CURRICULUM OVERVIEW OF MASTER PROGRAM EDUCATIONAL CHEMISTRY FMIPA UNIVERSITAS NEGERI JAKARTA

A. Objectives Of The Degree Programme

Vision of University "becoming a reputable university in the asian region". mission of university is *"*organizing the tridharma of higher education that is excellent and useful for the benefit of humans*"*nilai-nilai dasar yang ditetapkan dalam penyelenggaraan unj meliputi: (1). kebenaran dan kebijaksanaan; (2). integritas akademik, (3) demokratis dan humanis, (4) keberagaman dan kesetaraan, (5) bermanfaat bagi kemanusiaan; (6). nilai berkelanjutan (sustainalibility).

Vision of Faculty : "to become an excellent and competitive faculty in the field of mathematics and natural sciences and mathematics and natural sciences education at the asian level based on faith and piety."

Mission Of Faculty of mathematical and Natural Sciences are :

1. to conduct a certified education and teaching activity by using information technology and communication to create a graduate who is compliant with stakeholder requirement and able to contend in asean level.
2. to build conducive academic circumstances, generating religious circumstances during academic and non-academic activity, and growing entrepreneurship ability for the students.
3. to conduct researches and developments in mathematics and science study program, and mathematics and science education study program in accordance with development of science and technology.
4. to conduct community services relevant to mathematics and science study program, and mathematics and science education study program.
5. to establish and develop a partnership with various institutions, both national and international institutions.

The aims of FMIPA UNJ are :

1. To create a graduate in Mathematics and science (MIPA) And Education Of Mathematics And Sciences (MIPA) Who Is Professional, Able To Apply Information Technology And Communication, Faithful And Piety, Has An Entrepreneurship Ability, Meet The Stakeholder Requirements And Able To Compete In Asian Level.
2. To Make Scientific Papers That Are Worth For The Science And Technology Development Based On The Research In Mathematics And Science Non-Education Area Of Study And Mathematics And Sciences Education Area Of Study.
3. To Conduct Community Services In Mathematics And Science Area Of Study And Mathematics And Sciences Education Area Of Study That Can Be Beneficial For The Society.
4. To Have A Mutual Partnership With Other Institutions Both In National And International, Especially Related With The Development Of FMIPA UNJ.

Visi master's degree of chemistry education study program

to become a center for innovative learning and development of ict-based chemistry education research, multiculturalism, and sustainable goals at the asian level.

Misi Prodi S2 Pend Kimia

1. menyelenggarakan program magister pendidikan kimia berkualitas yang didasarkan pada profesionalisme layanan terpadu dalam suasana akademik yang kondusif, bertanggung jawab, akuntabel, dan transparan untuk menghasilkan lulusan yang profesional, serta mampu bersaing di tingkat nasional.
2. menyiapkan lulusan yang memiliki kompetensi profesional, pedagogik, kepribadian, dan sosial yang berkarakter melalui pendidikan dan penelitian orisinal yang berkualitas global.
3. menyumbangkan gagasan, ide, hasil penelitian, inovasi dan pengembangan ilmu pendidikan kimia kepada stakeholder bagi kemajuan pendidikan kimia di berbagai jenjang melalui kegiatan pengabdian pada masyarakat.
4. mengembangkan kolaborasi dengan berbagai pihak berdasarkan pada azas manfaat dan kesetaraan.

B. Program Educational Objectives (PEO)

Program educational objective was developed based on vision and mission in developing chemistry education postgraduate who possess high academic capabilities, social competence, innovation, creativity, competitiveness, and motivation for lifelong learning to become educators, professional researchers, and educational managers, who able to:

1. have in-depth knowledge of TPACK (Technological Pedagogical Content Knowledge) and apply the concept of green chemistry to the chemistry learning process.
2. teach at high school and university level with good attitudes, work ethics, responsibility, leadership, communication skills, and professionalism.
3. have a competitive advantage in global competition and have social competence.
4. have a critical understanding of solving educational problems and be able to communicate and collaborate in groups.

C. Program Learning Outcomes(PLO)

Learning outcomes of master's degree of chemistry education study program are presented in table below. the plos are classified into two areas of social competence and specialist competence.

Table 1.10 Plos Of Master's Degree Of Chemistry Education Study Programme

Area	Code	Program Learning Outcome
Social Competence	PLO 1	be able to respect humanity value, moral, and ethics, and entirely understand him/her as educators as well as life-long learners.
	PLO 2	be able to apply logical, critical, systematic, innovative thinking, and collaborate for developing or implementing effective and applicative science and technology in society based on his subject of study.

