



Universitas Negeri Surabaya
Faculty of Mathematics and Natural Sciences
Chemistry Masters Study Program

Document
Code

SEMESTER LEARNING PLAN

| Courses | CODE | Course Family | Credit Weight | | | SEMESTER | Compilation Date |
|--------------------|---------------------------------|-----------------------------------|----------------------------|-----|-----------|-------------------------------------|-------------------|
| Science phylosophy | 4710202051 | Compulsory Study Program Subjects | T=2 | P=0 | ECTS=4.48 | 1 | November 30, 2019 |
| AUTHORIZATION | SP Developer | | Course Cluster Coordinator | | | Study Program Coordinator | |
| | Dr. I Gusti Made Sanjaya, M.Si. | | Prof. Dr. Suyono, M.Pd. | | | Prof. Dr. Nuniek Herdyastuti, M.Si. | |

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| Learning model | Case Studies |
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| Program Learning Outcomes (PLO) | PLO study program that is charged to the course |
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| Program Objectives (PO) | |
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| PO - 1 | Able to work together and be responsible for work to solve problems related to the philosophy of chemistry |
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| PO - 2 | Able to plan, lead, coordinate, delegate, control, evaluate and budget to achieve resolution of chemical philosophy problems |
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| PO - 3 | Master the basic principles and have the ability to analyze chemical philosophy problems |
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| PO - 4 | Have strong scientific insight to solve chemical philosophy problems through an inter or multidisciplinary approach that is beneficial for society and science |
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| PLO-PO Matrix | |
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|------|---|-----|------|------|------|------|
| | <table border="1"> <tr><td>P.O</td></tr> <tr><td>PO-1</td></tr> <tr><td>PO-2</td></tr> <tr><td>PO-3</td></tr> <tr><td>PO-4</td></tr> </table> | P.O | PO-1 | PO-2 | PO-3 | PO-4 |
| P.O | | | | | | |
| PO-1 | | | | | | |
| PO-2 | | | | | | |
| PO-3 | | | | | | |
| PO-4 | | | | | | |

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| PO Matrix at the end of each learning stage (Sub-PO) | |
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| | <table border="1"> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </tr> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-2</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-3</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PO-4</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> | P.O | Week | | | | | | | | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | PO-1 | | | | | | | | | | | | | | | | | PO-2 | | | | | | | | | | | | | | | | | PO-3 | | | | | | | | | | | | | | | | | PO-4 | | | | | | | | | | | | | | | | |
|------|---|-----|------|---|---|---|---|---|---|----|----|----|----|----|----|----|--|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| P.O | Week | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PO-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PO-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PO-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PO-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Short Course Description | Study of the philosophy of development as a pure experimental science which includes pioneering, dynamics, frontiers and the role of chemistry in the development and modernization of life. (The study of the philosophy of its development as a pure experimental science which includes origination, dynamics, frontiers and the role of chemistry in the development and modernization of life) |
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| References | Main : |
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1. Eric R. Scerri. 2008. Collected Papers on Philosophy of Chemistry. London: Imperial College Press
2. Davis Baird, Eric Scerri, Lee McIntyre. 2006. Philosophy of Chemistry: Synthesis of a New Discipline. Volume 42. Netherlands: Springer.
3. Eric Scerri and Grant Fisher. 2016. Essays in the Philosophy of Chemistry. USA: Oxford University Press.
4. Jean-Pierre Llored. 2013. The Philosophy of Chemistry: Practices, Methodologies, and Concepts. UK: Cambridge Scholars Publishing
5. Martin Labarca . 2017. Philosophy of Chemistry. Argentina: ResearchGate

Supporters:

1. Journal-journal terkini yang terkait dengan masing-masing topik.

Supporting lecturer
Prof. Dr. Suyatno, M.Si.
Dr. I Gusti Made Sanjaya, M.Si.

