	Universitas Negeri Surabaya Faculty of Education, Special Education Undergraduate Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
SCIENCE LEARNING FOR CHILDREN WITH SPECIAL NEEDS	8620202354	IPA	T=1	P=1	ECTS=3.18	3	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)

PLO study program which is charged to the course

PLO-10	Designs special education curriculum and service programs.
PLO-14	Mastering the basics of designing, implementing, assessing services for GDPK

Program Objectives (PO)

PO - 1	Describe cognitive, behavioral and social theories that support the process of mastering science and mathematics concepts for students with special needs
PO - 2	Demonstrate the characteristics of students with special needs in learning science and mathematics concepts
PO - 3	Adapting and modifying the science and mathematics learning curriculum for students with special needs
PO - 4	Skilled in improving the thinking skills of students with special needs through case studies and problem based learning by applying the concepts of observation, classification, measurement, hypothesis and experimentation
PO - 5	Skilled in logical thinking to find alternative solutions in solving problems in science and mathematics classes for students with special needs

PLO-PO Matrix

P.O	PLO-10	PLO-14
PO-1		
PO-2		
PO-3		
PO-4		
PO-5		

PO Matrix at the end of each learning stage (Sub-PO)

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																
PO-5																

Short Course Description	Science and mathematics learning courses for children with special needs are courses that provide opportunities in the fields of science, technology, engineering and mathematics (STEM). Ensuring that children with special needs have equal access to STEM programs is critical. Learn how the accessibility of children with special needs can be improved through STEM. Understanding and knowledge, as well as experience and skills for students through theories, concepts, the nature of science and mathematics, science teaching strategies using inquiry and mnemonics, virtual experiments, manipulative strategies in mathematics learning and problem solving, and using assistive calculator and computer technology. Equipping students to be able to make decisions in applying science and mathematics learning for children with special needs to find alternative solutions in solving problems in science and mathematics classes

References

Main :

1. Matthews, Michael R.2015.Science Teaching.New York and London: Routledge Taylor & Francis Group Mehmet Sahin, Nurettin Yorek.2009. Teaching science to visually impaired students: A small-scale qualitative study. Volume 6, No. 4. US-China Education Review, ISSN1548-6613, USA Miner, Dorothy L., Ron Nieman, Anne B. Swanson, and Woods, Michael.2001. Teaching Chemistry to Students with Disabilities: A manual for High Schools, Coleges, and Graduate Programs. USA: The American Chemical Society National Science Resources Center Advisory Board.1996.Resources for Teaching Elementary School Science. USA: National Academy Press National Science Resources Center Advisory Board.1997. Science for All Children.USA: National Academy Press Wijiastuti, Asri.2016. Bahan Ajar Pendidikan IPA, Hasil Penelitian, tidak diterbitkan Lindenskov, Lena, 2016. Special needs in mathematics education. Denmark:Danish School of Education Aarhus University. Jimenez, Bree Ann, Stanger, Carol.2017. Math manipulatives for students with severe intellectual disability: a survey of special eduation teachers.Physical Disabilities: Education and Related Services, 2017, 36(1),1-12, doi:10.14434/pders.v36i1.22172

Supporters:

1. Jarrett,D.1997. Inquiry strategies for science and mathematics learning

Supporting lecturer	Dr. Asri Wijiastuti, M.Pd. Diah Anggraeny, S.Pd., M.Pd.