Specialist Competences	PLO 3	be able to design and conduct scientific research with a multidisciplinary or interdisciplinary approach to solve problems in chemistry education.
	PLO 4	be able to analyze main theoretical concepts, such as organic chemistry, biochemistry, analytical chemistry, physical chemistry, inorganic chemistry, and also applications in secondary school and higher education.
	PLO 5	be able to apply pedagogical concepts (classic or modern education theory, behavioristic, cognitive humanistic, and constructivism) in chemistry learning.
	PLO 6	be able to design and develop chemistry learning activities which are active, creative, effective and fun by applying several approaches, strategies, methods, and media related to students characteristics, learning materials, and learning goals led to the tpack approach.
	PLO 7	be able to develop and evaluate chemistry laboratory experiment in secondary school level and university level.
	PLO 8	be able to effectively write and present scientific reports based on research data, and publish the research result in a reputable publication.

the relevance between plo and peo of master's degree of chemistry education study program is described below.

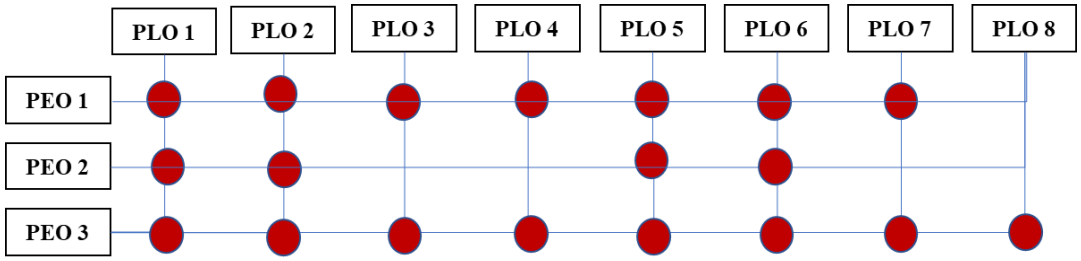


Figure 1.6 Matrix Of Plo And Peo Of Master's Degree Of Chemistry Education Programme

Subject-specific criteria are developed based on the classification of chemistry study program body of knowledge and its plo. the subject-specific criteria (ssc) for the graduates of master chemistry education study program are stated in the table below.

Table 1.11 Ssc Of Master's Degree Of Chemistry Education Study Program

Ssc (Subject-Specific Criteria)		
Specialist Competences	Ssc 1	Have Escalated Their Knowledge In Core Subjects, Special Subjects Or Interdisciplinary Subjects.
	Ssc 2	Be Able To Have Knowledge Building Up On A Bachelor's Degree Level In Chemistry, Which Forms A Foundation For Original And Competent Development And Implementation Of Ideas Within A Research Area.

	Ssc 3	Be Able To Have Qualified And Professional Competences, E.G., To Work As A Chemist In Industry Or Public Service.
	Ssc 4	Be Able To Carry Out Independent Scientific Work.
	Ssc 5	Be Able To Apply The Knowledge And Its Understanding, In Order To Solve Problems In New And Unaccustomed Situations, Involving Broader (Or Multidisciplinary) Issues.
Social Competences	Ssc 6	Have Acquired A Capacity To Carry Out Independent Scientific Work And To Organize, Conduct And Lead More Complex Projects.
	Ssc 7	Have Acquired Scientific, Technical And Social Competences (Abstraction Ability, Systems Analytical Thinking, Capacity For Teamwork, Ability To Communicate, International And Intercultural Experience Etc.), And Are Therefore Prepared To Take On Leadership Responsibility.
	Ssc 8	Be Able To Combine And Independently Apply Specialized Knowledge In Various Component Disciplines, In Order To Organize, Work On And Manage Complex Problems.
	Ssc 9	Be Able To Make Decisions, Based On Incomplete Or Limited Information.
	Ssc 10	Be Able To Take Into Account Ethical Responsibility In Their Decisions.

The Relevance Between Plo And Ssc Of Master's Degree Of Chemistry Education Study Program Is Described In The Matrix Below.

