowledge (PMBOK), PMP, 2017.
3. The ITIL 2011 Series Books, the Office of Government Commerce (OGC).

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Tony D. Susanto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Data and Information Management

Code: IS185104	CREDIT: 3	Semester: 1

Course Description

Upon completion of the course, graduates are expected to contribute effectively in the process that can improve organization's capability to achieve its goal through effective use of data, both structured and unstructured as well as information.

Expected Learning Outcome

- Implementing concepts and method to process structured and unstructured data and information in a process that can improve organization capability to achieve its goals.
- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions.
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.

Course Learning Outcome

Specific Skills :
- Capture and structurize data and information with the right conceptual modelling techniques.
- Develop logical level representation based on conceptual model.
- Implementing database solution to serve systems with multiple applications.
- Effectively use data manipulation and contemporary retrieval language.
- Choosing the right data management technology based on domain needs.
- Securing domain data and protecting user privacy and organizational intellectual property rights.
- Making scalable infrastructure for large amounts of data using parallel and distributed technology.
- Integrate and prepare captured data from various sources for analytical purposes.

Knowledge :
- Understand the basics of relational, object-oriented and distributed database systems, including: data models, database architecture, and database manipulation.
- Master theories and techniques in developing database applications and being able to demonstrate the ability to build databases using DBMS (Access, MySql, etc.).

Attitude :
- Able to work together to make the most of their potential.
- Internalizing academic values, norms and ethics

Specific Learning Outcome

Cognitive :
- Students are able to explain the concept of data and information; life cycle of data and information management.
- Students are able to explain the latest state-of-the-art in data and information management technology.

Course

Data and Information Management

Code: IS185104	CREDIT: 3	Semester: 1

Psychomotor :	• Students are able to choose data and information management technology that is appropriate for the needs of the organization. • Students are able to apply the rules & laws that apply to the project • Capable of capturing and structuring data and information needs using appropriate conceptual data models. • Able to build logical data models from conceptual data models. • Able to implement database solutions for systems consisting of a number of applications. • Able to use manipulation and retrieval language effectively.
Affective :	• Students are capable & willing to behave honestly • Students are capable & willing to behave communicatively • Students are able & willing to comply with applicable rules & regulations • Students are capable & willing to behave responsibly

Course Subjects

1. Database System Concepts and Architecture: Strengths of database management systems, Data Models, Architecture
2. Conceptual Data Model: Entity Relational Diagram (ERD) Model, Enhanced Entity Relational Diagram (EERD) model.
3. Logical Data Model: Relational Data Model, Basic SQL: data definition language (DDL), data manipulation language (DML); Advanced SQL: Complex queries, Indexes, Constraints and Triggers, Transactions, Views, Authorization, Recursion in SQL.
4. Database Programming: Manipulating Data With Python.
5. Database Design and Theories: Normalization, Boycodd
6. Emerging Technologies in Data Management and Content Management: Distributed Databases, NOSQL Systems, Big Data

Main References

1. Elmasri, Ramez, and Shamkant B. Navathe. **Fundamentals of database systems**. 7th Edition. Pearson, 2016.

Additional References

1. **Ramakrishnan, R. and Gehrke, J., 2000. Database management systems. McGraw Hill.**

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Achmad Muklason Lecturer	Apol Pribadi Subriadi Course Director	Aris Tjahyanto Head of Department

Course

Research Methodology

Code: IS185201	CREDIT: 3	Semester: 2

Course Description

This course provides guideline for students to conduct research using relevant research methods in information systems. Students will learn principles in quantitative and qualitative research to gain deeper understanding on: reviewing the literature, observing phenomena, extracting and processing data, formulating results, as well as how to contribute in developing science and knowledge. One of the main goal of this course is to ensure students can write thesis proposal and conduct scientific research.

Expected Learning Outcome

Graduates will be able to:

- Describes and applies the right type of information systems research method including quantitative, qualitative, action research, modelling, statistical analysis in different research such as diffusion, development and use of information technology as well as the use of information and management.
- Applies the right method to conduct research and write scientific works in the form of research proposal, thesis and scientific publication.

Course Learning Outcome

Specific Skills :
- Able to design a research in the field of information systems.
- Able to creatively develop qualitative and quantitative research.
- Able to conduct a research both independently and as a team.
- Able to provide solution alternatives for problems related to research topics
- Leadership attitude both as a leader or member of a research team.

General Skills :
- Able to design and conduct information system research
- Able to write a Thesis proposal, and complete it on time

Knowledge :
- Have the knowledge about information systems research methods and scientific developments in the field from time to time.
- Have adequate knowledge to avoid plagiarism and master other academic research rules.
- Able to improve the capacity of learning independently
- Able to document and apply research results in order to utilize them for scientific publication

Attitude :
- Uphold the value of humanity in conducting research based on religion, morals, and ethics;
- Obey the law and discipline in social life and state;
- Shows responsibility and independence for the work in the field of his expertise;

Specific Learning Outcome

Kognitif :
- Ability to explain the concepts and principles of information systems research
- Able to determine research methods that are appropriate to the research problem
- Able to conduct Quantitative research
- Able to conduct Qualitative research
- Able to conduct Mix Methods research (Qualitative and Quantitative)

Psychomotor :
- Able to provide solutions related to relevant research methods for a research plan
- Able to make a research roadmap and communicate it
- Able to write papers related to chosen research topic

Affective :
- Able & willing to behave honestly and against plagiarism.
- Able & willing to behave according to academic ethics
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course Subjects

- Introduction: Information systems research methods
- Research principles
- Basic Research, theory and measurement
- Defining research problems
- Preparing research
- Experiments and experimental Design
- Survey and questionnaire
- Probability and sampling
- Working with structured Data
- Data recoding for analysis
- Univariate analysis
- Univariate statistics and central tendency
- Bivariate Statistics: correlation and t-standardized test
- Chi-Square: analyzing nominal data
- Linear regression
- Structural Equation Modeling (SEM)
- SEM software
- Understanding qualitative research
  - Types of qualitative research
  - Components of the research process
  - Sampling and "Corpus Construction"
  - Propositions: major and minor
  - Qualitative research analysis
  - Writing Qualitative Research
  - Interview Techniques
  - Evaluating Qualitative Research
  - Qualitative Research Generalization
- Writing ethics

Main References

1. Bernard, Russell H. Social Research Methods: Qualitative and Quantitative Approaches.
2. John Lofland and Lyn Lofland, Analyzing Social Settings: A Guide to Qualitative Observation and Analysis, 4th edition
3. John W. Creswell, Qualitative Inquiry & Research Design, Choosing Among Five Approaches, Sage Publication

Course
Research Methodology

Code: IS185201	CREDIT: 3	Semester: 2

Additional References

1. Scientific articles related to research method

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Apol Pribadi Subriadi Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Information Systems Strategic Management

Code: IS185202	CREDIT: 3	Semester: 2

Course Description

Information Systems Strategic Management include competencies that enable graduates to have the ability to formulate Information Systems strategic policy policies that support an organization's business strategy, through the use of tools and analysis techniques for developing Information Systems (SI) strategic plans.

Expected Learning Outcome

Graduates will be able to:

- Implement concepts and methods to develop and implement long-term plans for designing, delivering, and using organizational information systems to achieve strategic domain goals and objectives.
- Analyze the effect and impact of IS on industries, firms, and institutions; create and manage the oversight mechanisms by which an organization evaluates, directs, and monitors organizational IT and establish practices for minimizing environmental impacts and planning for long-term firm viability.
- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy
- Apply sustainable approaches for IT solutions development, IT procurement, IT operations, IT resources management, and other IT practices; Ensure safety and avoid health hazards for contract arrangements with external parties; Ensure that privacy and integrity guide all IT practices; Interpret and comply with legislative requirements.