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	Understand the competencies, descriptions, sequence of sciencemat learning course material for ABK and lecture contracts	Understand the competencies, descriptions, sequence of sciencemat learning course material for ABK and lecture contracts	**Criteria:** 1.4: mention and explain the 4 CPs correctly 2.3: just mention and explain correctly the 3 CPs 3.2: name and explain correctly 2 CP 4.1: mention and explain 1 CP **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Tests	Expository discussion 2 X 50		**Material:** Learning Material: 1. Meaning of Theory 2. Function of theory 3. Meaning of Learning Theory 4. Why learning theory is important 5. Criteria for assessing theory 6. Learning domain 7. Learning theory **Reference:** *Matthews, Michael R.2015.Science Teaching.New York and London: Routledge Taylor & Francis Group Mehmet Sahin, Nurettin Yorek.2009. Teaching science to visually impaired students: A small-scale qualitative study. Volume 6, No. 4. US-China Education Review, ISSN1548-6613, USA Miner, Dorothy L., Ron Nieman, Anne B. Swanson, and Woods, Michael.2001. Teaching Chemistry to Students with Disabilities: A manual for High Schools, Colleges, and Graduate Programs. USA: The American Chemical Society National Science Resources Center Advisory Board.1996.Resources for Teaching Elementary School Science. USA: National Academy Press National Science Resources Center Advisory Board.1997. Science for All Children. USA: National Academy Press Wijiastuti, Asri. 2016. Science Education Teaching Materials, Research Results, unpublished Lindenskov, Lena, 2016. Special needs in mathematics education. Denmark: Danish School of Education Aarhus University. Jimenez, Bree Ann, Stanger, Carol. 2017. Math manipulatives for students with severe intellectual disability: a survey of special education teachers. Physical Disabilities: Education and Related Services, 2017, 36(1),1-12, doi:10.14434/pders.v36i1.22172*	3%

2	Understanding the nature of Sainsmat for ABK Understanding the scope of Sainsmat Learning for ABK	1. Describe the nature of science for ABK 2. Describes the scope of Sainsmat Learning for ABK	**Criteria:** 1. 4: mention and explain the 4 CPs correctly 2. 3: just mention and explain correctly the 3 CPs 3. 2: name and explain correctly 2 CP 4. 1: mention and explain 1 CP **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Scientific 2 X 50		**Material:** Learning Material: 1. Meaning of Theory 2. Function of theory 3. Meaning of Learning Theory 4. Why learning theory is important 5. Criteria for assessing theory 6. Learning domain 7. Learning theory **Reference:** *Matthews, Michael R.2015.Science Teaching.New York and London: Routledge Taylor & Francis Group Mehmet Sahin, Nurettin Yorek.2009. Teaching science to visually impaired students: A small-scale qualitative study. Volume 6, No. 4. US-China Education Review, ISSN1548-6613, USA Miner, Dorothy L., Ron Nieman, Anne B. Swanson, and Woods, Michael.2001. Teaching Chemistry to Students with Disabilities: A manual for High Schools, Colleges, and Graduate Programs. USA: The American Chemical Society National Science Resources Center Advisory Board.1996.Resources for Teaching Elementary School Science. USA: National Academy Press National Science Resources Center Advisory Board.1997. Science for All Children. USA: National Academy Press Wijiastuti, Asri. 2016. Science Education Teaching Materials, Research Results, unpublished Lindenskov, Lena, 2016. Special needs in mathematics education. Denmark: Danish School of Education Aarhus University. Jimenez, Bree Ann, Stanger, Carol. 2017. Math manipulatives for students with severe intellectual disability: a survey of special education teachers. Physical Disabilities: Education and Related Services, 2017, 36(1),1-12, doi:10.14434/pders.v36i1.22172*	3%
3	Describe STEM-based science learning for children with visual impairments	Formulate the concept of STEM-based science learning for ATN	**Criteria:** 1. 4: the writing is close to the same, and describes the definition of a gifted child correctly. 2. 3: the writing is generally correct, only one aspect is incorrectly explained 3. 2: the writing only contains two correct aspects. 4. 1: writing in general does not answer commands. **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Small Group Discussion, Discovery Learning 2 X 50		**Material:** Learning Materials: 1. Science and Mathematics for ABK 2. Characteristics of ABK learning science and mathematics 3. Standard measurement tools 4. Modification of volume measurement tools for ABK **Reference:** *Jarrett,D.1997. Inquiry strategies for science and mathematics learning*	3%
4	Identifying science mathematics learning strategies using virtual experiments for ATR	Demonstrates the characteristics of science mathematics learning using virtual experiments for ATR	**Criteria:** 1. 4: correct content and placement; 2. 3: the content is correct, there is a placement error, OR the content is incorrectly placed 3. 2: partially correct content, and partially correct placement 4. 1: partially correct and incorrect placement OR correct placement and incorrect content. **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Independent Study Scientific Tutorial 2 X 50		**Material:** Learning Materials: 1. Science and Mathematics for ABK 2. Characteristics of ABK learning science and mathematics 3. Standard measurement tools 4. Modification of volume measurement tools for ABK **Reference:** *Jarrett,D.1997. Inquiry strategies for science and mathematics learning*	3%

