



Module Handbook

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| Module Name : | <i>Fungsi-fungsi Khusus</i> Special Functions |
| Module level : | Bachelor degree/Undergraduate Program |
| Course Code : | 4420103157 |
| Abbreviation, if applicable: | - |
| Courses included in the module, if applicable: | Not Applicable |
| Semester/Term | 7 th / third year |
| Module coordinator(s) | Prof. Dr. Manuharawati, M.Si |
| Lecturer(s): | Dwi Nur Yuniarti, S.Si., M.Sc. Dimas Avian Maulana, S.Si., M.Si. |
| Language: | Bahasa Indonesia (Indonesian Language) |
| Classification within the curriculum: | Compulsory / Elective |
| Teaching format/class hours per week during the semester: | 3 contact hours of lectures (<i>sks</i> or credit unit*) |
| Workload : | 3 x 50 minutes lectures, 3 x 60 minutes structured activity, and 3 x 60 minutes individual activity per week, 14 weeks per semester 119 total hours per semester ~ 4.77 ECTS** |
| Credit Unit: | 3 credit unit (4.77 ECTS) |
| Requirements: | Integral Calculus and Ordinary Differential Equation |



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| <p>Learning goals/competencies:</p> | <p>Knowledge (KNO-1)</p> <p>CLO-1: Demonstrate the ability to think structured, reasoned, proof based on deductive-axiomatic analysis, and proof of mathematical induction; understand the concept of Concepts and properties of special functions (Gamma functions, Beta functions, Legendre polynomials, Bessel functions, Hypergeometric functions, Fourier series and periodic functions, even and odd functions).</p> <p>Skill (SKI-1)</p> <p>CLO-2: Formulate and solve fundamental problems related to special functions.</p> <p>Skill (SKI-3)</p> <p>CLO-3: Analyze the formal structure of special functions problems and relevant fields.</p> <p>Competences (COM-2)</p> <p>CLO-4: Generate ideas used for completing mathematical tasks and to communicate them either in writing or orally, in accordance with scientific principles related to special functions.</p> |
| <p>Content</p> | <p>This course discusses Concepts and properties of Gamma functions, Beta functions, Legendre polynomials, Bessel functions, Hypergeometric functions, Fourier series and periodic functions, even and odd functions and their applications. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations.</p> |

| <p>Attribute Soft skill:</p> | <p>Active communication; Discipline; Collaboration; Responsibility; and Argumentation in class.</p> | | | | | | | | | | | |
|---------------------------------|--|--|-----------------------|----------------------------|---------------|-----|------------|-----|-------------------|-----|---------------------|-----|
| <p>Study/exam achievements:</p> | <p>The final grade (<i>NA</i>) is calculated based on the following ratio:</p> <table border="1" data-bbox="539 1615 1347 1939"> <thead> <tr> <th>Assessment Components</th> <th>Percentage of contribution</th> </tr> </thead> <tbody> <tr> <td>Participation</td> <td>20%</td> </tr> <tr> <td>Assignment</td> <td>30%</td> </tr> <tr> <td>Mid-semester test</td> <td>20%</td> </tr> <tr> <td>Final semester test</td> <td>30%</td> </tr> </tbody> </table> | | Assessment Components | Percentage of contribution | Participation | 20% | Assignment | 30% | Mid-semester test | 20% | Final semester test | 30% |
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| Participation | 20% | | | | | | | | | | | |
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| | <p>Grade conversion of 0-100 scale into 0-4 scale is set as below:</p> <table border="1"> <thead> <tr> <th>Letter</th> <th>Number</th> <th>Grade Interval</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>4,00</td> <td>$85 \leq A \leq 100$</td> </tr> <tr> <td>A-</td> <td>3,75</td> <td>$80 \leq A- < 85$</td> </tr> <tr> <td>B+</td> <td>3,50</td> <td>$75 \leq B+ < 80$</td> </tr> <tr> <td>B</td> <td>3,00</td> <td>$70 \leq B < 75$</td> </tr> <tr> <td>B-</td> <td>2,75</td> <td>$65 \leq B- < 70$</td> </tr> <tr> <td>C+</td> <td>2,50</td> <td>$60 \leq C+ < 65$</td> </tr> <tr> <td>C</td> <td>2,00</td> <td>$55 \leq C < 60$</td> </tr> <tr> <td>D</td> <td>1,00</td> <td>$40 \leq D < 55$</td> </tr> <tr> <td>E</td> <td>0,00</td> <td>$0 \leq E < 40$</td> </tr> </tbody> </table> | Letter | Number | Grade Interval | A | 4,00 | $85 \leq A \leq 100$ | A- | 3,75 | $80 \leq A- < 85$ | B+ | 3,50 | $75 \leq B+ < 80$ | B | 3,00 | $70 \leq B < 75$ | B- | 2,75 | $65 \leq B- < 70$ | C+ | 2,50 | $60 \leq C+ < 65$ | C | 2,00 | $55 \leq C < 60$ | D | 1,00 | $40 \leq D < 55$ | E | 0,00 | $0 \leq E < 40$ |
|----------------------------------|---|----------------------|--------|----------------|---|------|----------------------|----|------|-------------------|----|------|-------------------|---|------|------------------|----|------|-------------------|----|------|-------------------|---|------|------------------|---|------|------------------|---|------|-----------------|
| Letter | Number | Grade Interval | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | 4,00 | $85 \leq A \leq 100$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A- | 3,75 | $80 \leq A- < 85$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B+ | 3,50 | $75 \leq B+ < 80$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 3,00 | $70 \leq B < 75$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B- | 2,75 | $65 \leq B- < 70$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| E | 0,00 | $0 \leq E < 40$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Learning Methods : | Student-centered approach; project-based learning; lecturer and discussion; and presentations (structured activities) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Form of Media: | Power point slides; video; worksheets, and textbooks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Literature (primary references): | <ol style="list-style-type: none"> 1. Andrews, C.L., 1985. <i>Special Functions for Engineers and Applied Mathematicians</i>. New York. Macmillan Publishing Company. 2. Bell, W.W., 2004. <i>Special Functions for Scientists and Engineers</i>. New York. Dover Publications, Inc. 3. Kreyzig. 2007. <i>Advanced Engineering Mathematics</i>. Canada. John Wiley & Sons | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Notes: | *1 credit unit or <i>sks</i> in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY

UNIVERSITAS NEGERI SURABAYA

FACULTY OF MATHEMATICS AND NATURAL SCIENCE

UNDERGRADUATE PROGRAM OF MATHEMATICS

Ketintang Campus, C8-C9 Buildings of FMIPA, Surabaya

Email: s1-mat@unesa.ac.id

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| <p>**1 credit unit or <i>sks</i> = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019</p> |
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