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MODULE HANDBOOK

COMPUTER PROGRAMMING

BACHELOR DEGREE PROGRAM
DEPARTEMENT OF STATISTICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE

	MODULE HANDBOOK **COMPUTER PROGRAMMING** **DEPARTMENT OF STATISTICS** **INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

Proses ***Process***	**Penanggung Jawab** ***Person in Charge***			**Tanggal** ***Date***
	Nama ***Name***	**Jabatan** ***Position***	**Tandatangan** ***Signature***	
Perumus *Preparation*	Dr. Kartika Fithriasari, M.Si	Dosen *Lecturer*		**March 28, 2019**
Pemeriksa dan Pengendalian *Review and Control*	Dr. Dra. Kartika Fithriasari, M.Si ; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D ; Ahmad Choirudin, S.Si.,M.Sc., Ph.D ; Erma Oktania Permatasari, S.Si., M.Si. ; Adatul Mukarromah, S.Si. M.Si	Tim kurikulum *Curriculum team*		**April 15, 2019**
Persetujuan *Approval*	Prof. Drs. Nur Iriawan, M.Ilkom., Ph.D	Koordinator RMK *Course Cluster Coordinator*		**July 17, 2019**
Penetapan *Determination*	Dr. Kartika Fithriasari, M.Si	Kepala Departemen *Head of Department*		**July 30, 2019**

MODULE HANDBOOK

COMPUTER PROGRAMMING

Module name	**Computer Programming**	
Module level	Undergraduate	
Code	KS184240	
Course (if applicable)	Computer Programming	
Semester	Second Semester (Genap)	
Person responsible for the module	Dr. Kartika Fithriasari, M.Si	
Lecturer	Dr. Dra. Kartika Fithriasari, M.Si ; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D ; Ahmad Choirudin, S.Si., M.Sc., Ph.D ; Erma Oktania Permatasari, S.Si., M.Si. ; Adatul Mukarromah, S.Si. M.Si	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, **mandatory**, 2nd semester.	
Type of teaching, contact hours	Lectures, <50 students	
Workload	1. Lectures : 4 x 50 = 200 minutes per week. 2. Practicum : 180 minutes per week. 3. Exercises and Assignments : 4 x 60 = 240 minutes (4 hours) perweek. 4. Private learning : 4 x 60 = 240 minutes (4 hours) per week.	
Credit points	4 credit points (SKS)	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	*CPMK.1 Able to understand the definition of Computers, Organization and Computer Work Procedures and apply the knowledge of statistical theory, mathematics, and computing.* *CPMK.3 Able to analyze data with the right statistical methods and interpret it using computer programming* *CPMK.4 Able to identify, formulate, and solve statistical problems using computer programming* *CPMK.5 Able to use the computing techniques and modern computer devices required in the field of statistics and data science, including Ms. Excel and C++* *CPMK.6 Has the knowledge of current and upcoming*	PLO – 1 PLO – 3 PLO – 4

	issues related to the field of computer programming *CPMK.8 Has professional responsibilities and ethics* *CPMK.9 Able to motivate yourself to think creatively and learn throughout life*	PLO – 5
Content	*This course aims to equip students with knowledge of parts of computers and how computers work. Students are also equipped with the ability to use application software such as spreadsheet processing programs and data management systems using Excel to solve real problems. In addition, students are given the material on the basics of programming algorithms as well as the ability to compile, test and run programs in C++ language and then apply them to solve simple statistics problems. The material is delivered through interactive lectures, discussions, exercises, practicums and Problem Based Learning.* *Computer programming are computational courses. This course aims to allow students to create simple programs with object-oriented programming languages to solve statistical problems. The learning strategy to achieve the objectives of giving this course is a discussion and explanation of the basics of programming and practicum directly by making a program from the given case. Students are also expected to demonstrate and explain the programs that have been created.*	
Study and examination requirements and forms of examination	• In-class exercises • Assignment 1, 2, 3 • Mid-term examination • Final examination	
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.	
Reading list	1. Pozrikidis,C., 2007. Introduction to C++ Programming and Graphics. 2. Reynolds, C. dan Tymann,P., 2003. Principles of Computer Science. McGraw-Hill. 3. Tremblay dan Bunt. 2000. An Introduction to Computer Science and Algorithm Approach. McGraw-Hill. 4. Verschuuren, G, M. 2008. Excel 2007 for Scientists. Holy Macro Books.	