5	Describe scientific learning strategies for children with intellectual disabilities using assistive technology and computers	Formulating scientific learning strategies for children with intellectual disabilities using assistive technology and computers	**Criteria:** 1.4: correct content, coherent/coherent, maximum length 150 words. 2.3: correct content, not coherent/coherent, maximum 150 words, 3.2: partially incorrect content, not coherent/coherent, less than 100 words long, 4.1: wrong content **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Small Group Discussion, Problem Based Learning 2 X 50		**Material:** Learning Material: 1. The concept and meaning of STEM integrated science and mathematics for ABK 2. STEM-based PBL stages: problem orientation, formulating problems, solving problems by designing simple technology, preparing reports on problem solving results 3. STEM-based instructional elements include, among others namely Personalization of Learning; Problem-Based Learning (PBL); Rigorous Learning; Career, Technology, and Life Skills. The non-instructional elements are School Community and Belonging; External Community; and supported by supporting elements, namely Staff Foundations and Essential Factors (LaForce, et al., 2016:7). 4. Implementation of STEM-based science and mathematics learning by designing media to solve problems. **Library:** *Jarrett, D. 1997. Inquiry strategies for science and mathematics learning*	3%
6	Describe the principles of scientific learning for children with autism using manipulatives and virtual experiments	Demonstrates the principles of scientific learning for children with autism using manipulatives and virtual experiments	**Criteria:** 1.4: mention completely and explain correctly 2.3: call incomplete and explain correctly 3.2: mention some and explain correctly 4.1: mention some and explain wrong **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Small Group Discussion, Project Based Learning 2 X 50		**Material:** Learning Material: 1. The concept and meaning of STEM integrated science and mathematics for ABK 2. STEM-based PBL stages: problem orientation, formulating problems, solving problems by designing simple technology, preparing reports on problem solving results 3. STEM-based instructional elements include, among others namely Personalization of Learning; Problem-Based Learning (PBL); Rigorous Learning; Career, Technology, and Life Skills. The non-instructional elements are School Community and Belonging; External Community; and supported by supporting elements, namely Staff Foundations and Essential Factors (LaForce, et al., 2016:7). 4. Implementation of STEM-based science and mathematics learning by designing media to solve problems. **Library:** *Jarrett, D. 1997. Inquiry strategies for science and mathematics learning*	3%
7	Describe scientific learning strategies for children with special needs using STEM	1.Develop a scientific learning strategy chart for children with special needs using STEM 2.Presenting a diagram of science mathematics learning strategies for ABK using STEM	**Criteria:** 1.4: complete and correct content and attractive appearance 2.3: the content is complete and correct, the appearance is not attractive OR the appearance is attractive but there are inaccuracies in the content 3.2: the content is partly correct, the appearance is attractive 4.1: the content is incorrect and the appearance is not attractive **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Small Group Discussion, Project Based Learning 2 X 50		**Material:** 1. How to adapt and/or modify the science and mathematics curriculum in the class of students with visual impairments 2. The science and mathematics curriculum in the class of students with hearing impairments 3. The science and mathematics curriculum in the class of students with intellectual disabilities **Reference:** *Jarrett , D. 1997. Inquiry strategies for science and mathematics learning*	3%
8	Meetings 1-7	Meetings 1-7	**Criteria:** Maximum value 100 **Form of Assessment** : Test	Written test 2 X 50		**Material:** material 1-7 **Reference:** *Jarrett, D. 1997. Inquiry strategies for science and mathematics learning*	25%

