

# MODULE HANDBOOK

## COMPUTER PROGRAMMING



**STATISTICS UNDERGRADUATE PROGRAM  
DEPARTMENT OF STATISTICS  
FACULTY OF SCIENCE AND DATA ANALYTICS  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER  
SURABAYA**

## ENDORSEMENT PAGE



### MODULE HANDBOOK COMPUTER PROGRAMMING STATISTICS UNDERGRADUATE PROGRAM DEPARTMENT OF STATISTICS INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses <i>Process</i>	Penanggung Jawab <i>Person in Charge</i>			Tanggal <i>Date</i>
	Nama <i>Name</i>	Jabatan <i>Position</i>	Tanda tangan <i>Signature</i>	
Perumus <i>Preparation</i>	Adatul Mukarromah, S.Si. M.Si	Dosen Lecturer		
Pemeriksa dan Pengendalian <i>Review and Control</i>	Adatul Mukarromah, S.Si. M.Si; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D	Tim kurikulum Curriculum team		
Persetujuan <i>Approval</i>	Prof. Nur Iriawan, MIKom., Ph.D.	Koordinator RMK Course Cluster Coordinator		
Penetapan <i>Determination</i>	Dr. Kartika Fithriasari, M.Si	Kepala Departemen Head of Department		

# MODULE HANDBOOK

## COMPUTER PROGRAMMING

Module name	COMPUTER PROGRAMMING	
Module level	Undergraduate	
Code	SS234101	
Course (if applicable)	COMPUTER PROGRAMMING	
Semester	1	
Person responsible for the module	Adatul Mukarromah, S.Si. M.Si	
Lecturer	Adatul Mukarromah, S.Si. M.Si; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, mandatory, 1th semester.	
Type of teaching, contact hours	Lectures, <50 students	
Workload	1. Lectures [L]: 4 x 50 = 200 minutes per week. 2. Exercises and Assignments [EA]: 4 x 60 = 240 minutes (4hours) per week. 3. Individual Learning [IL]: 4 x 60 = 240 minutes (4 hours) per week.	
Credit points	4 credit points (SKS), equivalent to 6,4 ECTS	
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	CLO.1 Able to understand the use of data types, variables and assignments in computational techniques CLO.2 Able to use control structure (conditional statements and looping) in computer programming CLO.3 Able to identify and formulate array, record (user define type) and filling data types for computer programming CLO.4 Able to use computational techniques and modern computer tools (high language) to apply commands in computer programming CLO.5 Able to apply statistical theory and statistical methods using computer programming	PLO-7 PLO-8  PLO-7 PLO-8  PLO-6  PLO-7 PLO-8  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.
Assessment and its weight	Case Study I – 25% Midterm Exam – 25% Final Exam – 25% Case Study – 25%
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom
Reading list	<ol style="list-style-type: none"> <li>1. Pozrikidis,C., 2007. Introduction to C++ Programming and Graphics. Springer Science + Business Media</li> <li>2. Bielajew, A., F., 2002. Introduction to Computers and Programming Using C++ and MATLAB. Department of Nuclear Engineering and Radiological Sciences, University of Michigan</li> <li>3. Reynolds, C. dan Tymann,P, 2003 .“Principles of Computer Science”, McGraw-Hill</li> <li>4. Tremblay dan Bunt, 2000 “An Introduction to Computer Science and Algoritma Approach”, McGraw-Hill</li> </ol>



**INSTITUT TEKNOLOGI SEPULUH NOPEMBER**  
**FAKULTAS SAINS DAN ANALITIKA DATA**  
**PROGRAM STUDI SARJANA STATISTIKA**  
**DEPARTEMEN STATISTIKA**