	Program Studi	Sarjana, Departemen Statistika, FMKSD-ITS
	Mata Kuliah	Pemrograman Komputer
	Kode Mata Kuliah	KS184240
	Semester/SKS	II/4
	MK Prasyarat	-
RP-S1	Dosen Pengampu	Dr. Dra. Kartika Fithriasari, M.Si ; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D ; Ahmad Choirudin, S.Si., M.Sc., Ph.D ; Erma Oktania Permatasari, S.Si., M.Si. ; Adatul Mukarromah, S.Si. M.Si

Bahan Kajian *Study Materials*	Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Pemodelan, Industri dan Bisnis, Pemerintahan dan Kependudukan, Ekonomi dan Manajemen, Kesehatan dan Lingkungan *Basic Science, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, Modeling, Industry and Business, Government and Population, Economics and Management, Health and Environment*
CPL yang dibebankan MK *PLO*	CPL-1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi CPL-3 Mampu menganalisis data dengan metode statistika yang tepat dan mengintepretasikannya CPL-4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan CPL-5 Mampu menggunakan teknik komputasi dan perangkat komputer modern yang diperlukan dalam bidang statistika dan sains data *CPL-1 Able to apply statistical, mathematical, and computational theory knowledge* *CPL-3 Able to analyze data with the right statistical methods and interpret it* *CPL-4 Able to identify, formulate, and solve statistical problems in various applied fields* *CPL-5Able to use the computing techniques and modern computer devices required in the field of statistics and data science*
CP-MK *CLO*	CPMK.1 Mampu memahami pengertian Komputer, Organisasi Dan Tata Kerja Komputer serta menerapkan pengetahuan teori statistika, matematika, dan komputasi. CPMK.3 Mampu menganalisis data dengan metode statistika yang tepat dan mengintepretasikannya menggunakan pemrograman komputer CPMK.4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah statistika menggunakan pemrograman komputer CPMK.5 Mampu menggunakan teknik komputasi dan perangkat komputer modern yang diperlukan dalam bidang statistika dan sains data, meliputi Ms. Excel dan C++ CPMK.6 Memiliki pengetahuan tentang isu terkini dan mendatang yang berkaitan dengan bidang pemrograman komputer CPMK.8 Memiliki tanggung jawab dan etika profesi CPMK.9 Mampu memotivasi diri untuk berpikir kreatif dan belajar sepanjang hayat *CPMK. 1 Able to understand the understanding of Computer, Organization and Computer Work System and apply knowledge of statistical theory, mathematics, and computing.* *CPMK. 3 Able to analyze data with the right statistical methods and interpret it using computer programming* *CPMK. 4 Able to identify, formulate, and solve statistical problems using computer programming* *CPMK. 5May able to use the computing techniques and modern computer devices required in the fields of statistics and datascience, including Ms. Excel and C++* *CPMK.6 Have knowledge of current and upcoming issues related to the field of computer programming* *CPMK.8 Has professional responsibilities and ethics*

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	CPMK.9 Able to motivate yourself to think creatively and learn throughout life

Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability of Sub-CLO*	**Keluasan (materi pembelajaran)** *Extent (Study Materials)*	**Metode Pembelajaran** *Learning Methods*	**Estimasi Waktu** *Estimated Time*	Bentuk Evaluasi *Evaluation Form*	Kriteria dan Indikator Penilaian *Assessment Criteria and Indicators*	**Bobot Penilaian** *Score Weight*
1-2	1. Mampu menjelaskan organisasi dan tata kerja komputer serta konsep sistem bilangan *1. Able to explain the organization and working system of computers and the concept of number systems*	1. Organisasi Komputer 2. Tata Kerja Komputer 3. Konsep dan Sistem Bilangan *1. Computer Organization* *2.Computer Work Procedures* *3.Concept and Number System*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions, Practicum and Problem Exercises (CIDPLS)*	500 menit/ *500 Minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	1. Mampu menyebutkan elemen elemen komputer dan fungsinya 2. Mampu menyebutkan proses yang terjadi pada komputer: penyimpanan, pemrosesan, dan output 3. Mengetahui sistem bilangan dalam sistem kompute *1. Able to name computer element elements and their functions* *2. Able to mention processes that occur on the computer: storage, processing, and output* *3. Know the number system in a computer system*	10%/10%
3	2. Mampu mengelola data menggunakan MS Excel *2.Able to manage data using MS Excel*	1. Menyimpan, memasukkan, mengimport dan export data dari/ke berbagai format yang bisa dibaca software lain	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS)	250 menit *250 Minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	1. Mampu memanggil dan merubah data dari/ke data excel ke/dari data dengan format lain 2. Mampu menyiapkan dari data tidak terstruktur atau tidak bersih agar siap untuk diolah	5%/15%

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Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability of Sub-CLO*	**Keluasan (materi pembelajaran)** *Extent (Study Materials)*	**Metode Pembelajaran** *Learning Methods*	**Estimasi Waktu** *Estimated Time*	Bentuk Evaluasi *Evaluation Form*	Kriteria dan Indikator Penilaian *Assessment Criteria and Indicators*	**Bobot Penilaian** *Score Weight*
		2.Mengurutkan, mengubah orientasi vertikal-diagonal, membuang data yang tidak perlu dan memilih data yang diperlukan *1. Save, insert, import and export data from/to various formats that other software can read* *2. Sort, change the vertical-diagonal orientation, discard unnecessary data and select the necessary data*	*Interactive Lectures, Discussions, Practicum and Problem Exercises (CIDPLS)*			*1. Able to call and change data from/to excel data to/from data in other formats* *2. Able to prepare from unstructured or unsanstructed data to be ready for processing*	
4	3. Mampu membuat visualisasi data menggunakan Excel *3. Able to create data visualizations using Excel*	Membuat dan mengedit berbagai Pie Chart, Bar Chart, Histogram, Line, Plygon, Bubble, Circle sesuai dengan kebutuhan dan data *Create and edit various Pie Charts, Bar Charts, Histograms, Line, Plygon, Bubbles, Circles*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions, Practicum and Problem*	250 menit *250 Minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	Mampu membuat dan memodifikasi gambar yang tepat sesuai dengan persoalan/data dan tujuan visualisasi *Able to create and modify the right image according to the problem / data and visualization objectives*	10%/25%

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Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability of Sub-CLO*	**Keluasan (materi pembelajaran)** *Extent (Study Materials)*	**Metode Pembelajaran** *Learning Methods*	**Estimasi Waktu** *Estimated Time*	Bentuk Evaluasi *Evaluation Form*	Kriteria dan Indikator Penilaian *Assessment Criteria and Indicators*	**Bobot Penilaian** *Score Weight*
		according to needs and data	*Exercises (CIDPLS)*				
5-7	4. Mampu menggunakan Solver untuk mendapatkan solusi penerapan metode Statistika *4. Able to use Solver to get solutions for applying statistics methods*	1. Menggunakan formula untuk menyelesaikan persoalan statistika dan peringkasan data serta otomatisasi perhitungan/pentabelan 2. Menggunakan add on. Khususnya solver untuk menyelesaikan persoalan statistika termasuk optimasi *1. Using formulas to solve statistical and data compaction issues and automationof calculations/ingbelans* *2. Use add ons. Especially solver to solve statistical problems including optimization*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions, Practice and Problem Exercises (CIDPLS)*	750 menit *750 minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	1. Mampu menyelesaikan pengisian tabel otomatis berdasarkan informasi dari tabel lain atau kolom lain tabel itu sendiri. 2. Mampu menyelesaikan probel optimasi dan problem statistika menggunakan add on dan/atau khususnya solver *1. Able to complete automatic table filling based on information from other tables or other columns of the table itself.* *2. Able to solve probel optimization and statistical problems using add on and/or especially solver*	25%/50%
8	**ETS/***Midterm*						