| Week- | Final abilities of each learning stage (Sub-PO) | Evaluation | | Help Learning, Learning methods, Student Assignments, [Estimated time] | | Learning materials [References] | Assessment Weight (%) |
|-------|--|---|--|---|---|--|-----------------------|
| | | Indicator | Criteria & Form | Offline (offline) | Online (online) | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1 | Critically evaluate the history and philosophy of chemistry | Clarifying the philosophy of the history of chemistry as a new disciplinary study | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: History and Philosophy of Chemistry (Ref. 3); Synthesis of the new discipline of chemistry Bibliography: | 3% |
| 2 | Critically evaluate the history and philosophy of chemistry | Explain the development of chemical philosophy | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: History and Philosophy of Chemistry (Ref. 3); Philosophy of Chemistry Literature: | 3% |
| 3 | Analyze the relationship between the philosophy of chemistry and the Philosophy of Science | Clarify the relationship between the Philosophy of Chemistry and the Philosophy of Science in the Past | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Philosophy of Chemistry and Philosophy of Science: Chemistry and Philosophy of Science in the Past Bibliography: | 4% |
| 4 | Analyze the relationship between the philosophy of chemistry and the Philosophy of Science | Clarify the relationship between the Philosophy of Chemistry and the Philosophy of Science today | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Philosophy of Chemistry and Philosophy of Science: chemistry and Philosophy of Science today References: | 4% |
| 5 | Evaluate the relationship between chemistry and physics | Clarifying the problematic relationship between chemistry and physics | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case study, preseCase study, presentation, and discussion, and discussion | Material: Chemistry and Physics: Problems of the Relationship between Chemistry and Physics Literature: | 4% |
| 6 | Evaluate the relationship between chemistry and physics | Analyzing the Existence of Physics in a Chemical Container: Ontological Limitations and Epistemological Blueprints" | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Chemistry and Physics: Physics in a Chemical Container: Ontological Limits and Epistemological Blueprints" Bibliography: | 4% |

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| 7 | Communicate systematically the existence of chemistry and its assessment methodology | Analyze chemical assessment methodology | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Chemistry and its study methodology References: | 3% |
| 8 | Mastering the material from meetings 1 to 7 | Clarify the material for meetings 1 to 7 | Criteria: Paper assessment Form of Assessment : Practice / Performance | | Write a paper | Material: Ref 1 to ref 5 References: | 20% |
| 9 | Describes the essence of chemistry theoretically and practically | Analyzing the essence of Chemistry theoretically and practically | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Theoretical and Practical Essence of Chemistry Literature: | 4% |
| 10 | Describes the essence of chemistry theoretically and practically | Analyzing the essence of chemistry theoretically and practically | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Theoretical and Practical Essence of Chemistry Literature: | 4% |
| 11 | Critically evaluate chemistry and its means of representation | Analyzing Chemistry and chemical representation tools to date. | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Chemistry and its representation tools Library: | 4% |
| 12 | Critically evaluate chemistry and its means of representation | Predicting Chemistry and chemistry representation tools in the future | Criteria: Participation and assignments Form of Assessment : Participatory Activities, Practice/Performance | | Case studies, presentations and discussions | Material: Chemistry and its representation tools Library: | 4% |
| 13 | Critically deciphering chemistry from metaphysics to metachemistry | Analyze and predict chemistry from metaphysics to metachemistry | Criteria: Participation and assignments Form of Assessment : Participatory Activities | | Case studies, presentations and discussions | Material: Chemistry from metaphysics to metachemistry References: | 3% |
| 14 | Critically deciphering chemistry from metaphysics to metachemistry | Analyze and predict chemistry from metaphysics to metachemistry | Criteria: Participation and assignments Form of Assessment : Participatory Activities | | Case studies, presentations and discussions | Material: Chemistry from metaphysics to metachemistry References: | 3% |
| 15 | Critically deciphering chemistry from metaphysics to metachemistry | Analyze and predict chemistry from metaphysics to metachemistry | Criteria: Participation and assignments Form of Assessment : Participatory Activities | | Case studies, presentations and discussions | Material: Chemistry from metaphysics to metachemistry References: | 3% |
| 16 | Mastering the material from meetings 9 to 15 | Clarify meeting materials 9-15 | Criteria: Work method Form of Assessment : Participatory Activities, Practice/Performance | | | Material: meeting material 9 to 15 References: | 30% |

Evaluation Percentage Recap: Case Study

| No | Evaluation | Percentage |
|----|--------------------------|------------|
| 1. | Participatory Activities | 44.5% |
| 2. | Practice / Performance | 55.5% |
| | | 100% |

Notes

- Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
- The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program)

which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.

3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.