9	Analyzing science and mathematics books in elementary school about the nature of science and mathematics as knowledge, products and processes Making an analysis of the SLB science and mathematics curriculum and inclusion	1. Explain the nature of science and mathematics as science, process and product 2. Differentiating the science and mathematics curriculum in inclusive and special classes	**Criteria:** 1. 4: mention 2 fields and explain them correctly. 2. 3: mention 2 fields, and explain what is wrong. 3. 2: mentions 2 fields, explains everything wrong 4. 1: call wrong and explain wrong. **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Small Group Discussion, Project Based Learning 2 X 50		**Material:** 4. Science and mathematics curriculum in the class of students with mobility impairments 5. Science and mathematics curriculum in the class of students with learning disabilities 6. Science and mathematics curriculum in the class of students with autism Asperger's barriers **Reference:** *Jarrett, D. 1997 . Inquiry strategies for science and mathematics learning*	3%
10	Applying the basics and principles of a differentiated curriculum	1. Developing differentiated science and mathematics learning plans in inclusion classes 2. Analyzing the content, processes and products of differentiated science and mathematics learning in inclusion classes	**Criteria:** 1. 4: correct according to theoretical and empirical, 2. 3: theoretically correct, empirically partly incorrect; OR theoretical is partially wrong, empirical is correct, 3. 2: theoretical is partly wrong, and empirical is partly wrong 4. 1: theoretical is wrong, empirical is wrong **Form of Assessment** : Portfolio Assessment	Small Group Discussion, Project Based Learning 2 X 50		**Materials:** Learning Materials: 1. How to develop a science and mathematics learning syllabus according to students' obstacles 2. Develop science and mathematics learning objectives according to students' obstacles 3. Arrange learning activities according to the syntax of Problem base learning 4. Develop teaching materials and media required according to students' obstacles 5. Develop evaluations and rubrics 6. Design and prepare science and mathematics learning plans according to students' obstacles according to the template **Reference:** *Jarrett, D.1997. Inquiry strategies for science and mathematics learning*	2%
11	Analyzing water science learning concepts and materials and changes for ABK	1. Explains the concept of water and materials and changes in e-learning 2. Analyzing the effectiveness of water science learning and materials and changes for ABK	**Criteria:** 1. 4: the writing is close to the same, and describes the definition of a gifted child correctly. 2. 3: the writing is generally correct, only one aspect is incorrectly explained 3. 2: the writing only contains two correct aspects. 4. 1: writing in general does not answer commands. **Form of Assessment** : Portfolio Assessment	Inquiry Independent Study 2 X 50		**Materials:** Learning Materials: 1. How to develop a science and mathematics learning syllabus according to students' obstacles 2. Develop science and mathematics learning objectives according to students' obstacles 3. Arrange learning activities according to the syntax of Problem base learning 4. Develop teaching materials and media required according to students' obstacles 5. Develop evaluations and rubrics 6. Design and prepare science and mathematics learning plans according to students' obstacles according to the template **Reference:** *Jarrett, D.1997. Inquiry strategies for science and mathematics learning*	3%
12	Applying scientific learning strategies for gifted children in inclusion classes using inquiry-discovery	1. Describe scientific learning strategies for gifted children in inclusion classes 2. Analyzing the management of scientific learning environments for gifted children	**Criteria:** 1. 1: mention and explain 1 CP 2. 2: name and explain correctly 2 CP 3. 3: just mention and explain correctly the 3 CPs **Form of Assessment** : Participatory Activities, Portfolio Assessment	Responsiveness, Peer Teaching, Small Group Discussion, Problem Based Learning 2 X 50		**Material:** Characteristics and needs for learning science and mathematics for ABK Stages of drill-based PBL: problem orientation, formulating problems, solving problems by designing simple technology, Compiling reports on problem solving results Teaching science and mathematics for ABK **Readers:** *Jarrett, D.1997. Inquiry strategies for science and mathematics learning*	2%