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9-10	5. Mampu membuat program sederhana menggunakan bahasa C++ *5. Able to create simple programs using C++ language*	1. Struktur bahasa C++. 2. Tipe data dalam C++ 3. Operasi aritmatika dan logical dalam C++ Program sederhana dengan menggunakan statement input output *1. C++ language structure.* *2. Data types in C++* *3. Arithmetic and logical operations in C++* *Simple program using output input statement*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions, Practice and Problem Exercises (CIDPLS)*	500 menit *500 minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	1. Mampu menjelaskan struktur bahasa C++. 2. Mampu menjelaskan tipe data dalam C++ 3. Mampu menjelaskan operasi aritmatika dan logical dalam C++ 4. Mampu membuat program sederhana dengan menggunakan statement input output *1. Able to explain the structure of the C++ language.* *2. Able to explain data types in C++* *3. Able to explain arithmetic and logical operations in C++* *4. Able to create simple programs by using output input statements*	10%/60%
11-14	6. Mampu membuat program yang memerlukan persyaratan dan ulangan menggunakan C++ dan untuk data array	1. Pernyataan Bersyarat IF dan Case 2. Perulangan While, Do, For Algoritma *1. IF and Case Conditional Statements*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions,*	2000 menit *2000 minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	1. Mampu menyelesaikan persoalan yang memerlukan Pernyataan Bersyarat IF dan Case 2. Mampu menyelesaikan persoalan yang memerlukan perulangan While, Do, For	25%/85%

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Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability of Sub-CLO*	**Keluasan (materi pembelajaran)** *Extent (Study Materials)*	**Metode Pembelajaran** *Learning Methods*	**Estimasi Waktu** *Estimated Time*	Bentuk Evaluasi *Evaluation Form*	Kriteria dan Indikator Penilaian *Assessment Criteria and Indicators*	**Bobot Penilaian** *Score Weight*
	6. Able to create programs that require requirements and replays using C++ and for array data	*2. Iterations While, Do, and For Algorithms*	*Practice and Problem Exercises (CIDPLS)*			3. Mampu membuat algoritma untuk menyelesaikan persoalan *1. Able to resolve issues requiring IF and Case Conditional Statements* *2. Able to solve problems that require iteration While, Do, For* *3. Able to create algorithms to solve problems*	
15	7. Mampu membuat program yang memerlukan persyaratan dan ulangan menggunakan C++ dan untuk data array *7. Able to create programs that require requirements and replays using C++ and for array data*	Array *Array*	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal (CIDPLS) *Interactive Lectures, Discussions, Practicum and Problem Exercises (CIDPLS)*	250 menit *250 minutes*	Quiz, Praktikum, Tugas *Quiz, Practice, Task*	Mampu menyelesaikan persoalan untuk data Array *Able to resolve issues for Array data*	15%/100%
16	**EAS/***Finalterm*						

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PUSTAKA/*References* **:**

1. Reynolds, C. dan Tymann,P., "*Principles of Computer Science"*, McGraw-Hill, 2003
2. Tremblay dan Bunt, "*An Introduction to Computer Science and Algoritma Approach"*, McGraw-Hill, 2000
3. Verschuuren, G, M, "Excel 2007 for Scientists", Holy Macro! Books.,2008
4. Pozrikidis,C., Introduction to C++ Programming and Graphics, 2007