Kode Dokumen

**RENCANA PEMBELAJARAN SEMESTER**  
**SEMESTER LEARNING PLAN**

<b>MATA KULIAH (MK)/ Course</b>	<b>KODE/ Code</b>	<b>Rumpun MK/ Course Group</b>	<b>BOBOT (sks)/ Weight (Credit)</b>		<b>SEMESTER/ Semester</b>	<b>Tgl Penyusunan/ Drafting Date</b>
<b>PEMROGRAMAN KOMPUTER/ COMPUTER PROGRAMMING</b>	SS234101	SKSD	<b>T=3</b>	<b>P=1</b>	I	11 Januari 2023/ <i>January 11, 2023</i>
<b>OTORISASI/ AUTHORIZATION</b>	<b>Pengembang RPS/ RPS Developer</b>		<b>Koordinator RMK/ Course Group Coordinator</b>		<b>Ketua PRODI/ Head of Department</b>	
	Adatul Mukarromah, S.Si. M.Si; Prof. Drs. Nur Iriawan, M.Ikom, Ph.D		Prof. Drs. Nur Iriawan, M.Ikom, Ph.D		Dr. Kartika Fithriasari, M.Si	
<b>Capaian Pembelajaran (CP)/ Learning Achievement</b>	<b>CPL-PRODI yang dibebankan pada MK/ PLO</b>					
	CPL-5	Mampu menerapkan teori statistika pada metode statistika				
	CPL-6	Mampu merancang, mengumpulkan, dan melakukan manajemen data dengan metodologi yang tepat				
	CPL-7	Mampu menggunakan perangkat komputasi modern untuk menyelesaikan permasalahan statistik				
	CPL-8	Mampu menggunakan teknik komputasi untuk menyelesaikan permasalahan statistik				
	<b>PLO-5</b>	<i>Able to apply statistical theory to statistical methods</i>				
<b>PLO-6</b>	<i>Able to design, collect, and perform data management with the right methodology</i>					
<b>PLO-7</b>	<i>Able to use modern computing devices to solve statistical problems</i>					
<b>PLO-8</b>	<i>Able to use computational techniques to solve statistical problems</i>					
	<b>Capaian Pembelajaran Mata Kuliah (CPMK)/ CLO</b>					

	<p>CPMK.1 Mampu memahami penggunaan tipe data, variable dan assigment pada teknik komputasi</p> <p>CPMK.2 Mampu menggunakan control structure (pernyataan bersyarat dan perulangan) pada pemrograman komputer</p> <p>CPMK.3 Mampu mengidentifikasi dan memformulasi tipe data array, record (user define type) dan filling untuk pemrograman komputer</p> <p>CPMK.4 Mampu menggunakan teknik komputasi dan perangkat komputer modern (high language) untuk mengaplikasikan perintah-perintah dalam pemrograman komputer</p> <p>CPMK.5 Mampu menerapkan teori statistika dan metode statistika dengan menggunakan pemrograman komputer</p> <p><i>CLO.1 Able to understand the use of data types, variables and assignments in computational techniques</i></p> <p><i>CLO.2 Able to use control structure (conditional statements and looping) in computer programming</i></p> <p><i>CLO.3 Able to identify and formulate array, record (user define type) and filling data types for computer programming</i></p> <p><i>CLO.4 Able to use computational techniques and modern computer tools (high language) to apply commands in computer programming</i></p> <p><i>CLO.5 Able to apply statistical theory and statistical methods using computer programming</i></p>																														
	<p><b>Matrik CPL – CPMK</b> <b><i>PLO-CLO Matrix</i></b></p> <table border="1" data-bbox="645 879 2016 1082"> <thead> <tr> <th>CLO</th> <th>PLO-5</th> <th>PLO-6</th> <th>PLO-7</th> <th>PLO-8</th> </tr> </thead> <tbody> <tr> <td>CLO.1</td> <td></td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>CLO.2</td> <td></td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>CLO.3</td> <td></td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>CLO.4</td> <td></td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>CLO.5</td> <td>√</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	CLO	PLO-5	PLO-6	PLO-7	PLO-8	CLO.1			√	√	CLO.2			√	√	CLO.3		√			CLO.4			√	√	CLO.5	√			
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<p><b>Deskripsi Singkat MK/ Course Description</b></p>	<p>Mata kuliah ini bertujuan untuk membekali mahasiswa dengan pengetahuan tentang dasar-dasar pemrograman dengan menggunakan software modern (high language). Mahasiswa juga dibekali kemampuan untuk Menyusun, menguji dan menjalankan program dengan software modern (high language) kemudian mengaplikasikannya pada teori dan metode statistika. Selain itu, mahasiswa diberi materi untuk melakukan manajemen data menggunakan struktur data yang didefinisikan sendiri pada software. Materi disampaikan melalui ceramah interaktif, diskusi, latihan, praktikum serta Problem Based Learning. Program komputer merupakan mata kuliah bidang komputasi. Mata kuliah ini bertujuan agar mahasiswa bisa membuat program sederhana dengan bahasa pemrograman yang berorientasi pada objek untuk menyelesaikan permasalahan statistika. Strategi pembelajaran untuk mencapai tujuan pemberian mata kuliah ini adalah diskusi dan penjelasan tentang dasar-dasar pemrograman</p>																														

