



UNIVERSITAS
INDONESIA

CEP-CCIT

FAKULTAS TEKNIK

FAKULTAS TEKNIK UNIVERSITAS INDONESIA
CONTINUING EDUCATION PROGRAM
CENTER FOR COMPUTING AND INFORMATION TECHNOLOGY

SURAT KEPUTUSAN
DIREKTUR / KEPALA UKK PPM CEP - CCIT FAKULTAS TEKNIK UNIVERSITAS INDONESIA
NOMOR : 19 TAHUN 2025

TENTANG :
KURIKULUM CEP-CCIT FTUI TAHUN 2025
PROGRAM TEKNOLOGI INFORMASI (TI) DAN CREATIVE MULTIMEDIA (CM)

- Menimbang :**
1. Telah dilaksanakan kegiatan *workshop*, diskusi, dan evaluasi secara berkala untuk melakukan perbaikan terhadap kurikulum pembelajaran program profesional;
 2. CEP-CCIT FTUI perlu menetapkan kurikulum yang akan dipergunakan sebagai acuan penyelenggaraan pendidikan program profesional hingga peserta program lulus atau habis masa studi.
- Mengingat :**
1. Surat Keputusan Dekan Fakultas Teknik Universitas Indonesia Nomor: 653/D/SK/FTUI/X/2003 tanggal 1 Oktober 2003 perihal Pembentukan Pusat Komputasi dan Teknologi Informasi (Center for Computing & Information Technology) Fakultas Teknik Universitas Indonesia;
 2. Surat Keputusan Rektor Universitas Indonesia Nomor: 1369/ SK/R/UI/2009 tanggal 17 November 2009 perihal Penetapan Nama Unit Usaha di lingkungan Universitas Indonesia;
 3. Surat Keputusan Rektor Universitas Indonesia Nomor: 1020/SK/R/UI/2018 tanggal 27 April 2018 perihal Alih Bentuk *Continuing Education Program – Center for Computing and Information Technology* Fakultas Teknik Universitas Indonesia sebagai Unit Kerja Khusus Pelayanan dan Pengabdian Masyarakat Universitas Indonesia;
 4. Peraturan Rektor UI Nomor : 25 Tahun 2019 tentang UKK PPM Universitas Indonesia;
 5. Surat Keputusan Dekan Fakultas Teknik Universitas Indonesia Nomor: 265/D/SK/FTUI/II/2022 tanggal 7 Februari 2022 perihal Pengangkatan Kepala *Continuing Education Program – Center for Computing and Information Technology* Fakultas Teknik Universitas Indonesia.

MEMUTUSKAN :

- Menetapkan :** KURIKULUM CEP-CCIT FTUI TAHUN 2025 PROGRAM TEKNOLOGI INFORMASI (TI) DAN CREATIVE MULTIMEDIA (CM).
- KESATU :** Program Teknologi Informasi (TI) program ini 5 peminatan sebagai berikut:
- a. *Full Stack Developer (FSD)*
 - b. *Internet-based System Automation (ISA)*
 - c. *Cyber Security (CS)*
 - d. *Artificial Intelligence and Data Analytics (AIDA)*
 - e. *Digital Marketing (DM)*
- KEDUA :** Program *Creative Multimedia (CM)* program ini memiliki 2 peminatan yaitu *Multimedia Design (MD)* dan *Animation (AN)*.

Surat Keputusan ini akan ditinjau dan diperbaiki kembali seperlunya, bila di kemudian hari terdapat kekeliruan dalam keputusan ini.

Ditetapkan di : Depok
Pada Tanggal : 20 Agustus 2025
Direktur (Kepala UKK PPM),



Prof. Dr. Muhammad Suryanegara. S.T., M.Sc., IPU
NIP 198105142012121001



D. Program Teknologi Informasi *Artificial Intelligence and Data Analytics* (TI AIDA)

Overview

This curriculum strategically prepares graduates to excel in the rapidly evolving fields of data and artificial intelligence. It establishes a robust foundation in core Information Technology principles (databases, algorithms, software engineering, operating systems) before systematically progressing through essential data competencies – statistics, visualization, exploratory analysis – and culminating in advanced Artificial Intelligence. The program's lies in its forward-looking focus: it dedicates substantial modules to cutting-edge domains like Machine Learning (including supervised, unsupervised, and ensemble techniques), Natural Language Processing (SVM, Neural Networks, Deep Learning), and critically, Generative AI and Agentic AI. This emphasis ensures graduates possess not just current skills but are equipped to handle the emerging complexities of autonomous systems, large language models (LLMs), and AI workflow automation, directly addressing the technological frontier.