Course Learning Outcome

Specific Skills :
- Able to carry out strategic analysis of IS
- Able to manage IS / IT procurement strategies
- Able to carry out IS strategic planning
- Able to plan and implement IS governance
- Able to plan and improve sustainability

General Skills :
- Able to describe business activities of organizations that use IT
- Able to explain the structure of business activities within the organization
- Able to explain the components of business processes
- Able to describe how IT supports the implementation of business activities
- Able to develop business sustainability concepts

Knowledge :
- Have knowledge about information technology systems and services
- Have Knowledge about information infrastructure

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Kognitif :
- Students are able to understand theoretical concepts and methods for formulating strategic management of information systems

Course

Information Systems Strategic Management

Code: IS185202	CREDIT: 3	Semester: 2

	• Students are able to understand the information system strategy framework • Students are able to understand the internal and external environments that influence the formulation of strategic information management systems • Students are able to plan and implement strategic information management systems
Psychomotor :	• Students are able to carry out strategic analysis of IS • Students are able to make IS strategic planning • Students are able to align systems and information technology towards the organization's business strategy • Students are able to develop the concept of developing IT solutions • Students are able to manage information system development strategiessi
Affective :	• Students are capable & willing to behave honestly • Students are capable & willing to behave communicatively • Students are able & willing to comply with applicable rules & regulations • Students are capable & willing to behave responsibly

Course Subjects

The Role of Information Systems from a strategic point of view: Understanding and initial SI models, IS Strategies. The concept of business strategy and its implications for the IS strategy: Strategic planning frameworks, processes, techniques and business planning tools. Exploration of International Journal related to strategic management of IS: journal resumes, reviews of journal content, research that can be developed from explored journals. Development of effective IS strategies: Problems and limitations, IS / IT strategy framework and approach. Analysis of the IS strategy: Techniques for interpreting and analyzing the current situation, Evaluating Gap between existing and IS requirements, Value chain analysis, Information systems and value chains, Determining the organization's competitive strategy. Determination of company IS strategies: Strategic planning techniques and their relationships, How IS can influence strategy. Management of application portfolios: Classification of application portfolios, management strategies and their application to the application portfolio. Organizing and availability of IS resources; The strategy of organizing IS management, Increasing the contribution of IS functions. Investment management IS: Determination of investment policies and priorities, Investment risk assessment and management.

Main References

1. John Ward, Strategic Planning for Information Systems, John-Wiley, 2002
2. Anita Cassidy, A Practical Guide to Information Systems Strategic Planning, Second Edition 2nd Edition, 2006.
3. Clive Finkelstein, An Introduction to Information Engineering: From Strategic Planning to Information Systems, 2014.
4. Joe Peppard and John Ward, The Strategic Management of Information Systems: Building a Digital Strategy, 2016.

Additional References

1. International journals and articles related to "IS / IT Strategy and Policy".

2. Tozer, Edwin. Strategic IS/IT Planning, Butterworth-heinemann 1996

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Erma Suryani Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Seminar / Thesis Proposal

Code: IS185301	CREDIT: 2	Semester: 3

Course Description

The Seminar / Thesis Proposal Course will provide knowledge or experience to students to be able to produce a thesis proposal and publish it into a seminar or journal. The resulting scientific work is primarily the result of structured literature review on the state-of-the-art of the students research topic and be integrated with current research issues. This course will provide a very strong foundation for students to be able to complete the Thesis research

Expected Learning Outcome

- Describes and applies the right type of information systems research method including quantitative, qualitative, action research, modelling, statistical analysis in different research such as diffusion, development and use of information technology as well as the use of information and management.
- Applies the right method to conduct research and write scientific works in the form of research proposal, thesis and scientific publication.

Course Learning Outcome

Specific Skills : Able to design, perform, write, and publish a literature review, as well as design and publish a research proposal.

General Skills : Able to conduct a literature review and write scientific paper.

Knowledge : Have knowledge to formulate problems in the community through research

Attitude :
- Uphold the value of humanity in conducting research based on religion, morals, and ethics;
- Anti plagiarism
- Obey the law and discipline in social life and state;
- Shows responsibility and independence for the work in the field of his expertise;

Specific Learning Outcome

Kognitif :
- Students are able to make literature review, identify problems in the community, formulate them into a research plan, and publish them.

Psychomotor :
- Students are able to present research ideas or proposals
- Students are able to organize research plan either individually or in groups

Affective :
- Able & willing to behave honestly and against plagiarism.
- Able & willing to behave according to academic ethics.
- Able & willing to comply with applicable laws & regulations.
- Able & willing to behave responsibly.

Course Subjects

Write a thesis proposal, present in thesis Exam / seminar, conducting research, writing thesis, and defend it in final thesis examination

Main References

1.

Course

Seminar / Thesis Proposal

Code: IS185301	CREDIT: 2	Semester: 3

Additional References

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Apol Pribadi Subriadi Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Thesis

Code: IS185401	CREDIT: 3	Semester: 2

Course Description

Thesis course is the final task of magister students in the form of scientific work. This course provides students with expertise and experience to conduct a series of research activities according to good academic principles, which is original and free from plagiarism. Thesis works should be published into a scientific seminar or into research journals.

Expected Learning Outcome

- Describes and applies the right type of information systems research method including quantitative, qualitative, action research, modelling, statistical analysis in different research such as diffusion, development and use of information technology as well as the use of information and management.
- Applies the right method to conduct research and write scientific works in the form of research proposal, thesis and scientific publication.

Course Learning Outcome

Specific Skills : Able to design, perform, write, and publish a scientific research

General Skills :
- Able to do research and write it in a report
- Able to write the results of research into scientific reports and papers

Knowledge : Have knowledge to formulate problems in the community through research

Attitude :
- Uphold the value of humanity in conducting research based on religion, morals, and ethics;
- Anti plagiarism
- Obey the law and discipline in social life and state;
- Shows responsibility and independence for the work in the field of his expertise;

Course Learning Outcome

Cognitive : Students are able to see problems in society, formulate them into a research, design research methods, carry out research, and write them into a scientific work.

Psychomotor :
- Students are able to present research ideas or proposals
- Students are able to organize research plans either individually or in groups

Affective :
- Able & willing to behave honestly and against plagiarism.
- Able & willing to behave communicatively
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course Subjects

Write a thesis proposal, present in thesis Exam / seminar, conducting research, writing thesis, and defend it in final thesis examination

Main References

Additional References

	Course **Thesis**		
	Code: IS185401	CREDIT: 3	Semester: 2

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Apol Pribadi Subriadi Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in E-Government dan Smart City Management

Code: IS185901	CREDIT: 3	Semester: 2/3

Course Description

Manajemen e-Government dan Smart City mencakup kompetensi yang memungkinkan lulusan memiliki kemampuan memahami factor-faktor pendorong (*drivers*) dan mengelola factor-faktor penentu keberhasilan (*enablers*) kesuksesan e-Government dan Smart City, serta menemukan potensi-potensi penelitian topik e-government dan Smart City.

Expected Learning Outcome

Graduates will be able to:

- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy
- Implementation of concept and environmentally and socially sustainable IT solutions that are aligned with the responsibilities of organizations as well as in compliance with legislative and regulatory requirements and industry standards.
- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.
- Apply concepts and methods to develop, maintain, and consistently improve organization performance while providing appropriate information systems, services, and infrastructure.
- Implement concepts and methods to develop and implement long-term plans for designing, delivering, and using organizational information.
- Mampu menjelaskan komponen-komponen infrastruktur TI.
- Developing policy and standard for business continuity, information assurance, planning and implementing risk management, trust, security and safety, as well as disaster recovery and information protection.
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.
- Merancang dan mengimplementasikan arsitektur untuk sistem manajemen konten.
- Menggunakan arsitektur enterprise untuk mempengaruhi proyek peningkatan organisasi yang terkait dengan sistem informasi.
- identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.
- Apply professional management skills to design and manage an effective IS, ensure operational efficiency and effectiveness in service delivery, govern IS project management principles and manage information systems use.
- Analyze the effect and impact of IS on industries, firms, and institutions; create and manage the oversight mechanisms by which an organization evaluates, directs, and monitors organizational IT and establish practices for minimizing environmental impacts and planning for long-term firm viability.

- Design integrated communication networks; Specify requirements for large-scale network solutions, design an implementation architecture for organizational data processing and system solutions, using both internal hardware resources and external service so

Course Learning Outcome

Specific Skills :
- Able to create e-Government and Smart City Masterplan
- Able to conduct literature studies on e-Government and Smart City studies and find Knowledge Gap as a potential thesis

General Skills :
- Able to describe business activities of organizations that use IT
- Able to explain the structure of business activities within the organization
- Able to explain the components of business processes
- Able to describe how IT supports the implementation of business activities
- Able to develop business sustainability concepts
- Able to recommend IT solutions for improving business processes of public organizations and city management.