	<p>serta praktikum secara langsung dengan membuat program dari kasus yang diberikan. Mahasiswa juga diharapkan bisa mendemokan dan menjelaskan program yang sudah dibuat.</p> <p><i>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.</i></p>												
<b>Bahan Kajian: Materi Pembelajaran/ Course Material</b>	<p>Tehnik Komputasi, manajemen data, teori Statistika, metode statistika, software (perangkat komputasi)</p> <p><i>Computational Engineering, data management, statistical theory, statistical methods, software (computing devices)</i></p>												
<b>Pustaka/ References</b>	<table border="1"> <tr> <td><b>Utama/ Primary</b></td> <td></td> </tr> <tr> <td></td> <td>1. Pozrikidis,C., 2007. Introduction to C++ Programming and Graphics. Springer Science + Business Media</td> </tr> <tr> <td><b>Pendukung/ Secondary</b></td> <td></td> </tr> <tr> <td></td> <td>1. Bielajew, A., F., 2002. Introduction to Computers and Programming Using C++ and MATLAB. Department of Nuclear Engineering and Radiological Sciences, University of Michigan</td> </tr> <tr> <td></td> <td>2. Reynolds, C. dan Tymann,P., 2003 .“Principles of Computer Science”, McGraw-Hill</td> </tr> <tr> <td></td> <td>3. Tremblay dan Bunt, 2000 “An Introduction to Computer Science and Algoritma Approach”, McGraw-Hill</td> </tr> </table>	<b>Utama/ Primary</b>			1. Pozrikidis,C., 2007. Introduction to C++ Programming and Graphics. Springer Science + Business Media	<b>Pendukung/ Secondary</b>			1. Bielajew, A., F., 2002. Introduction to Computers and Programming Using C++ and MATLAB. Department of Nuclear Engineering and Radiological Sciences, University of Michigan		2. Reynolds, C. dan Tymann,P., 2003 .“Principles of Computer Science”, McGraw-Hill		3. Tremblay dan Bunt, 2000 “An Introduction to Computer Science and Algoritma Approach”, McGraw-Hill
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<b>Dosen Pengampu/ Lecturers</b>	<p>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</p>												
<b>Matakuliah syarat/</b>	-												

<i>Pre-requisite Course</i>							
<b>Mg Ke-Week</b>	<b>Kemampuan akhir tiap tahapan belajar (Sub-CPMK)</b> <i>Final capability for each learning step</i>	<b>Penilaian Evaluation</b>		<b>Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]</b>  <b>Learning Format Learning Methods Assignment for Student [Estimated Time]</b>		<b>Materi Pembelajaran [Pustaka] Learning Material [References]</b>	<b>Bobot Penilaian (%) Evaluation Weight (%)</b>
		<b>Indikator Indicator</b>	<b>Kriteria &amp; Bentuk Criteria and Format</b>	<b>Luring (offline)</b>	<b>Daring (online)</b>		
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>
1	Mampu menjelaskan tentang komputer dan komputasi serta konsep sistem bilangan  <i>Able to explain about computers and computing as well as the concept of a number system</i>	<ul style="list-style-type: none"> <li>a. Mampu menyebutkan elemen elemen komputer dan fungsinya</li> <li>b. Mampu menyebutkan proses yang terjadi pada komputer: penyimpanan, pemrosesan, dan output</li> <li>c. Mengetahui sistem bilangan dalam sistem komputer</li> </ul> <i>a. Able to mention the elements of the computer and their functions</i> <i>b. Be able to mention</i>	Non tes (Tugas) <i>Non test (Assignment)</i>	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal  <i>Interactive Lectures, Discussions, Practicums and Exercise</i>  <b>TM: 1x4x50"</b> <b>BM: 1x4x60"</b> <b>PT: 1x4x60"</b>		<ul style="list-style-type: none"> <li>a. Komputer</li> <li>b. Tata Kerja Komputer</li> <li>c. Konsep dan Sistem Bilangan</li> </ul> <i>a. Computer</i> <i>b. Computer Work Procedure</i> <i>c. Concept and Number System</i>	10%/10%