The curriculum's structure is explicitly designed to meet the burgeoning demand for professionals capable of transforming data into intelligent action. By integrating theoretical knowledge with extensive practical application (evident in significant lab credits and specific technology training like Python, TensorFlow, Keras, MongoDB, Tableau, Metabase, Streamlit, LangChain, and specialized platforms like N8n), students develop the hands-on expertise required to build and deploy real-world AI and data solutions. Modules such as "Generative AI Fundamentals", "Agentic AI Introduction", "AI Workflow Automation", and the "Data Deployment Application" ensure graduates are proficient in the latest tools and methodologies driving innovation. This practical, tool-centric approach is vital for organizations seeking to leverage AI for competitive advantage and navigate the challenges of data-driven decision-making and intelligent system implementation.

The graduates of this program shall exceptionally well-positioned for a diverse spectrum of high-demand, future-oriented roles. Potential career paths include Data Analyst, Business Intelligence Analyst, Machine Learning Engineer, AI Specialist (particularly in NLP or Generative AI), GenAI Application Developer, AI Solutions Architect (focusing on workflow automation or agentic systems), Data Engineer (with foundational skills for further specialization), and roles in deploying data applications. The inclusion of professional communication, ethics, and a significant internship/final project further enhances their readiness to contribute immediately and ethically within sectors such as technology, finance, healthcare, e-commerce, and consulting, building resilient careers at the forefront of the AI and data revolution.

Exit Profile of AIDA Curriculum

After completing all modules, the students should be able to:

- Design and implement database systems using relational and NoSQL technologies, including ERD modeling and normalization.
- Develop software applications using object-oriented programming, web technologies, and mobile platforms.
- Apply statistical methods and exploratory data analysis (EDA) to derive actionable insights from complex datasets.
- Create effective data visualizations and business intelligence dashboards leveraging tools for data storytelling and decision support.
- Build, train, and deploy machine learning models including supervised/unsupervised algorithms, ensemble methods, and deep learning architectures.
- Develop natural language processing solutions with techniques like SVM, neural networks for text and sequence data and time-series analysis.
- Design and implement generative AI applications using large language models (LLMs), and frameworks.
- Engineer autonomous agentic AI systems capable of reasoning, planning, and adapting through tools.
- Automate AI workflows using no-code/low-code platforms for rapid integration of AI into business processes.
- Deploy data-driven applications and integrate end-to-end data pipelines from analysis to production.
- Communicate technical findings professionally through data storytelling, video presentations, and research documentation.
- Apply ethical principles in AI development, data handling, and technology implementation.

Target Students

The course designed for students who have the desire to work as a Data Engineer, AI Solutions Architect, Generative AI Developer, Machine Learning Engineer, BI Analyst, and Agentic AI Specialist.

Prerequisites

Student should be able to interact in an English Classroom Environment

Entry Profile

- Student at least having a high school graduate certificate
- Student should already comfortable using the any OS smartphone, internet, Microsoft Windows / Linux Operating System PC
- Knowledge of basic programming as well as basic networking would be an advantage

Curriculum Contents

Semester 1		
Modules	Credits	Exit Profile
Introduction to Information Technology	3	After completing this course, the students will be able to: <ul style="list-style-type: none">• Identify application areas of IT• Explore various components of a computer• Explore the Windows Operating System• Work effectively on the computer• Explore the usage of Internet• Troubleshoot PC and its peripherals• Classify network architecture and topologies• Identify resources used to connect a network
Introduction to Information Technology Project	1	<ul style="list-style-type: none">• Secure your system and mobile devices• Use the Microsoft Office Application Suite including Word, Excel, PowerPoint, and Outlook
Algorithm and Data Structure	3	After completing this module, the student will be able to: <ul style="list-style-type: none">• Understand the fundamentals of algorithms and programming• Interpret and create flowcharts• Write and compile simple programs in C• Implement conditional statements and loops
Algorithm and Data Structure Project	1	<ul style="list-style-type: none">• Work with arrays and matrices.• Define and invoke functions in C• Implement Bubble Sort, Insertion Sort, and Selection Sort algorithms• Implement Linear Search and Binary Search algorithms• Create and manipulate singly, doubly, and circular linked lists• Understand and implement queues