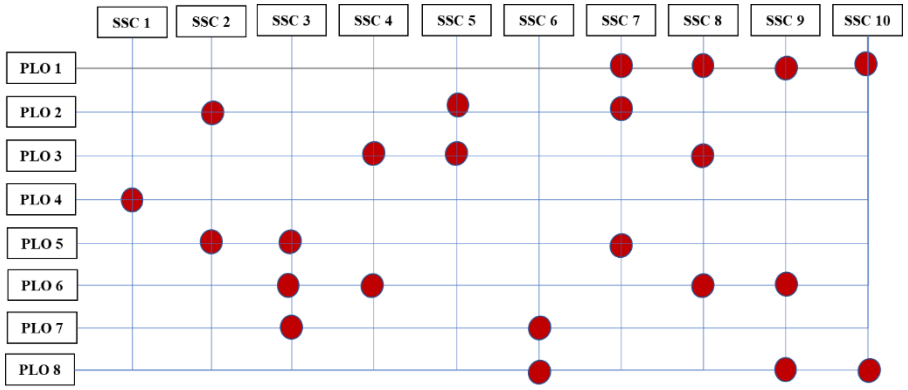


Figure 1.7 Mapping Plo And Ssc Master's Degree Of Chemistry Education Study Programme

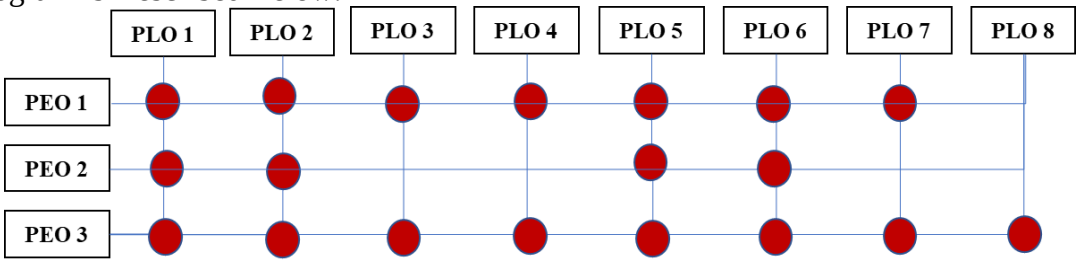
D. Programme Structure
E. Learning Outcomes Of Master's Degree Of Chemistry Education Study Program Are Presented In Table Below. The Plos Are Classified Into Two Areas Of Social Competence And Specialist Competence.
F. Table 1.10 Plos Of Master's Degree Of Chemistry Education Study Programme

Area	Code	Program Learning Outcome

Social Competence	Plo1	Be Able To Respect Humanity Value, Moral, And Ethics, And Entirely Understand Him/Her As Educators As Well As Life-Long Learners.
	Plo 2	Be Able To Apply Logical, Critical, Systematic, Innovative Thinking, And Collaborate For Developing Or Implementing Effective And Applicative Science And Technology In Society Based On His Subject Of Study.
Specialist Competences	Plo 3	Be Able To Design And Conduct Scientific Research With A Multidisciplinary Or Interdisciplinary Approach To Solve Problems In Chemistry Education.
	Plo 4	Be Able To Analyze Main Theoretical Concepts, Such As Organic Chemistry, Biochemistry, Analytical Chemistry, Physical Chemistry, Inorganic Chemistry, And Also Applications In Secondary School And Higher Education.
	Plo 5	Be Able To Apply Pedagogical Concepts (Classic Or Modern Education Theory, Behavioristic, Cognitive Humanistic, And Constructivism) In Chemistry Learning.
	Plo 6	Be Able To Design And Develop Chemistry Learning Activities Which Are Active, Creative, Effective And Fun By Applying Several Approaches, Strategies, Methods, And Media Related To Students Characteristics, Learning Materials, And Learning Goals Led To The Tpack Approach.
	Plo 7	Be Able To Develop And Evaluate Chemistry Laboratory Experiment In Secondary School Level And University Level.
	Plo 8	Be Able To Effectively Write And Present Scientific Reports Based On Research Data, And Publish The Research Result In A Reputable Publication.

G.

H. The Relevance Between Plo And Peo Of Master's Degree Of Chemistry Education Study Program Is Described Below.



I.

J. Figure 1.6 Matrix Of Plo And Peo Of Master's Degree Of Chemistry Education Programme

K.

L. Subject-Specific Criteria Are Developed Based On The Classification Of Chemistry Study Program Body Of Knowledge And Its Plo. The Subject-Specific Criteria (Ssc) For The Graduates Of Master Chemistry Education Study Program Are Stated In The Table Below.