Knowledge :
- Able to explain the city's anatomy and the city's development process
- Able to explain the understanding and domain of Smart City
- Able to explain internal government processes and *Government Resource Planning* (GRP) technology

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Cognitive :
- Students are able to explain the framework, standards, concepts, methods, and tools for e-Government and Smart City management
- Students are able to explain various types of business processes and e-Government technology
- Students are able to explain various concepts and technological innovations supporting e-government and Smart City.
- Students are able to explain enablers and drivers for successful e-Government and Smart City management.
- Students are able to explain and analyze various existing and most appropriate research methods for the topic of Smart City and e-government

Psychomotor :
- Able to analyse e-Government Enterprise Architecture
- Able to analyse Enterprise Architecture of Smart City.
- Able to write a literature review on the potential research in e-Government and Smart City.

Affective :
- Able & willing to behave honestly and against plagiarism.
- Able & willing to behave communicatively
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course

Topics in E-Government dan Smart City Management

Code: IS185901	CREDIT: 3	Semester: 2/3

Course Subjects

- Definition, Concept, Motivation, Objectives of e-Government & Smart City
- Enterprise Architecture & e-Government & Smart City domains
- e-Government & Smart City Problems / Constraints
- e-Government & Smart City Masterplan
- Government Business Processes & Government Resource Planning (GRP)
- City anatomy & City development process
- Technology innovation for various dimensions of Smart City
- Project Management & Management of Change in e-Government
- Leasons learned: cases of success & failure of e-Government & Smart City in Indonesia and in the world
- e-Government & Smart City Research: existing vs. Knowledge Gaps

Main References

1. Anthony Alexander, Alisha Nguyen, Living in Smart Cities – Innovation & Sustainability, World Scientific Publishing Co., 2018.
2. Lazar Rusu & Guinluigi Viscusi, Information Technology Governance in Public Organizations: Theory and Practice, Springer, 2017.
3. Darrel M. West, Digital Government, Princeton University Press, 2005.

Additional References

1. Arpan Kumar Kar and P. Vigneswara Ilavarasan, **Digital Nations – Smart Cities, Innovation, & Sustainability**, Springer, 2017.
2. **Jurnal – Jurnal internasional dan artikel** terkait “Smart City” dan “e-Government”.

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Date: …….	Date: …….	Date: …….
Tony D. Susanto Lecturer	Apol Pribadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Information Systems Audit and Governance

Code: IS185902	CREDIT: 3	Semester: 2/3

Course Description

Information System Audit and Governance includes competencies that enable graduates to have the ability to direct, design, implement, monitor and evaluate (audit) systems and information technology in organizations, and find potential research topics on IS governance and auditing.

Expected Learning Outcome

Graduates will be able to:

- Implementing audit, business continuity and information systems assurance concepts and methods.
- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy.
- Apply concepts and methods to develop, maintain, and consistently improve organization performance while providing appropriate information systems, services, and infrastructure.
- Implement concepts and methods to develop and implement long-term plans for designing, delivering, and using organizational information.
- Understand concept and methods systems implementation and the deployment of systems to organizational use.
- Developing policy and standard for business continuity, information assurance, planning and implementing risk management, trust, security and safety, as well as disaster recovery and information protection.
- Identifying and applying a formal approach to EA development, performing the multistage process of developing an EA, identifying the EA change needs, and applying them to the EA.
- identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.
- Apply professional management skills to design and manage an effective IS, ensure operational efficiency and effectiveness in service delivery, govern IS project management principles and manage information systems use.
- Analyze the effect and impact of IS on industries, firms, and institutions; create and manage the oversight mechanisms by which an organization evaluates, directs, and monitors organizational IT and establish practices for minimizing environmental impacts and planning for long-term firm viability.

Course Learning Outcome

Specific Skills	:	• Able to explain activities, tools, and concepts in the Evaluation, Direct, Monitoring process for IT management. • Able to conduct a literature study of IS Governance and Audit studies and find Knowledge Gap as a potential thesis.
General Skills	:	• Able to describe business activities of organizations that use IT • Able to explain the structure of business activities within the organization • Able to explain the components of business processes • Able to describe how IT supports the implementation of business activities • Able to develop business sustainability concepts

- Able to ensure the success of the strategy and implementation of IT in supporting the achievement of organizational goals.
- Able to carry out evaluations and continuous improvement of organizational IS/IT

Knowledge :
- Able to explain the framework, standards, concepts and domains of IT Governance
- Able to explain the concepts and methods of IT-business strategic alignment.
- Able to explain the concepts and methods of IT Value Realization
- Able to explain risk optimization concepts and methods.
- Able to explain the resource optimization concepts and methods.
- Able to explain IT audit concepts and methods

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate responsible attitude for work in his area of expertise independently

Specific Learning Outcome

Kognitif :
- Able to explain the framework, standards, concepts, methods, and tools to implement IT Governance processes
- Able to explain enablers and drivers for successful IT governance.
- Explain the IS audit methods and tools.
- Able to explain and analyze various existing and most appropriate research methods for the topic of IT Governance and Audit.

Psychomotor :
- Able to map Stakeholder needs, Organizational Goals, IT Objectives, Processes, Activities, to IT KPIs.
- Able to carry out IS audit simulations.
- Able to write literature review on the potential research on the topic of IS Governance and Audit.

Affective :
- Able & willing to behave honestly and against plagiarism.
- Able & willing to behave communicatively
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course Subjects

- Concepts, domains, frameworks & standards in IT governance & IT management.
- Enablers & Drivers of IT Governance
- IT-Business Strategic Alignment: Concepts, Methods & Tools
- Realization Benefits: IT Investment Management, Prioritization, IT Performance Evaluation, & IT Service Life Cycle.
- Risk Optimization: Concepts, Frameworks, Standards, Methods & Risk Management Tools
- Resource Optimization: Concepts & Methods of Planning, Procurement, Management, Monitoring, & Evalusation of IT Resources
- IS Audit Methods, Techniques and Components
- IS Governance & Audit Research: existing vs. Knowledge Gaps

Course

Topics in Information Systems Audit and Governance

Code: IS185902	CREDIT: 3	Semester: 2/3

Main References

1. **ISACA,** Certified in the Governance of Enterprise IT (**CGEIT**) Review Manual, ISACA, 2017.
2. **ISACA,** Certified Information Systems Auditor (**CISA**), ISACA, 2017.
3. Gerard Blokdyk, **Corporate governance of information technology**, the Art of Service 2017

Additional References

1. Robert Moeller, **Executive's Guide to IT Governance: Improving Systems Processes with Service Management, COBIT, and ITIL**, Wiley Corporate, 2013.
2. **Jurnal – Jurnal internasional dan artikel** terkait “Tata Kelola SI/TI” dan “Audit SI”.

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Date: …….	Date: …….	Date: …….
Tony D. Susanto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Information Technology Investment and Productivity Management

Code: IS185903	CREDIT: 3	Semester: 2/3

Course Description

Information Technology productivity paradox is a situation where the ratio of cost or efforts (input) incurred is still greater than the benefits or output (output) of the use of information technology (IT). IT investment and productivity studies are important because significant portion of IT spending increases, leading to greater gaps between costs and benefits or between output and inputs. IT spending should be viewed as an investment that needs to be critically scrutinized.

Unlike investments in general, IT investments involve tangible and intangible costs and both directly and indirectly. Therefore, to get the best solution, it is important to IT managers to conduct IT investment and IT productivity analysis which tangible and intangible and intangible costs and benefits. Topics in Investment Management and Information Technology Productivity courses, provide experience and expertise to students to analyze IT investments and productivity using financial, nonfinancial, econometric, or other relevant IT performance measurement methods. Learning method used is literature review, contextual, and final project to the research / Thesis based on Investment Management and IT Productivity.

The Course Subjects focus on IT investment concepts, IT productivity concepts, IT investment performance measurement, IT productivity measurement, financial techniques for IT investments, intangibility, cost-benefit analysis, economic information, balanced score cards, multi factor scoring, benchmarking, productivity functions including econometric, literature review, and journal publication based on literature review. The final assignment of the course is intended to produce a research proposal / thesis in the form of IT investment analysis document and provide the student the capability to answer problem in field of investment and IT productivity.

Expected Learning Outcome

Graduates will be able to:

- Implement concepts and methods to develop and implement long-term plans for designing, delivering, and using organizational information systems to achieve strategic domain goals and objectives
- Analyze the effect and impact of IS on industries, firms, and institutions; create and manage the oversight mechanisms by which an organization evaluates, directs, and monitors organizational IT and establish practices for minimizing environmental impacts and planning for long-term firm viability.