Relational Database Design	2	<p>After completing this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand how to design a relational database • Create an entity-relationship model • Map an entity-relationship diagram to tables • Normalize and denormalize data in tables • Apply the ER / Normalization while designing a database
Tools and Technique for Analyzing Data*	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Process data from business transactions • Summarize data • Analyze data for decision making • Exchange data between various sources • Analyze and present complex data • Collaborate with other users • Automate the business operations
Implementing Database Design on MySQL	3	<p>After completing this module, the student should be able to:</p> <ul style="list-style-type: none"> • create and implement a database using database management system • Query data from tables
Implementing Database Design on MySQL Project	1	<ul style="list-style-type: none"> • Manage and manipulate databases • Implement stored procedures, triggers and functions • Implement triggers and transactions • Map an entity-relationship diagram to tables • Normalize and denormalize data in tables
Information Systems Architecture and Technology	2	<p>After completing this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understanding the analysis and design of an information system architecture • Understanding of methodological due to process and best practice for ISA development • Understanding of the challenges and critical success factors of ISA development • Understand the individual architectural component and the relations
Operating System	2	<p>After completing this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand what is an operating system and the role it plays • Have a high level understanding of the structure of operating systems, applications, and the relationship between them • Explain some knowledge of the services provided by operating systems • Explore some details of major OS concepts
Total Credits	21	Output of Semester 1 : Database Developer or Junior Analysts

Semester 2

Modules	Credits	Exit Profile
Practical Statistic for Analytics	3	<p>After completing this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand why exploratory data analysis is a key preliminary step in data science • Understand how random sampling can reduce bias and yield a higher quality dataset, even with big data • Understand the principle of experimental design yield definitive answer to questions • Understand the usage of regression to estimate outcomes and detect anomalies • Understand the key classification techniques for predicting which categories a record belongs to • Understand the statistical machine learning methods that "learn" from data • Understand Unsupervised learning methods for extracting meaning from unlabeled data
Object Oriented Programming in Python	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Get familiar with Python • Implement operators • Work with conditional and loop constructs • Work with arrays, enums, and strings
Object Oriented Programming in Python Project	1	<ul style="list-style-type: none"> • Implement inheritance and polymorphism • Handle errors • Design a user interface • Handle events
Web Application	3	<p>After completing this module, the student will be able to:</p> <ul style="list-style-type: none"> • Understand the concepts of web programming • Create an HTML Web page • Enhance Web pages • Work with tables and frames • Add interactivity to Web pages
Web Application Project	1	<ul style="list-style-type: none"> • Create dynamic Web pages • Work with graphics • Add visual effects to Web pages • Implement geolocation and offline support for data • Develop Web applications using MySQL and PHP. • Design interactive Web applications
NoSQL - MongoDB Fundamentals	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the Basics of NoSQL and MongoDB • MongoDB Installation and Configuration • Data Modeling in MongoDB • CRUD Operations • Working with MongoDB's Aggregation Framework
NoSQL - MongoDB Fundamentals Project	1	<ul style="list-style-type: none"> • Indexing and Performance Tuning • Scalability and Replication • Application Integration • Data Security and Backup Procedures • Real-world Applications and Case Studies

Mobile Application	3	After completing this module, the student will be able to: <ul style="list-style-type: none"> • Develop native Android applications using Kotlin programming language • Build RESTful API integrations and handle network operations
Mobile Application Project	1	<ul style="list-style-type: none"> • Apply mobile security best practices and data protection measures • Optimize application performance and memory management • Implement push notifications and background processing • Test mobile applications using unit testing and UI testing frameworks
Exploratory Data Analysis	2	After completing this module, the student will be able to: <ul style="list-style-type: none"> • understand the importance of data context • visualize data by choosing an appropriate visual display • Know which clutter and eliminate it • focus the attention to specific data which important • create stories to resonate the data
Professional Communication	1	After completing this module, the student will be able to: <ul style="list-style-type: none"> • Improve communication skills • Improve self-presentation skills • Work effectively in a team environment • Effectively explain about Data Science • Explain why data science is needed
Total Credits	22	Output of Semester 2 : Associate Application Developer