		<p><i>the processes that occur on a computer: storage, processing, and output</i></p> <p>c. <i>Know the number system in a computer system</i></p>					
2	<p>Mampu memahami dasar-dasar pemrograman dan membuat program sederhana dengan menggunakan software modern (<i>high language</i>)</p> <p><i>Able to understand the basics of programming and create simple programs using modern software (high language)</i></p>	<p>a. Mampu menjelaskan struktur bahasa pemrograman.</p> <p>b. Mampu menjelaskan tipe data dan variable dalam Bahasa pemrograman</p> <p>c. Mampu menjelaskan operasi aritmatika dan logical dalam Bahasa pemrograman</p> <p>d. Mampu membuat program sederhana dengan menggunakan statement input output dan assignment</p> <p><i>a. Be able to explain the structure of the programming language.</i></p> <p><i>b. Able to explain data types and variables in programming languages.</i></p> <p><i>c. Able to explain arithmetic and logical operations in programming</i></p>	<p>Quiz, Praktikum, Tugas</p> <p><i>Quiz, Practicum, Assignments</i></p>	<p>Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal</p> <p><i>Interactive Lectures, Discussions, Practicums and Exercise</i></p> <p><b>TM: 1x3x50"</b></p> <p><b>BM: 1x3x60"</b></p> <p><b>PT: 1x3x60"</b></p> <p><b>P : 1x1x170"</b></p>		<p>a. Struktur bahasa C++.</p> <p>b. Tipe data dalam C++</p> <p>c. Operasi aritmatika dan logical dalam C++</p> <p>d. Program sederhana dengan menggunakan statement input output</p> <p><i>a. C++ language structure.</i></p> <p><i>b. Data types in C++</i></p> <p><i>c. Arithmetic and logical operations in C++</i></p> <p><i>d. Simple program using input output</i></p>	10%/20%

		<i>languages. d. Able to make simple programs using input output and assignment statements.</i>					
<b>3-5</b>	Mampu membuat program yang memerlukan control structure (pernyataan bersyarat dan perulangan) <i>Able to create programs that require control structure (conditional statements and loops)</i>	<ul style="list-style-type: none"> <li>a. Mampu menyelesaikan persoalan yang memerlukan Pernyataan Bersyarat IF dan Case</li> <li>b. Mampu menyelesaikan persoalan yang memerlukan perulangan While, Do, For</li> <li>c. Mampu membuat algoritma untuk menyelesaikan persoalan <ul style="list-style-type: none"> <li>a. <i>Able to solve problems that require IF and Case Conditional Statements</i></li> <li>b. <i>Able to solve problems that require While, Do, For loops</i></li> <li>c. <i>Able to create algorithms to solve problems</i></li> </ul> </li> </ul>	Quiz, Praktikum, Tugas <i>Quiz, Practicum, Assignments</i>	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal  <i>Interactive Lectures, Discussions, Practicums and Exercise</i>  <b>TM: 3x3x50"</b> <b>BM: 3x3x60"</b> <b>PT: 3x3x60"</b> <b>P : 3x1x170"</b>		<ul style="list-style-type: none"> <li>a. Pernyataan Bersyarat IF dan Case</li> <li>b. Perulangan While, Do, For Algoritma <ul style="list-style-type: none"> <li>a. <i>IF and Case Conditional Statements</i></li> <li>b. <i>While, Do, For loop Algorithms</i></li> </ul> </li> </ul>	15%/35%
<b>6-7</b>	Mampu membuat program dengan menggunakan tipe data array	<ul style="list-style-type: none"> <li>a. Mampu menyelesaikan persoalan dengan menggunakan array</li> </ul>	Quiz, Praktikum, Tugas <i>Quiz, Practicum, Assignments</i>	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal		<ul style="list-style-type: none"> <li>a. Tipe data Array</li> <li>b. Array dimensi satu</li> <li>c. Array dimensi dua</li> <li>a. <i>Array data type</i></li> </ul>	15%/50%