Course Learning Outcome

Specific Skills :

- Capable of aligning IT investment and IT productivity
- Able to plan, manage and coordinate information resources
- Able to manage IT portfolio
- Making financial justifications IS / IT
- Managing the IS / IT procurement strategy
- Engage in strategic planning of IS / IT
- Plan and improve productivity sustainability
- Optimizing the utilization of infrastructure and IS / IT resources
- Manage a set of standards, policies, understand key laws and regulations for IT investment decisions

Course

Topics in Information Technology Investment and Productivity Management

Code: IS185903	CREDIT: 3	Semester: 2/3

General Skills : Have an innovative IT idea as an actual solution to the problem

Knowledge :
- Have Knowledge of current & future business environment (including management, organization, function, business process)
- Have adequate knowledge to master the issues of financial, investment, and IT productivity
- Able to improve the capacity of learning independently
- Able to document and apply research results in order to utilize them

Attitude :
- Uphold the value of humanity in conducting research based on religion, morals, and ethics;
- Obey the law and discipline in social life and state;
- Shows responsibility and independence for the work in the field of his expertise;

Specific Learning Outcome

Cognitive :
- Able to explain the concept of IT investment
- Able to explain the concept of IT productivity
- Able to compare different types and alternatives of IT investments
- Able to adequately calculate IT investment and IT productivity
- Able to provide solutions to avoid IT Productivity Contradictions

Psychomotor :
- Able to provide solutions related to investment issues and IT productivity
- Able to create a structured literature review in investment management and IT productivity
- Able to write papers related to investment management and IT productivity

Affective :
- Able & willing to behave honestly.
- Able & willing to behave communicatively
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course Subjects

- The concept of investment, investment management, and IT investment management
- The concept of IT productivity
- Tangible and intangible calculation methods
- Direct and indirect calculation methods
- Econometric calculation method
- IT Productivity Function
- Selection of investment alternatives to IS / IT solutions
- IS / IT portfolio
- IT Performance Measurement
- Previous literature on IT investment and productivity management

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. Scientific journal articles on IT investment and productivity management

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Apol Pribadi Subriadi Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Database Technology

Code: IS185904	CREDIT: 3	Semester: 2/3

Course Description

Recently the relational database has become the primary choice for data storage, especially in the world of enterprise applications. If you are an architect starting a new project, the only choice is the relational database that will be used.
However, this alternative has never been everywhere. After a long period of domination, the excitement is now about the NoSQL database. In this lecture, we will discuss various NoSQL databases.

Expected Learning Outcome

Graduates will be able to:

- Implementing concepts and method to process structured and unstructured data and information in a process that can improve organization capability to achieve its goals
- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy
- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.
- Apply professional management skills to design and manage an effective IS, ensure operational efficiency and effectiveness in service delivery, govern IS project management principles and manage information systems use.
- Integrate iterative processes consisting of analysis, design, implementation, and operations, develop and deploy IT applications that satisfy user needs.

Course Learning Outcome

Specific Skills :

- Capture and structure data and information with appropriate conceptual modelling techniques
- Develop logical level data representations based on conceptual models
- Implement database solutions to service systems that consist of many applications
- Use effective retrieval data manipulation and language
- Choose the right data management technology based on domain needs
- Secure domain data and protecting user privacy and organizational intellectual property rights
- Make scalable infrastructure for large amounts of data using parallel and distributed technology
- Integrate and prepare captured data from various sources for analytical purposes
- Design and implement architectures for content management systems

General Skills :

- Have innovative IT ideas as solutions to actual problems

Course

Topics in Database Technology

Code: IS185904	CREDIT: 3	Semester: 2/3

Knowledge :
- understand the basics of relational, object-oriented database systems, and distributed including data models, database architecture, and database manipulation
- Theories and techniques in developing database applications and being able to demonstrate the ability to build databases using DBMS (Access, MySql, etc.)
- New developments and trends in the database.
- The complexity of systems and information technology

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Cognitive :
- Students understand the basics of NoSQL (C2)
- Students are able to understand various data storage (C2)
- Students are able to choose the NoSQL (C4) database

Psychomotor :
- Students are able to store data in NOSQL (P2)
- Students are able to design and develop NoSQL architecture (P2)

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

Course Subjects

- Map Reduce
- Key Value Database
- Document Dabase
- Graph Database
- Data Privacy
- Consistency

Main References

1. Pramod J. Sadalage and Martin Fowler. 2012. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence (1st ed.). Addison-Wesley Professional.
2. Ian Robinson, Jim Webber, and Emil Eifrem. 2013. Graph Databases. O'Reilly Media, Inc..
3. SQL on Big Data: Technology, Architecture, and Innovation

Additional References

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Course

Topics in Database Technology

Code: IS185904	CREDIT: 3	Semester: 2/3

Date: …….	Date: …….	Date: …….
Nur Aini Rakhmawati Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Data Integration

Code: IS???08	CREDIT: 3	Semester: 2/3

Course Description

Data integration is one of the main challenges in most IT projects. In a corporate context, data integration problems arise when data from separate sources need to be combined as a basis for new applications. In the context of the Web, data integration techniques are the foundation for utilizing some publicly accessible data sources and are increasingly possible to produce applications such as product comparison portals, location-based mashups, and data search engines.
In this course, students will learn techniques for integrating and cleaning data from an extensive collection of heterogeneous data sources.

Expected Learning Outcome

Graduates will be able to:

- Implementing concepts and method to process structured and unstructured data and information in a process that can improve organization capability to achieve its goals
- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.

Course Learning Outcome

Specific Skills :

- Capture and structure data and information with appropriate conceptual modelling techniques
- Develop logical level data representations based on conceptual models
- Implement database solutions to service systems that consist of many applications
- Use effective retrieval data manipulation and language
- Choose the right data management technology based on domain needs
- Make a scalable infrastructure for large amounts of data using parallel and distributed technology
- Integrate and prepare captured data from various sources for analytical purposes
- Design and implement architectures for content management systems

General Skills :

-

Knowledge :

- understand the basics of relational, object-oriented database systems, and distributed including data models, database architecture, and database manipulation
- Theories and techniques in developing database applications and being able to demonstrate the ability to build databases using DBMS (Access, MySql, etc.)
- New developments and trends in the database.

Attitude :

- Uphold human values in carrying out tasks based on religion, morals, and ethics;

- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Cognitive :
- Students understand understanding data integration architecture (C2)
- Students are able to make data in semantic web form (C2)
- Students understand various data integration algorithms (C2)

Psychomotor :
- Students can integrate data that have different structures (P2)
- Students can choose data integration techniques (P3)

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

Course Subjects

- Heterogeneity and Distributedness
- String Matching
- Schema Matching and Mapping
- Data Matching
- INTEGRATION ARCHITECTURES
- Data Fusion

Main References

1. AnHai Doan, Alon Halevy, and Zachary Ives. 2012. Principles of Data Integration (1st ed.). Morgan Kaufmann Publishers Inc., San Francisco, CA, USA.

Additional References

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Nur Aini Rakhmawati Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Semantic Web

Code: IS???09	CREDIT: 3	Semester: 2/3

Course Description

We are surrounded by data everywhere. By helping us make better decisions, data plays a central role in our daily lives. A growing number of data sources, driven by individuals and organizations, contribute to this flood of data by sharing their data with others. However, data is locked behind proprietary, unreliable, and even unstable programming interfaces that prevent us from using it optimally. Linked data has the potential to revolutionize the way we find, access, integrate and use data; only by the way the World Wide Web has revolutionized the way we consume and connect documents. This course will introduce you to the basic principles and techniques of Linked Data to enable data sharing and reuse on a large scale. Along with an ontology, which is Knowledge representation based on Semantic Web technology, Linked Data functions as the primary building block of newly emerging Web Data.

Expected Learning Outcome

Graduates will be able to:

- Implementing concepts and method to process structured and unstructured data and information in a process that can improve organization capability to achieve its goals
- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.

