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|  | <p style="text-align: center;"><b>UNIVERSITAS PADJADJARAN</b><br/> <b>FACULTY OF MATHEMATICS AND NATURAL SCIENCES</b><br/> <b>MASTER PROGRAM IN CHEMISTRY</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | <p><b>COURSE CODE:</b><br/> <b>140120-UND202502013</b></p> |
| Module designation                                                                | Research Method and Academic Writing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                            |
| Semester(s) in which the module is taught                                         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                            |
| Lecturers                                                                         | Prof. Dr. Ukun M.S. Soedjanaatmadja                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                            |
| Medium of instruction                                                             | Bahasa Indonesia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                            |
| Relation to curriculum                                                            | Compulsory Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                            |
| Teaching methods                                                                  | Participatory Learning Method (A learning approach in which students actively participate in the learning process—for example, through presentations and discussions—rather than just passively receiving information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                            |
| Workload                                                                          | Lecture and Discussion : 24 hours<br>Tutorial : 4 hours<br>Assignment : 5 hours<br>Test and Examination : 4 hours<br>Independent Study : 53 hours<br>Total workload : 90 hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                            |
| Credit points                                                                     | 2 (2-0)<br>2 credit = $2 \times 1.81 \text{ ECTS} = 3.62 \text{ ECTS}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                            |
| Required and recommended prerequisites for joining the module                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                            |
| Module objectives/intended learning outcomes                                      | <p><b>LO1:</b> Students are able to communicate research findings effectively in both oral and written forms to academic, industrial, and public audiences using structured and ethical scientific arguments.</p> <p><b>LO2:</b> Students are able to develop scientific works and/or innovative designs based on their field of expertise and humanities insight, validate them as potential solutions to industrial or societal problems, and prepare them for publication in scientific journals or forums.</p> <p><b>LO3:</b> Students are able to manage interdisciplinary knowledge, communicate scientific arguments ethically, and make strategic decisions in research planning, execution, and interpretation to support the advancement of science and technology.</p> |  |                                                            |
| Contents                                                                          | 1. <b>Introduction to Research Methodology and Academic Writing</b><br>Overview of research methodology concepts and the structure of academic theses, including components such as cover page,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                            |

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|  | <p>approval page, acknowledgments, abstract, table of contents, and chapter organization.</p> <p>2. <b>Writing Effective Abstracts</b><br/>Principles and key elements of effective abstract writing for theses, dissertations, and journal manuscripts, emphasizing clarity, focus, and contribution to the field.</p> <p>3. <b>Abstract Revision and Improvement Workshop</b><br/>Guided exercises and peer-review sessions to revise and enhance abstracts according to academic writing standards.</p> <p>4. <b>Thesis Structure and Composition — Chapter I (Introduction)</b><br/>Detailed guidance on composing Chapter I, including background of study, problem identification, research objectives, and research significance.</p> <p>5. <b>Thesis Structure and Composition — Chapter II (Literature Review, Framework, and Hypothesis)</b><br/>Explanation of the literature review process, conceptual framework development, and hypothesis formulation.<br/>Includes citation methods and referencing using the Harvard System, as well as writing captions and titles for tables and figures.</p> <p>6. <b>Thesis Structure and Composition — Chapter III (Materials and Methods)</b><br/>Explanation of research design, materials, and methods, including how to construct and present research workflow or flowcharts.</p> <p>7. <b>Thesis Structure and Composition — Chapters IV and V (Results, Discussion, Conclusion, and Recommendations)</b><br/>Principles for presenting and interpreting data, writing scientific discussions, drawing valid conclusions, and providing constructive recommendations.</p> <p>8. <b>Fundamentals of Data Analysis and Experimental Design (Part I)</b> <ul style="list-style-type: none"> <li>o Introduction to statistical concepts in research</li> <li>o Descriptive statistics and data summarization</li> <li>o Inferential statistics: <i>t</i>-test, single-factor experiment (One-Way ANOVA)</li> <li>o Introduction to statistical software (e.g., Excel, SPSS, R, Minitab)</li> </ul> </p> <p>9. <b>Advanced Data Analysis and Experimental Design (Part II)</b> <ul style="list-style-type: none"> <li>o Multifactor and factorial experiments (Two-Way ANOVA and higher designs)</li> <li>o Mixed design and repeated measures</li> <li>o Introduction to optimization approaches: Response Surface Methodology (RSM)</li> <li>o Interpreting statistical outputs and significance</li> </ul> </p> <p>10. <b>Effective Data Presentation and Referencing Techniques</b> <ul style="list-style-type: none"> <li>o Principles of clarity, precision, and ethics in data visualization</li> <li>o Designing publication-quality figures, graphs, and tables</li> <li>o Selecting appropriate formats for different data types</li> <li>o Common mistakes and ethical considerations in figure manipulation</li> <li>o Recommended software and tools (Excel, Origin, GraphPad, ImageJ)</li> <li>o Principles of proper referencing in scientific writing (Harvard, APA, Vancouver)</li> <li>o Use of reference management software (Mendeley, Zotero, EndNote)</li> </ul> </p> |
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|                                    | <p><b>11. Writing Scientific Manuscripts for Publication (Part I)</b><br/>Step-by-step guidance on the structure and content of scientific manuscripts for national and international journals.</p> <p><b>12. Writing Scientific Manuscripts for Publication (Part II)</b><br/>Improving scientific style, clarity, and argument flow; responding to reviewers; and preparing manuscripts for resubmission.</p> <p><b>13. Preparing Research Papers and Scientific Posters</b><br/>Techniques for preparing reports, seminar papers, and visually engaging research posters suitable for conferences and symposia.</p> <p><b>14. Accessing, Managing, and Evaluating Scientific Information</b><br/>Literature searching using databases (Scopus, Scimago, PubMed), accessing patents (US and European), and using reference management tools (Mendeley, Zotero).<br/>Final evaluation and peer-review of manuscripts and posters.</p> |
| Examination forms                  | Written test, assignment, presentation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Study and examination requirements | A minimum of 80% attendance in lectures is required. The final grade will be evaluated based on quizzes (10%), individual assignment (10%), mid-term exam (15%), final term exam (15%), class participation (20%), and the project (30%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Reading lists                      | <ol style="list-style-type: none"> <li>1. Booth, W.C., Colomb, G.G., Williams, J.M., Bizup, J. &amp; Fitzgerald, W.T. (2024) <i>The Craft of Research</i>. 5th edn. Chicago: University of Chicago Press.</li> <li>2. Turabian, K.L. (2018) <i>A Manual for Writers of Research Papers, Theses, and Dissertations</i>. 9th edn. Chicago: University of Chicago Press.</li> <li>3. Cooper, H. (2017) <i>Research Synthesis and Meta-Analysis: A Step-by-Step Approach</i>. 5th edn. New York: Sage Publications.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                             |