	<i>Able to create programs using the array data type</i>	<p>dimensi satu</p> <p>b. Mampu menyelesaikan persoalan dengan menggunakan array dimensi dua</p> <p>a. <i>Able to solve problems using one-dimensional arrays</i></p> <p>b. <i>Able to solve problems using two-dimensional arrays</i></p>		<p><i>Interactive Lectures, Discussions, Practicums and Exercise</i></p> <p><b>TM: 2x3x50"</b>  <b>BM: 2x3x60"</b>  <b>PT: 2x3x60"</b>  <b>P : 2x1x170"</b></p>		<p>b. <i>One dimensional arrays</i></p> <p>c. <i>Two dimensional arrays</i></p>	
<b>8</b>							
<b>9-10</b>	<p>Mampu membuat program dengan menggunakan <i>Sub program (function dan procedure)</i></p> <p><i>Able to make programs using sub programs (functions and procedures)</i></p>	<p>a. Mampu membuat program dengan menggunakan procedure</p> <p>b. Mampu membuat program dengan menggunakan function</p> <p>a. <i>Able to create programs using procedures</i></p> <p>b. <i>Able to create programs using functions</i></p>	<p>Quiz, Praktikum, Tugas</p> <p><i>Quiz, Practicum, Assignments</i></p>	<p>Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal</p> <p><i>Interactive Lectures, Discussions, Practicums and Exercise</i></p> <p><b>TM: 2x3x50"</b>  <b>BM: 2x3x60"</b>  <b>PT: 2x3x60"</b>  <b>P : 2x1x170"</b></p>		<p>a. Prosedur</p> <p>b. Function</p> <p>a. <i>Procedure</i></p> <p>b. <i>Function</i></p>	15%/65%
<b>11</b>	<p>Mampu membuat program dengan menggunakan tipe data sendiri (<i>user define type</i>)</p> <p><i>Able to create programs using their own data types (user define type)</i></p>	<p>Mampu membuat program dengan menggunakan tipe data <i>struct</i></p> <p><i>Able to create programs using the struct data type</i></p>	<p>Quiz, Praktikum, Tugas</p> <p><i>Quiz, Practicum, Assignments</i></p>	<p>Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal</p> <p><i>Interactive Lectures, Discussions, Practicums and Exercise</i></p>		<p>a. Tipe data struct</p> <p>a. <i>Structs data type</i></p>	10%/75%

				<b>TM: 1x3x50"</b> <b>BM: 1x3x60"</b> <b>PT: 1x3x60"</b> <b>P : 1x1x170"</b>			
<b>12-13</b>	Mampu membuat program untuk membaca dan menuliskan data dari dan ke file text ( <i>read/write from/to file text</i> ) <i>Able to create programs to read and write data from and to text files (read/write from/to text files)</i>	a. Mampu membuat program untuk membaca input dari file text b. Mampu membuat program untuk menuliskan output ke file text a. <i>Able to make a program to read input from a text file</i> b. <i>Able to create a program to write output to a text file</i>	Quiz, Praktikum, Tugas <i>Quiz, Practicum, Assignments</i>	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal  <i>Interactive Lectures, Discussions, Practicums and Exercise</i>  <b>TM: 2x3x50"</b> <b>BM: 2x3x60"</b> <b>PT: 2x3x60"</b> <b>P : 2x1x170"</b>		a. Read to file b. Write from file a. <i>Read to file</i> b. <i>Write from file</i>	10%/85%
<b>14-15</b>	Mampu membuat program untuk membaca dan menuliskan tipe data array dan struct dari dan ke file text ( <i>read/write structure/array from/to file</i> ) <i>Able to write programs to read and write array and struct data types from and to text files (read/write structure/array</i>	a. Mampu membuat program untuk membaca tipe data array dan struct dari file text b. Mampu membuat program untuk menuliskan tipe data array atau struct ke file text a. <i>Able to create programs to read array and struct data types from text files</i> b. <i>Able to write programs to write</i>	Quiz, Praktikum, Tugas <i>Quiz, Practicum, Assignments</i>	Ceramah Interaktif, Diskusi, Praktikum dan Latihan Soal  <i>Interactive Lectures, Discussions, Practicums and Exercise</i>  <b>TM: 2x3x50"</b> <b>BM: 2x3x60"</b> <b>PT: 2x3x60"</b> <b>P : 2x1x170"</b>		a. Read structure/array to file b. Write structure/array from file a. <i>Read structure/array to file</i> b. <i>Write structure/array from file</i>	15% /100%

	<i>from/to file)</i>	<i>array or struct data types to text files</i>					
<b>16</b>	<b>Evaluasi Akhir Semester / Ujian Akhir Semester</b>						