Course Learning Outcome

Specific Skills	:	• Capture and structure data and information with appropriate conceptual modelling techniques • Develop logical level data representations based on conceptual models • Implement database solutions to service systems that consist of many applications • Use effective retrieval data manipulation and language • Choose the right data management technology based on domain needs • Make a scalable infrastructure for large amounts of data using parallel and distributed technology • Integrate and prepare captured data from various sources for analytical purposes • Design and implement architectures for content management systems
General Skills	:	•
Knowledge	:	• understand the basics of relational, object-oriented database systems, and distributed including data models, database architecture, and database manipulation • Theories and techniques in developing database applications and being able to demonstrate the ability to build databases using DBMS (Access, MySql, etc.)

Attitude :
- New developments and trends in the database.
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate Attitude responsible for work in his area of expertise independently

Specific Learning Outcome

Kognitif :
- Students understand the basics of Semantic Web and Linked Data (C2)
- Students are able to make data in semantic web form (C2)
- Students understand ontology reasoning (C2)

Psychomotor :
- Students are able to use an existing vocabulary (P2)
- Students are able to conduct ontology-based reasoning

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

Course Subjects

- Semantic Web
- RDF
- Ontology
- Query Processing
- Reasoning

Main References

1. Tim Berners-Lee, James Hendler and Ora Lassila. The Semantic Web. Scientific American, 284 (5), pp. 34-43, 2001
2. Pascal Hitzler, Markus Krötzsch and Sebastian Rudolph. Foundations of Semantic Web Technologies. Chapman & Hall/CRC, 2009
3. Antoniou and van Harmelen (2004): A Semantic Web Primer. MIT Press.
4. Heath and Bizer (2011): Linked Data: Evolving the Web into a Global Data Space. Free online version."

Additional References

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Date:	Date:	Date: .....
Nur Aini Rakhmawati Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Data Mining dan Business Analytics

Code: IS185907	CREDIT: 3	Semester: 2/3

Course Description

The rapid development of data collection and data storage technology has led to various organizations and businesses to accumulate large amounts of data. On the other hand, the process for extracting information that is beneficial to the organization has shown a very difficult challenge. Various traditional tools and techniques for analyzing data cannot even be used because of the large size of data available. In this context, the nature of non-traditional data causes traditional techniques cannot be used even though the size of the data being analyzed is relatively small. In some other cases, problems that must be answered cannot be resolved using existing data analysis techniques, and thus new methods need to be developed to solve the problem.

Data mining is the process of finding useful information in a very large size data repository automatically. Data mining techniques are used to explore large databases to find new and useful patterns that were previously very difficult to find. Data mining is a technology that combines traditional data analysis methods with complex algorithms to process data of very large size. Data mining also opens interesting opportunities to explore and analyze new types of data and also to analyze old types of data using a variety of new ways.

Expected Learning Outcome

Graduates will be able to:

- Analyze the needs of an organization and determine how those needs can be best addressed with data, information, and content management solutions.
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.

Course Learning Outcome

Specific Skills	:	• Capturing and structuring data and information with appropriate conceptual modeling techniques • Use data manipulation and contemporary retrieaval language effectively • Choose the right data management technology based on domain needs • Integrate and prepare data obtained from various sources for analytical purposes • Choose and use the right analytical method • Analyzing data using contemporary methods of advanced data processing
General Skills	:	• Able to increase learning capacity independently related to data mining • Able to document, store, secure, and rediscover data from research results related to topics in data mining in order to ensure validity and prevent plagiarism
Knowledge	:	• Able to improve learning capacity independently related to Topics in extracting data from an algorithmic perspective • Able to apply data extracting concepts and algorithms to solve real problems • Able to apply the Knowledge obtained as a basis for conducting related research in the field of data mining
Attitude	:	• Uphold human values in carrying out tasks based on religion, morals, and ethics;

- Obey the law and discipline in community and state life;
- Demonstrate responsible attitude for work in his area of expertise independently

Specific Learning Outcome

Cognitive :
- Able to explain basic data types, data quality, preprocessing data techniques, and measurement of similarity and incompatibility
- Able to explain decision tree based classifiers and several important issues related to classification issues such as overfitting, performance evaluation, and comparison of several classification models
- Able to explain several important classification techniques such as rule-based systems, closest neighbor-based classifiers, Bayesian identifiers, artificial neural networks, support vector machines, and joint classifiers
- Able to explain basic association analyzes such as frequent itemsets, association rules, and several algorithms to generate them
- Able to explain how association analysis can be expanded to obtain sequential patterns
- Able to explain various types of clusters and some clustering techniques
- Able to explain several types of anomaly detection and outlier analysis
- Able to explain some basic techniques related to extracting text data such as topic research, text categorization, sentiment analysis, and text summaries

Psychomotor :
- Able to make a comprehensive literature review in data mining
- Able to write constructive papers in data mining

Affective :
- Able & willing to behave honestly.
- Able & willing to behave communicatively
- Able & willing to comply with applicable laws & regulations
- Able & willing to behave responsibly

Course Subjects

1. Data and preprocess data
2. Predictive modeling
3. Association analysis
4. Clustering
5. Detection of anomalies and outlier analysis
6. Extracting text data

Main References

1. Pang-Ning Tan, Michael Steinbach, and Vipun Kumar, “introduction to Data Mining”, Pearson, Addsion-Wesley, 2006
2. Jiawei Han, Micheline Kamber, and Jian Pei, “Data Mining: Concepts and Techniques”, Third edition, Elsevier, 2016

Additional References

1. Luis Torgo, "*Data Mining with R: Learning with Case Studies*", CRC Press, (*e-book*), 2011.

2. Yanchang Zao, "*R and Data Mining: Examples and Case Studies*", Published by Elsevier, (*e-book*), 2013.
3. Berbagai jurnal internasional yang terkait dengan topik *data mining*, *knowlegde and data engineering*, *text* mining, dan *data science*

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Date: …….	Date: …….	Date: …….
Arif Djunaidy Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Optimization and Management Science

Code: IS185908	CREDIT: 3	Semester: 2/3

Course Description

In this course the students will learn the theory of computational complexity, especially for real-world combinatorial optimization problems. Furthermore, the student will learn the algorithms for solving complex combinatorial optimization using approximation algorithms, e.g. meta-heuristics and hyper-heuristics.

Expected Learning Outcome

- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy.
- Identify, create, and manage organizational policies and processes related to data and information management by balancing multidimensional requirements, such as legal and regulatory requirements, ethical considerations and implications of technology decisions, organizational business requirements, data quality issues, and requirements of operating in an international environment.

Course Learning Outcome

Knowledge :
- Able to identify the complexity of information system and technology.

Skills :
- Able to select and use the right analytical methods.
- Able to analyze data using contemporary advanced methods.

Attitude
- Able to work in team to utilize their ultimate potential.
- Able to internalize values, norm, and academic ethics.

Specific Learning Outcome

Cognitive :
- The students will be able to describe the theoretical background of heuristic approaches for solving complex optimization problems, e.g. local search, evolutionary algorithm and its variants.
- The students will be able to identify the pros and cons of heuristics approaches.
- The students will be able to critically evaluate the quality of heuristics algorithms for solving complex optimization problems.

Psychomotor :
- The students will be able to implement heuristics algorithm into coding or other tools for solving combinatorial optimization problems.
- The students will be able to familiar in using meta-heuristics or hyper-heuristic framework.
- The students will be able to apply their knowledge for solving new optimization problems.

Affective :
- The students will be able to think critically and analytically.

Course Subjects

1. **omputational Complexity Theory**: Computational Complexity, Computability, Computational Algorithm, *Intractable and Undecidable Problems*, Time complexity, NP-Complete problems.
2. **Approximation Algorithms**: Optimization algoritm concepts, Algrorithm performance analysis, Worst-case Analysis.

3. **Heuristic Search for Optimization Problems**: Optimization problem, Linear programming, Integer programming, discrete, continu, and kombinatorial problems, Greedy algorithm and neighbourhood search, meta-heuristics, Evolutionary algorithm.
4. **Meta-heuristics**: Combinatorial optimisation problems, local-search algorithm: simulated annealing, tabu-search, variable neighbourhood search.
5. **Hyper-heuristics**: Fundamental concepts of hyper-heuristics, Selection hyper-heuristics, Generation hyper-heuristic.
6. **Evolutionary Algorithm**: Representation, genetics operators, Selection Techniques, diversification techniques, Contraints handling techniques.
7. **Case Study:** Educational timetabling, Travelling salesman problem.

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.