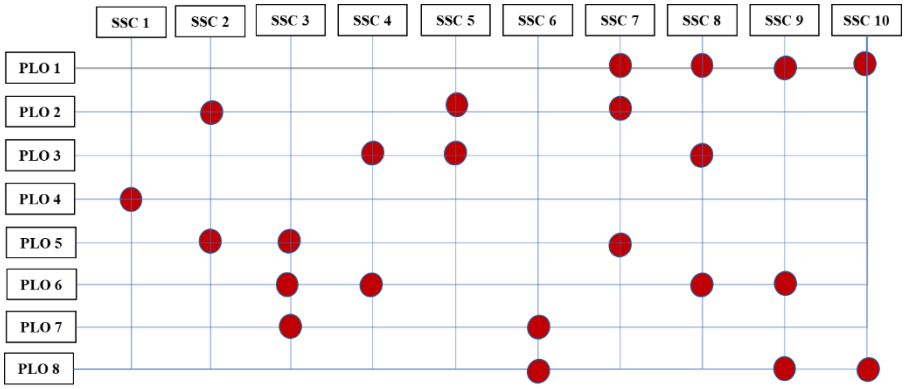
M. Table 1.11 Ssc Of Master's Degree Of Chemistry Education Study Program

Ssc (Subject-Specific Criteria)

Specialist Competences	Ssc 1	Have Escalated Their Knowledge In Core Subjects, Special Subjects Or Interdisciplinary Subjects.
	Ssc 2	Be Able To Have Knowledge Building Up On A Bachelor's Degree Level In Chemistry, Which Forms A Foundation For Original And Competent Development And Implementation Of Ideas Within A Research Area.
	Ssc 3	Be Able To Have Qualified And Professional Competences, E.G., To Work As A Chemist In Industry Or Public Service.
	Ssc 4	Be Able To Carry Out Independent Scientific Work.
	Ssc 5	Be Able To Apply The Knowledge And Its Understanding, In Order To Solve Problems In New And Unaccustomed Situations, Involving Broader (Or Multidisciplinary) Issues.
Social Competences	Ssc 6	Have Acquired A Capacity To Carry Out Independent Scientific Work And To Organize, Conduct And Lead More Complex Projects.
	Ssc 7	Have Acquired Scientific, Technical And Social Competences (Abstraction Ability, Systems Analytical Thinking, Capacity For Teamwork, Ability To Communicate, International And Intercultural Experience Etc.), And Are Therefore Prepared To Take On Leadership Responsibility.
	Ssc 8	Be Able To Combine And Independently Apply Specialized Knowledge In Various Component Disciplines, In Order To Organize, Work On And Manage Complex Problems.
	Ssc 9	Be Able To Make Decisions, Based On Incomplete Or Limited Information.
	Ssc 10	Be Able To Take Into Account Ethical Responsibility In Their Decisions.

N.

O. The Relevance Between Plo And Ssc Of Master's Degree Of Chemistry Education Study Program Is Described In The Matrix Below.



P.

Q. Figure 1.7 Mapping Plo And Ssc Master's Degree Of Chemistry Education Study Programme

The Curriculum Structure Is Designed To Realize The Vision, Mission, Goals, And Objectives Of The Master's Program Of Chemistry Education, Faculty Of Mathematics And

Natural Sciences, And The Vision And Mission Of Unj. The Curriculum Is Made To Meet The Expected Results, Formulated Based On Input And Intensive Communication With Stakeholders, Such As Educational Institutions And The Government, In Order To Produce Quality Graduates.

The Structure Of The Curriculum Has Been Designed And Aligned With The Program Learning Outcomes (Plo). Each Course Is Closely Related To Achieving The Established Plo. In General, There Are 19 Courses And 1 Final Project/Thesis To Achieve All 8 Plos That Have Been Set. The Courses Are Grouped Into 3 Categories; General Courses, Competence Courses, And Elective Courses. General Courses Consist Of 9 Credits, Competence Courses Include 37 Credits, And Elective Courses Include 8 Credits. The Minimum Number Of Credits That Must Be Taken By Students Is 45 Credits Or The Equivalent Of 117 Ects. A Total Of 19 Courses Are Distributed In 3 Semesters And The Thesis Project Is In The Fourth Semester.

The Curriculum In The Chemistry Education Master's Program Is Based On The Indonesian Qualifications Framework (Iqf) Level 8. In Revitalizing The Curriculum, We Involve The Suggestions Of Graduate Users, Discussions With All Lecturers, And Conduct A Situation Analysis Of The Needs Of The World Of Work. This Effort Is Made To Ensure Conformity And Relevance To Scientific Developments, University Regulations And Professional Associations, Suggestions From Alumni And Stakeholders, And The Needs Of The Job Market.