Semester 3

Modules	Credits	Exit Profile
Data Visualization	3	After completing this course, the students will be able to: <ul style="list-style-type: none"> • Install and Deploy Metabase as a tools to visualize data • Set up an instance, connecting a visulization tools to databases • Build a Data Model • Create Questions with a query or custom • Create a visualization with plot, histogram, alert, and maps • Create a Dashboards, Pulses, and Collections • Embed and Sharing dashboard on external websites
Business Intelligence	3	After completing this course, the students will be able to: <ul style="list-style-type: none"> • Design and develop interactive dashboards and visualizations using Tableau • Connect to various data sources and perform data blending and joining operations • Create advanced calculations, parameters, and table calculations for business insights • Understand data modeling concepts for business intelligence applications • Apply statistical analysis and trend identification within Tableau environment

Data Visualization and Business Intelligent Project	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Model data and plan visualization types based on a case study • Implement a Dashboard based on a case study • Connecting various sources data to a Dashboard based on a case study • Implement a statistical analysis and trend based on a case study
Introduction to Machine Learning	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand fundamental concepts of supervised, unsupervised, and reinforcement learning paradigms • Implement basic machine learning algorithms including KNN, Naive Bayes, and regression models • Apply decision trees, random forests, and association rule mining techniques to real-world datasets
Introduction to Machine Learning Project	1	<ul style="list-style-type: none"> • Utilize ensemble methods (Random Forest, AdaBoost, Gradient Boosting) for improved model performance • Demonstrate proficiency in using Scikit-Learn for data preprocessing and model development • Evaluate model performance using appropriate metrics and cross-validation techniques • Understand the bias-variance tradeoff and methods to address overfitting and underfitting • Implement end-to-end machine learning projects from data collection to model deployment
AI Application Review	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Conduct comprehensive reviews and evaluations of AI-powered applications across various industries • Analyze the underlying AI technologies and methodologies used in commercial applications • Assess the effectiveness, usability, and ethical implications of AI implementations • Compare different AI application approaches and their suitability for specific use cases • Identify strengths, weaknesses, and potential improvements in existing AI systems
Natural Language Processing	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand fundamental concepts of natural language processing and text analytics • Implement text preprocessing techniques including tokenization, stemming, and lemmatization
Natural Language Processing Project	1	<ul style="list-style-type: none"> • Apply machine learning algorithms (ANN, CNN, RNN) for NLP tasks • Develop time-series analysis models for sequential text data • Implement Support Vector Machines for text classification and sentiment analysis • Create end-to-end NLP pipelines for real-world text processing applications • Evaluate NLP model performance using appropriate metrics and validation techniques
Generative AI Fundamental	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the architecture and principles of large language models (LLMs) • Develop applications using AI frameworks and API services integration • Implement LangChain for building complex LLM-powered applications • Create chatbots and conversational AI systems using modern frameworks

Generative AI Fundamental Project	1	<ul style="list-style-type: none"> • Understand prompt engineering techniques for optimal LLM performance • Build document question-answering systems and knowledge retrieval applications • Implement retrieval-augmented generation (RAG) architectures • Develop multi-agent systems and autonomous AI workflows • Deploy and scale LLM applications in production environments
Agentic AI Introduction	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the principles and architecture of autonomous AI agent systems • Develop agents capable of reasoning, planning, and adaptive behavior • Understand emergent behavior in multi-agent systems and swarm intelligence • Evaluate agent performance and system reliability in dynamic environments
Total Credits	21	Output of Semester 3 : Junior Data Analyst