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Ahmad Muklason Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Decision Support Systems

Code: IS185909	CREDIT: 3	Semester: 2/3

Course Description

Rapid development of information technology shifts how business function work. Information as a basic input of business decision can be managed and processed in a relatively shorter period. It produces faster decision in addressing business problems. Thus the business itself become more competitive and challenging. The consequence is the business who could not provide appropriate information to satisfy their decision making process will face a downturn.
This course will provide an experience for students to understand business needs of information for decision making and how the 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.
Projects are provided for student to analyze some problems and directed to find a solution by recommending the right method to solve the problem. Furthermore, students implement the solution in a prototype system. The course material includes the basis of decision theory, computerized decisions, data analysis problems with certain methods and their implementation.

Expected Learning Outcome

- Integrate iterative processes consisting of analysis, design, implementation, and operations, develop and deploy IT applications that satisfy user needs.
- identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.
- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.

Course Learning Outcome

Specific Skills :
- Identify and choose system design from available implementation alternative design
- Deploy a new system to organization user
- Innovating by utilizing new technology or methodology
- Apply creative problem solving for technological problems

Knowledge :
- Able to describe how IT supports the implementation of business activities

Specific Learning Outcome

Kognitif :
- Able to explain the various of DSS approaches for solving specific problems.
- Able to identify Simon's models and components of DSS

Psychomotor :
- Able to create scenarios and propose supporting factors and their side effects.
- Able to propose and implement solutions for decision support problems and contribute a scientific papers.
- Able to use various methods to solve decision support problems

Affective :
- Able to negotiate methods to solve problems, prove and report that the method is proven to be able and right to solve problems
- Propose and make documentation regarding the latest topics regarding the development of decision support system

Course Subjects

1. Decision Making and Decision Support System,
2. Concept of Decision Making,
3. Identification of Simon's Model,
4. Identification of DSS Components,
5. Implementation of Data Mining for SPK
6. Implementation of predictive analytics for SPK

Main References

1. Turban, Aronson, and Liang. Decision Support Systems and Intelligent Systems, Seventh Edition

Additional References

1. Linda A. Winters-Miner, et.al, Practical Predictive Analytics and Decisioning Systems for Medicine, Elsevier.

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Faizal Mahananto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Modelling and Systems Simulation

Code: IS185910	CREDIT: 3	Semester: 2/3

Course Description

Topics in Modelling and Systems Simulation have competencies that enable graduates to be able to formulate, develop models, and simulate discrete and continuous systems to analyze policies and strategies, in order to manage and improve the organizational performance.

Expected Learning Outcome

Graduates will be able to:

- Explain the concept of IT solutions development
- Explain the design and implementation concepts for the organization's strategic goals
- Able to explain strategic planning
- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.
- Understand concept and methods systems implementation and the deployment of systems to organizational use.
- Identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.

Course Learning Outcome

Specific Skills :
- Able to capture and structure data and information with appropriate conceptual modeling techniques
- Develop and implement organizational information management policies and processes
- Select and implement the analytical methods that are appropriate for model development and systems simulation
- Implement a creative problem solving to technological problems
- Contribute to organizational development and change management

General Skills :
- Able to describe business activities of organizations that utilize IT
- Able to explain the structure of business activities within the organization
- Able to explain the components of business processes

Knowledge :
- Having knowledge in systems and information technology
- Having knowledge in model design concepts and simulations for implementation in order to achieve the organization's strategic goals

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate that attitude is responsible for work in his/her area of expertise independently

Specific Learning Outcome

Kognitif :
- Students are able to understand theoretical concepts and methods for model formulations.

- Students are able to understand the model and simulation development framework
- Students are able to understand the internal and external environments that affect the model formulation
- Students are able to develop models and simulations to improve system performance

Psychomotor :

- Students are able to identify problems in the system
- Students are able to identify significant variables in the system
- Students are able to develop a model
- Students are able to simulate the model
- Students are able to develop model scenarios to improve system performance

Affective :

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

Course Subjects

ntroduction to modeling and simulation; Model Development, Definition of Simulation, Benefits of Simulation, Simulation Development, Strengths and Weaknesses of Simulation Models, Classification of Simulation Models; The Basic Concept of a Systems Simulation; Basic Structure of Simulation Models, Simulation Steps of Development, Examples of Simulation Models; Several Approaches to Modeling; Deterministic System Simulation Model, Stochastic System Simulation Model, Examples of Deterministic and Stochastic Simulation Models, Discrete Change, Continuous Change; Probability Distribution and Statistics of Simulation; The Role of Probability and Statistics Distribution in Simulation, Basic Statistical Concepts, Sampling Distribution, Sample Size, Several Types of Data Distribution; Discrete Simulation Model; Basic Concepts Of Discrete Simulation, Discrete Simulation Components, Examples of Discrete Simulation Models, Arena Simulation; Continuous Simulation Model (System Dynamics); Modelling Steps in System Dynamics, Model Formulation, Characteristics of System Dynamics Models, Examples of System Dynamics Models; System Dynamics as a System Thinking; System Dynamics Variables, Stock and Flow Diagram, Simulation with Dynamo , Ventana Simulation, Project Dynamics. Model Validation; Basic Concept of Validation, Types of Validation, Steps of Validation, Percentage of Error Rate (E1), Percentage of Error Variance (E2); Scenario planning; Basic Concepts of Scenarios, Role of Scenarios in Model Simulation, The Differences between Scenario Planning and Forecasting.

Main References

1. **Erma Suryani**, Pemodelan dan Simulasi, Graha Ilmu, 2005.
2. **Erma Suryani,** System Dynamics Framework, 2012.
3. **John D. Sterman**, Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000.
4. **Vensim User Guide**, 2003
5. **Vensim Modeling Guide**, 2003
6. **W. David Kelton, Randall P. Sadowski, Nancy B. Zupick,** Simulation with Arena, Mc. Graw Hill, 2010.

Additional References

1. International Journals and Articles related to “modelling and simulation”.
2. Hague, P., Forecasting & Scenario Planning, B2B International, 2010
3. Barlas, Y.,Multiple tests for validation of system dynamics type of simulation models, European Journal of Operational Research 42 (1999) pp. 59-87.

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Erma Suryani Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in System Dynamics and Its Application in Various Fields

Code: IS185911	CREDIT: 3	Semester: 2/3

Course Description

Topics in System Dynamics and Its Application in Various Fields have competencies that enable graduates to have the ability to formulate systems, develop complex system models, and simulate complex system dynamics in various fields to obtain the dynamic system behavior, solve various complex system problems, as well as improve the system performance.

Expected Learning Outcome

Graduates will be able to:

- Explain the concept of IT solutions development
- Analyzing the complexity of systems and information technology
- Explain the design and implementation concepts for the organization's strategic goals
- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.
- Understand concept and methods systems implementation and the deployment of systems to organizational use.
- Identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.

Course Learning Outcome

Specific Skills	:	• Develop and implement organizational information management policies and Processes • Select and implement the appropriate analytical methods • Select the appropriate systems development approaches • Plan and improve the system sustainability
General Skills	:	• Able to describe business activities of organizations that utilize IT • Able to explain the structure of business activities within the organization • Able to explain the components of business processes • Able to describe how IT supports the implementation of business activities • Developing the concept of business sustainability
Knowledge	:	• Have knowledge about the complexity of systems and information technology • Have Knowledge about organizational strategic planning • Have Knowledge about managing external system development resources
Attitude	:	• Uphold human values in carrying out tasks based on religion, morals, and ethics; • Obey the law and discipline in community and state life; • Demonstrate attitude responsible for work in his/her area of expertise independently

Specific Learning Outcome

Kognitif	:	• Students are able to understand theoretical concepts and methods for complex system formulations. • Students are able to understand problems in complex systems.