Table 1.29 Course Structure Of Master Of Chemistry Education Study Programme

No	Types Of Courses	Total (In Credits)	Total (In Ects)
1	University's Courses	9	23.4
2	Compulsory Courses	36	93.6
3	Elective Course	2-4	5.34-10.68
Total		**47-50**	**122.2-130**

The Curriculum Of Master Of Chemistry Education Is Arranged Based On The Learning Achievements Completed By The Students To Get The Master's Degree Of Chemistry Education. The Result Of The Learning Achievements (Ilc/Cpl) And The Course Review Connection Is Specific Courses Required By The Students. The Following Table Presents Which Course Category Is Relevant With Its Course Review And Plo:

Table 1.30 Body Of Knowledge Of Master Of Chemistry Education Study Programme

Code	Body Of Knowledge (Bk)	Course Description	Course Name (Relevant To Bk)
Bk1	Basic General Ability	Ability To Think Critically And Creatively, Collaborate, Communicate, Computational Thinking, And Concern In Solving Problem And To Show Integrity And Concern And Also To Share Ideas For Advancement Of Chemistry Education.	1. Philosophy Of Science 2. New Orientation In Education 3. Research Methodology In Education 4. Statistics In Education 5. International Journal Review

			6. Thesis Seminar 7. Thesis
Bk2	Pedagogy Ability	To Have A Competency In Planning, Implementing, And Evaluating The Learning Process, And Also To Arrange A Set Of Learning Activity And Learning Media With Technology-Information-Base.	1. Analyzing And Implementing Chemistry 2. Information Technology In Chemistry 3. Measurement And Evaluation In Chemistry Education 4. Instructional Design And Curriculum Development Of Chemistry Education
Bk3	Acknowledgement Of Chemistry Learning Material Ability	Ability To Acknowledge Chemistry Learning Material Comprehensively And Correctly Based On Reliable Scientific Literature Review.	1. Misconception In Chemistry, Fundamental Concept In Biochemistry And Organic Chemistry 2. Fundamental Concept In Physical Chemistry And Inorganic Chemistry 3. Fundamental Concept Of Analytical Chemistry And Environmental Chemistry 4. Applied Chemistry 5. Green Chemistry 6. Chemical Instruments

Table 1.31 Course Distribution Of Master Of Chemistry Education Study Programme

Course Code	Course Name	Cu	Ects	Plo							
				1	2	3	4	5	6	7	8
Semester 1											
30061013	Philosophy Of Science	3	7.8	V	V		V				
30062023	Educational Research Methodology	3	7.8		V					V	V

33361113	Chemistry Learning, Analysis, And Its Application	3	7.8		V		V	V	V		
33361032	Ict In Chemistry Learning	2	5.2		V		V	V	V		
33363014	Current Issues In Chemistry Education	4	10.4		V	V	V			V	
	Total Cu	12	31.2								
Semester 2											
33363103	Educational Statistics	3	7.8		V					V	V
33362013	Chemistry Learning Design	3	7.8		V		V	V			
33362023	Chemistry Learning Evaluation	3	7.8		V			V	V		
33363063	Misconceptions In Chemistry	3	7.8		V			V		V	V
33361042	New Orientation In Education	2	5.2	V	V			V			
33361122	Academic Writing	2	5.2		V			V		V	V
33363103	Educational Statistics	3	7.8		V					V	V
	Total Cu	**18**	**46.8**								
Semester 3											
33361082	Fundamental Concepts In Biochemistry And Organic Chemistry	2	5.2		V	V		V	V		
33361092	Fundamental Concepts In Physical And Inorganic Chemistry	2	5.2		V	V		V	V		
33361102	Fundamental Concepts In Analytical And Environmental Chemistry	2	5.2		V	V		V	V		
33363082	Seminar On Thesis Proposal	2	5.2		V	V	V	V	V	V	
33361062	Green Chemistry	2	5.2		V	V		V	V		
33363052	Applied Chemistry	2	5.2		V	V		V	V		
	Total Cp	**12**	**31.2**								
Semester 4											
33363006	Thesis	6	15.6	V	V	V	V	V	V	V	V
	Total Cp	**6**	**15.6**								
	Total Credits	**49**	**127.4**								

The Curriculum Structure In Master Degree Program Refers Similar To Bachelor Degree Which Refers To Higher Education Regulation (Permenristekdikti Number 44 Of 2015 And Permendikbud Number 3 Of 2020). In Addition To Follow The Indonesian National Qualifications Framework (Kkni), The National Higher Education Standards (Snpt), The Standards Of The Indonesian Chemistry And Biology Consortium (Hki And Kobi) By Considering The Orientation Of Future Challenges And International Accreditation. As Presented In Criteria 1 The Curriculum Structure The Master Degree Study Program Consists Of 2 Groups Of Courses Of

a. University Course Which Are General Courses (Mata Kuliah Umum-Mku)

b. Study Program Courses Features Consist Of Compulsory Courses And Elective Courses.