Semester 4

Modules	Credits	Exit Profile
Agentic Artificial Intelligence	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Design and develop intelligent applications powered by large language models (LLMs) • Create autonomous AI agents capable of complex reasoning and decision-making
Agentic Artificial Intelligence Project	1	<ul style="list-style-type: none"> • Implement agent architectures using Python, LangChain, GPT, Llama, and Falcon LLM frameworks • Build semantic kernel-based applications for enhanced natural language understanding • Develop multi-modal AI agents that can process text, images, and other data types • Create intelligent apps that can perform task planning and execution autonomously • Apply prompt engineering and fine-tuning techniques for specialized agent behaviors • Integrate multiple LLMs and AI services to create robust intelligent applications • Evaluate agent performance and implement monitoring systems for production deployment
AI Workflow Automation	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Design and implement AI-integrated workflow automation using no-code/low-code platforms • Create automated business processes that incorporate AI decision-making capabilities • Build rapid prototypes and products using N8n workflow automation tools • Integrate various AI APIs and services into automated workflow pipelines • Develop event-driven automation systems that respond to real-time data inputs
AI Workflow Automation Project	1	<ul style="list-style-type: none"> • Implement data transformation and processing workflows for AI applications • Create automated testing and deployment pipelines for AI-powered applications • Monitor and optimize automated workflows for performance and reliability • Build cross-platform integrations connecting multiple business systems and AI services

Data Deployment Application	3	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Deploy machine learning models and data applications using Streamlit framework • Create interactive web applications for data visualization and model demonstration • Build user-friendly interfaces for non-technical users to interact with data models • Implement real-time data processing and visualization in web-based applications
Data Deployment Application Project	1	<ul style="list-style-type: none"> • Design responsive and scalable data applications using Python and Streamlit • Integrate various data sources and APIs into deployed applications • Apply best practices for application security, performance optimization, and user experience • Create automated deployment pipelines for data science applications • Monitor and maintain deployed applications in production environments • Develop documentation and user guides for deployed data applications
Agentic AI Application	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the theoretical foundations and practical implementation of agentic AI systems • Understand autonomous AI agents with reasoning, planning, and adaptive capabilities • Understand multi-agent systems that can collaborate and coordinate complex tasks • Evaluate agent performance in complex, multi-objective scenarios
Professional Ethics	2	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand fundamental ethical principles and moral reasoning in professional contexts • Demonstrate professional behavior and workplace etiquette in various business environments • Apply ethical decision-making frameworks to resolve workplace dilemmas and conflicts • Understand professional codes of conduct and industry standards across different sectors • Develop effective communication skills for professional interactions and presentations • Demonstrate leadership qualities and teamwork capabilities in professional settings • Understand workplace diversity, inclusion, and cultural sensitivity principles • Apply conflict resolution and negotiation strategies in professional environments • Understand legal and regulatory compliance requirements in business operations • Develop time management, project planning, and organizational skills for professional success • Understand corporate social responsibility and sustainable business practices • Demonstrate professional integrity, accountability, and reliability in work commitments

Writing Methodology	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Develop advanced academic writing skills for technical documentation and research papers • Create comprehensive technical reports following industry and academic standards • Write clear and concise documentation for software projects and AI applications • Structure and organize complex technical information for various audiences • Apply proper citation methods and reference management for technical literature • Develop proposal writing skills for project funding and stakeholder approval • Create user manuals, API documentation, and technical guides • Write effective abstracts, executive summaries, and technical presentations • Understand plagiarism prevention and intellectual property considerations • Edit and review technical documents for clarity, accuracy, and professional presentation
Final Report	1	<p>After completing this course, the students will be able to:</p> <ul style="list-style-type: none"> • Execute end-to-end data analytics projects from problem definition to solution deployment • Apply advanced statistical analysis and machine learning techniques to real-world datasets • Conduct comprehensive data exploration, cleaning, and preprocessing for complex projects • Design and implement predictive models and analytical solutions for business problems • Create professional data visualizations and interactive dashboards for stakeholder communication • Develop project management skills for data science initiatives including timeline and resource planning • Present technical findings to both technical and non-technical audiences effectively • Document project methodologies, findings, and recommendations in professional reports • Collaborate with industry partners and stakeholders throughout the project lifecycle • Demonstrate ethical considerations and best practices in data handling and analysis
Final Project	3	<ul style="list-style-type: none"> • Present technical findings to both technical and non-technical audiences effectively • Document project methodologies, findings, and recommendations in professional reports • Collaborate with industry partners and stakeholders throughout the project lifecycle • Demonstrate ethical considerations and best practices in data handling and analysis
Total Credits	20	Output of Semester 4 : Junior AI Solution Engineer