Psychomotor	:	• Students are able to understand the internal and external environments that affect complex system formulations. • Students are able to plan and develop system dynamics models • Students are able to analyze complex systems • Students are able to develop system dynamics models • Students are able to simulate system dynamics models • Students are able to analyze the behavior of complex system models • Students are able to develop scenarios of a complex and dynamic system
Affective	:	• Students are capable & willing to behave honestly • Students are capable & willing to behave communicatively • Students are able & willing to comply with applicable rules & regulations • Students are capable & willing to behave responsibly

Course Subjects

Introduction to modeling and simulation: Model Development, Definition of Simulation, Benefits of simulation, Simulation Steps, Advantages and Drawbacks of Model Simulation, Classification of Model Simulation; System Complexity: Policy Resistance, Feedback, Multi Loop System Dynamics, Dynamic Complexity, Bounded Rationality, The Core of Simulation; Basic Concept of Systems Simulation: The Basic Structure of Simulation Model, Simulation Steps; System Dynamics Modeling: System Dynamics Simulation Model: Characteristics of System Dynamics Models, Modelling Steps in System Dynamics, System Dynamics Variables; System Dynamics as a Tool for System Thinking: Causal Loop Diagram, Stock and Flow Diagram, Ventana Simulation; Project Dynamics: Modeling Decision Making, Modeling Human Behavior, Modeling Supply Chain Management; Model Validation: Basic Concepts of Validation; Types of Validation, Validation Steps, Percentage of Error Rate (E1), Error Variance Percentage (E2); Model Scenario: Structure Scenario; Parameter Scenario; Sensitivity Analysis; Prediction Model

Main References

1. **Erma Suryani**, Pemodelan dan Simulasi, Graha Ilmu, 2005.
2. **Erma Suryani**, System Dynamics Framework, 2012.
3. **John D. Sterman**, Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000.
4. **Vensim User Guide**, 2003
5. **Vensim Modeling Guide**, 2003

Additional References

1. **International Journals and Articles Related to** “Modelling and System Dynamics Simulation”.
2. **Ernest Doebelin ,** System Dynamics: Modeling, Analysis, Simulation, Design, 2017.
3. **Barlas, Y.,**Multiple tests for validation of system dynamics type of simulation models, European Journal of Operational Research 42 (1999) pp. 59-87.

Course

Topics in System Dynamics and Its Application in Various Fields

Code: IS185911	CREDIT: 3	Semester: 2/3

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Erma Suryani Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Enterprise Systems

Code: IS185912	CREDIT: 3	Semester: 2/3

Course Description

Competition in continuously changing business environment today requires an organization to adapt and innovate their business processes. The ability to innovate and manage business process becomes a key to survive the competition. Organisation requires information systems and technology to provide accurate data and information in real time manner to support its business processes. Enterprise Systems (ES) is a software package that automate most business functions such as accounting, finance, marketing, customer service, operation, procurement etc in various industry. More and more organizations implement ES such as Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Business Process Management (BPM) and Customer Relationship Management (CRM) Systems. However, ES implementation pose unique challenges and organization need to innovate. Therefore, further understanding of ES is needed to ensure organizations success. This course provides students with knowledge and experience to review current state-of-the-art in business process management and ES to identify gaps for further study in this fields. Therefore, the learning methods include lecture, discussions, project-based assignments to review research in the fields. The Course Subjects focus on ES concepts, implementation methods and recent studies in the field.

Expected Learning Outcome

Graduates will be able to:

- Describe various organization activities in order to make use of information technologies to improve the way those activities are structured and are performed.
- Identify and evaluate new IS methods and trends; develop innovative domain activity models; develop a plan to exploit new and emerging methods and technologies and new ways of structuring and performing organization activities as well as estimating the benefits, negative consequences of their implementation.

Course Learning Outcome

Specific Skills	:	• Monitor technology environment lingkungan teknologi • Applies creative problem-solving for technological problems. • Recommend organizational development and change management. • Analyze and document organization's activities • Identify opportunities to design process improvement • Develop ES implementation plan • Innovate to utilize technology or new methodologies
General Skills	:	• Able to improve learning capability independently; • Able to document, store, protect and retrieve data from research outcome to ensure validity and prevent plagiarism;
Knowledge	:	• Able to descrive organization business activities that use IT • Able to explain business activities structure in organization • Able to explain business process components • Able to descrive how IT support business activities
Attitude	:	• Uphold the value of humanity in carrying out duties based on religion, morals, and ethics; • Obey the law and discipline in social life and state;

- Demonstrate responsible attitude to work in the field of his expertise independently

Specific Learning Outcome

Cognitive :
- Able to describe business process and business process management concepts
- Able to explain system integration concepts
- Able to describe basic concept and evolution of ES
- Able to compare different types of ES
- Able to differentiate systems development lifecycle with ERP implementation lifecycle
- Able to differentiate ERP implementation strategies
- Able to elaborate operational and post implementation ERP activities

Psychomotor :
- Able to conduct structured literature review on ES
- Able to write a scientific paper related to ES

Affective :
- Able and willing to act honestly
- Able and willing to behave communicately
- Able and willing to obey the prevailing laws and regulations
- Able and willing to behave responsibly

Course Subjects

1. Business concepts, business processes, systems and information technology
2. Business process management cycle
3. System integration and evolution of enterprise systems
4. Enterprise Systems Implementation Lifecycle
5. Enterprise Systems Implementation strategies
6. Operation and post-implementation of enterprise systems
7. Innovation with business process management
8. Digital business innovation

Main References

1. Brocke, J. V. and Schmiedel, T., BPM – Driving Innovation in a Digital World, Springer, 2015.
2. Dumas, M., La Rosa, M., Mendling, J. & Reijers, H. A, Fundamentals of Business Process Management, Springer, 2013.
3. Motiwalla, Luvai dan Thompson, Jeffrey, Enterprise Systems for Management (2nd Edition), Pearson Education Limited, Essex, 2014.
4. Giachetti, Ronald. E., Design of Enterprise Systems: Theory, Architecture, and Methods, CRC Press, Taylor and Francis Group, Boca Raton, 2010.

Additional References

1. Monk, E., and Wagner, B., Concepts in Enterprise Resource Planning 4th Ed., Course Technology, Cengage Learning, 2013.
2. Kumar, S., Esteves, J. and Bendoly, E., Handbook of Research in Enterprise Systems, SAGE Publications India Pvt Ltd., New Delhi, 2011.
3. Weske, Mathias, Business Process Management: Concepts, Languages, Architectures, Springer-Verlag, Berlin, 2007.

4. Chaffey, D., 2015, Digital Business and e-Commerce Management: Strategy, Implementation and Practice, Pearson Education Limited.
5. Pujawan, N., 2010, Supply Chain Management edisi II, Guna Widya.
6. Jurnal-jurnal internasional dalam topik manajemen proses bisnis, sistem enterprise dan bisnis digital.

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Mahendrawathi ER Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Corporate Information Technology Architecture

Code: IS185913	CREDIT: 3	Semester: 2/3

Course Description

Topics in Corporate Information Technology Architecture will cover competencies that enable graduates to design and develop the most optimal IT architecture for various enterprises.

Expected Learning Outcome

Graduates will be able to:

- Describe concepts and methods to manage the complexity of information systems and technologies and fitting these with the organization's strategy.
- Identifying and applying a formal approach to EA development, performing the multistage process of developing an EA, identifying the EA change needs, and applying them to the EA.

Course Learning Outcome

Specific Skills :
- Able to develop Knowledge related to one or more topics in IT architecture for corporation through research in order to develop well tested theory, model or platform.
- Able to solve business or organisation problem at corporate level through the use of IT Architecture

General Skills :
- Create inovative IT ideas as actual problem solution

Knowledge :
- Has the knowledge on IT blueprint concept
- Has the knowledge on IT architecture concept
- Has the knowledge on IT architecture framework

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life ;
- Responsible for work in his area of expertise independently

Specific Learning Outcome

Kognitif :
- Students understand the basic concepts of IT blueprints, IT architecture, and frameworks on IT architecture
- Students can identify IT blueprints needed by a company
- Students can identify the IT architecture needed by a company
- Students can identify a suitable framework for IT architecture in a corporation
- Students can design and develop an optimal IT architecture for a corporation

Psychomotor :
- Students can develop IT blueprint for a corporation
- Students can document the right IT architecture for a company

Affective :
- Able and willing to act honestly
- Able and willing to behave communicately
- Able and willing to obey the prevailing laws and regulations
- Able and willing to behave responsibly

Course Subjects

- The basic concept of the IT blueprint
- Basic concepts of IT architecture

- Framework on the IT architecture
- IT architecture for corporations
- Current research topics on IT Architecture for Corporate

Main References

1. **Steven H. Spewak** (1193), Enterprise Architecture Planning: Developing a Blueprint for Data, Applications, and Technology 2nd Edition, Wiley.
2. **Danny Greefhorst** (2011), Architecture Principles: The Cornerstones of Enterprise Architecture (The Enterprise Engineering Series), Spriger.
3. **Scott A. Bernard** (2012), An Introduction to Enterprise Architecture 3rd Edition, AuthorHouse.
4. **Jeanne W. Ross** (2006), Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, Harvard Business Review Press.
5. **Daniel Minoli** (2018), Enterprise Architecture A to Z: Frameworks, Business Process Modeling, SOA, and Infrastructure Technology 2nd Edition, Auerbach Publications.
6. **Jaap Schekkerman** (2008), Enterprise Architecture Good Practices Guide: How to Manage the Enterprise Architecture Practice, Trafford Publishing.
7. **Jaap Schekkerman** (2003), How to Survive in the Jungle of Enterprise Architecture Frameworks: Creating or Choosing an Enterprise Architecture Framework 2nd Edition, Trafford Publishing.
8. **Marc Lankhorst** (2017), Enterprise Architecture at Work: Modelling, Communication and Analysis (The Enterprise Engineering Series) 4th Edition, Springer.
9. **Stefan Bente** (2012), Collaborative Enterprise Architecture: Enriching EA with Lean, Agile, and Enterprise 2.0 practices, Morgan Kaufmann.