The Courses Must Be Completed During A Minimum Study Period Of 4 (Four) Semesters And A Maximum Of 8 (Eight) Semesters With A Credit Unit Range Of 44 – 49 Sks Or 114-127.4 Ects. In The Final Year, Students Conduct Research As Final Thesis In Related To Their Field. In Completion Of Study, Students Are Required To Publish Their Research In International Conference And Publish Their Paper In Reputable International Proceeding/Journal.

1. Structure And Module Of Master Degree In Chemistry Education Study Programme

The Structure And Course (Module) In Chemistry Education Study Program Consists Of 47-49 Credit Hours. The Compulsory Courses Of 36 Credit Hours Give General And Basic Competency For A Chemistry Master Degree. The Elective Courses That Are Offered To The Students Consist Of 2-4 Credits Hours Elective Courses In Addition Of 9 Credit Hours Of General Courses. Elective Courses Are Categorized Into Chemistry Content And Publication. In Master Degree Of Chemistry Education Study Program, The Curriculum Structure Has Been Divided Into 2 Years Program. **First Year** Focuses On General Course And Pedagogy Of Chemistry Which Consist Of 36 Credits Courses. **Second Year** Of Study Focuses On Chemistry Content And Pedagogy Of Chemistry With Thesis Which Consists Of 18 Credits Courses. Each Course Contributes To Plo In Master Degree Of Chemistry Education Study. Each Course Contributes To Plo In Master Degree Of Chemistry Education Study As Diagram 2.4.

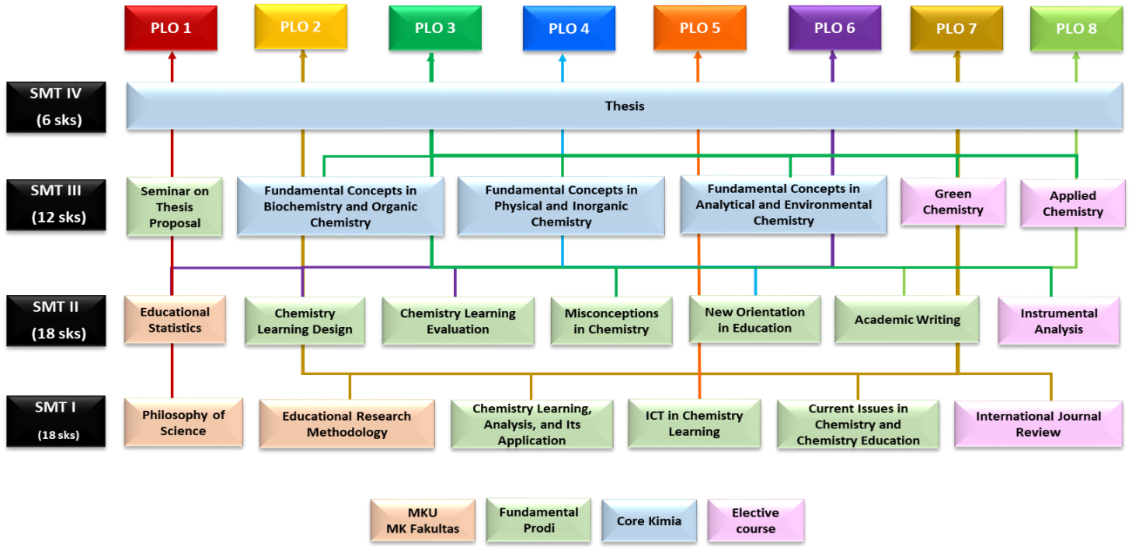


Figure 2.4 Course Mapping Based Of Courses And Plo In Master's Degree Of Chemistry Education Study Program

Program Learning Outcome (Plo) And All Courses Descriptions (Module Handbooks) From The Master Degree Of Chemistry Education Study Program Are Available On The Website: Https://Fmipa.Unj.Ac.Id/S2pendkimia/