Additional References

1. **Carol O'Rourke** (2003), Enterprise Architecture Using the Zachman Framework (MIS), Course Technology.
2. **The Open Group Foundation** (2013), TOGAF 9 Foundation Study Guide 3rd Edition, Van Haren Publishing.
3. **The Open Group Foundation** (2011), TOGAF Version 9.1, Van Haren Publishing.
4. **The Open Group Foundation** (2011), TOGAF Version 9.1: A Pocket Guide, Van Haren Publishing.
5. **Philippe Desfray** (2014), Modeling Enterprise Architecture with TOGAF: A Practical Guide Using UML and BPMN, Morgan Kaufmann.

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Febriliyan Samopa Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topics in Systems and Network Security

Code: IS185914	CREDIT: 3	Semester: 2/3

Course Description

With the growing interconnection in increasingly complex global networks, smooth operation of communication and computing is very important. In an effort to secure existing systems and networks, organizations need to anticipate and manage information security issues related that may arise. On the other hand, recurring events such as the existence of a virus and hacker attacks clearly indicate the weakness of information technology and the need to increase the level of system security. For this reason, a complete understanding of the SDLC of security is needed, what roles and personnel are needed, comprehensive system security planning, environmental and internal security of the system itself, and formal legal and professional ethics that are needed.

Expected Learning Outcome

Graduates will be able to:

- Developing policy and standard for business continuity, information assurance, planning and implementing risk management, trust, security and safety, as well as disaster recovery and information protection.
- Implementation of concept and environmentally and socially sustainable IT solutions that are aligned with the responsibilities of organizations as well as in compliance with legislative and regulatory requirements and industry standards.

Course Learning Outcome

Specific Skills :
- Able to harmonize
- Able to plan
- Able to manage
- Able to explore needs & design
- Able to integrate data & transform it

General Skills :
- Manage and implement Cycbersecurity
- Respond and manage information system problems
- Manage information system risk
- Protecting IT assets
- Develop an information certainty strategy

Knowledge :
- Has a current & future Knowledge of the business environment (including management, organization, functions, business processes)
- Have an IT Knowledge environment (including processes, organizations, applications, infrastructure, people IT, data) now & in the future

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate responsible attitude for work in his area of expertise independently

Specific Learning Outcome

Cognitive : •

Psychomotor : •

Affective :
- Able and willing to act honestly
- Able and willing to behave communicately
- Able and willing to obey the prevailing laws and regulations

- Able and willing to behave responsibly

Course Subjects

Security: The Concept of Main Information Security, Critical Characteristics of Information
Security System Development Lifecycle: Investigation, Analysis, Logical Design, Physical Design, Implementation, Maintenance and Change
Security and Organization Professionals: Senior Management, Information Security Project Teams, Data Responsibilities
The Need for Security: Business Needs, Threats, Attacks, Secure Software Development
Legal, Ethical and Professional Problems in Information Security
Security Planning: Planning and Information Security Governance, Policy Standards - Practice
Security Technology: Firewall and VPN
Physical Safety: Physical Access Control, Safety and Fire Safety, Mobile and Portable Systems, Failure of Supporting Utilities and Structure Collapse
Security and Personnel: Positioning and Staffing, Employment Policies and Practices, Internal Control
Information Security Maintenance: Security Management Maintenance Model, Digital Forensics

Main References

1. Whitman, ME and Mattord, HJ. Principles of Information Security, 4th ed., Thomson Courses Technology. 2007.
2. Harold F. Tipton, Mick Krause, Information Security Management Handbook, Auerbach Publication, 2007

Additional References

1. Ronald L. Krutz dan Russell D. Vines, The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley&Sons, 2001.
2. Ronald L. Krutz and Russell Dean Vines, The CISM Prep Guide: Mastering the Five Domains of Information Security Management, John Wiley & Sons, Canada, 2003

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Aris Tjahyanto Lecturer	Apol Pribadi Subriadi Course Director	Mahendrawathi ER Head of Department

Course

Topic in Embedded Systems

Code: IS185915	CREDIT: 8	Semester: 4

Course Description

Topics in Embedded System Development include competencies that enable graduates to become designers and developers for a variety of systems controlled by IT in the form of limited devices embedded into the system.

Expected Learning Outcomes

Graduates will be able to:

- Know and understand the basic concepts of embedded system design.
- Identify, design, and develop embedded systems using low-performance systems.
- Identify, design, and develop embedded systems using high-performance systems.
- Identify opportunities and develop research in the field of embedded systems.

Course Learning Outcome

Specific Skills :
- Able to develop knowledge related to one / more topics in the embedded system through research to produce proven theories, models, or platforms development.
- Able to solve business / organization problems using information technology by implementing embedded systems.

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

Knowledge :
- Have knowledge of design concepts using embedded systems
- Have low-performance embedded system knowledge
- Have knowledge of high-performance embedded systems

Attitude :
- Uphold human values in carrying out tasks based on religion, morals, and ethics;
- Obey the law and discipline in community and state life;
- Demonstrate responsible attitude for work in his area of expertise independently

Specific Learning Outcome

Cognitive :
- Able to understand the basic concepts of embedded system design
- Able to understand the advantages and disadvantages of low-performance embedded systems
- Able to understand the advantages and disadvantages of high-performance embedded systems
- Able to design and develop solutions using embedded systems

Psychomotor :
- Able to make device connectivity diagrams on embedded systems
- Able to assemble an independent embedded system as a solution

Affective :
- Able and willing to act honestly
- Able and willing to behave communicately
- Able and willing to obey the prevailing laws and regulations
- Able and willing to behave responsibly

Course Subjects

Course

Topic in Embedded Systems

Code: IS185915	CREDIT: 8	Semester: 4

- Definition, limitations, limitations, and advantages of the Embedded System.
- The basic concept of designing an Embedded System.
- Low Performance Computing Embedded System: concepts, tools, and case studies
- High Performance Computing Embedded System: concepts, tools, and case studies
- Recent research on the topic of Embedded Systems

Main References

1. **Tammy Noergaard** (2012), Embedded Systems Architecture, Second Edition: A Comprehensive Guide for Engineers and Programmers, Newnes.
2. **David E. Simon** (1999), An Embedded Software Primer, Addison-Wesley Professional.
3. **Frank Vahid** (2001), Embedded System Design: A Unified Hardware/Software Introduction, Wiley.
4. **Elecia White** (2011), Making Embedded Systems: Design Patterns for Great Software, O'Reilly Media.
5. **Jeremy Blum** (2013), Exploring Arduino: Tools and Techniques for Engineering Wizardry, Wiley.
6. **Simon Monk** (2011), Programming Arduino Getting Started with Sketches, McGraw-Hill.
7. **Simon Monk** (2013), Raspberry Pi Cookbook, O'Reilly Media.
8. **Matt Richardson** (2013), Getting Started with Raspberry Pi, Maker Media Inc.

Additional References

1. **Donald Norris** (2013), Raspberry Pi Projects for the Evil Genius, McGraw-Hill.
2. **Andrew Robinson** (2013), Raspberry Pi Projects, Wiley.
3. **Tero Karvinen** (2014), Make: Sensors: A Hands-On Primer for Monitoring the Real World with Arduino and Raspberry Pi, Maker Media Inc.

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Febriliyan Samopa Dosen	Apol Pribadi Ketua Prodi S2	Mahendrawathi ER Head of Department