13	Implementing water technology assistance and material changes for children with special needs in inclusion classes	1. Explain the basics of scientific learning technology assistance for ABK 2. Analyzing the assist components of ABK's sciencemat learning technology	**Criteria:** 1. 4: correct content, coherent/coherent, maximum length 150 words. 2. 3: correct content, not coherent/coherent, maximum 150 words, 3. 2: partially incorrect content, not coherent/coherent, less than 100 words long, 4. 1: wrong content **Form of Assessment** : Portfolio Assessment	Small Group Discussion, Project Based Learning 2 X 50		**Material:** 1. Assistive Technology and Accessible Computing 2. Universal Design: Accessible for all obstacles 3. Classes and laboratories for ABK 4. Safety in the laboratory for all obstacles 5. Universal design for laboratories 6. Use of the internet for all obstacles 7. Practical instructions accessible 8. How to arrange media and teaching materials according to the needs and characteristics of ABK. **Library:** *Matthews, Michael R. 2015. Science Teaching. New York and London: Routledge Taylor & Francis Group Mehmet Sahin, Nurettin Yorek. 2009. Teaching science to visually impaired students: A small-scale qualitative study. Volume 6, No. 4. US-China Education Review, ISSN1548-6613, USA Miner, Dorothy L., Ron Nieman, Anne B. Swanson, and Woods, Michael.2001. Teaching Chemistry to Students with Disabilities: A manual for High Schools, Colleges, and Graduate Programs. USA: The American Chemical Society National Science Resources Center Advisory Board.1996.Resources for Teaching Elementary School Science. USA: National Academy Press National Science Resources Center Advisory Board.1997. Science for All Children. USA: National Academy Press Wijiastuti, Asri. 2016. Science Education Teaching Materials, Research Results, unpublished Lindenskov, Lena, 2016. Special needs in mathematics education. Denmark: Danish School of Education Aarhus University. Jimenez, Bree Ann, Stanger, Carol. 2017. Math manipulatives for students with severe intellectual disability: a survey of special education teachers. Physical Disabilities: Education and Related Services, 2017, 36(1),1-12, doi:10.14434/pders.v36i1.22172*	3%

14	Through case studies, students are able to explain and demonstrate teaching science to children with special needs	present a case study of implementing the sciencemat differentiation strategy for ABK	**Criteria:** 1.4: mention and explain the 4 CPs correctly 2.3: correct content, not coherent/coherent, maximum 150 words, 3.2: name and explain correctly 2 CP 4.1: mention and explain 1 CP **Form of Assessment** : Portfolio Assessment	Small Group Discussion, Inquiry Learning, case study 2 X 50		**Material:** 1. Assistive Technology and Accessible Computing 2. Universal Design: Accessible for all obstacles 3. Classes and laboratories for ABK 4. Safety in the laboratory for all obstacles 5. Universal design for laboratories 6. Use of the internet for all obstacles 7. Practical instructions accessible 8. How to arrange media and teaching materials according to the needs and characteristics of ABK. **Library:** *Matthews, Michael R. 2015. Science Teaching. New York and London: Routledge Taylor & Francis Group Mehmet Sahin, Nurettin Yorek. 2009. Teaching science to visually impaired students: A small-scale qualitative study. Volume 6, No. 4. US-China Education Review, ISSN1548-6613, USA Miner, Dorothy L., Ron Nieman, Anne B. Swanson, and Woods, Michael.2001. Teaching Chemistry to Students with Disabilities: A manual for High Schools, Colleges, and Graduate Programs. USA: The American Chemical Society National Science Resources Center Advisory Board.1996.Resources for Teaching Elementary School Science. USA: National Academy Press National Science Resources Center Advisory Board.1997. Science for All Children. USA: National Academy Press Wijiastuti, Asri. 2016. Science Education Teaching Materials, Research Results, unpublished Lindenskov, Lena, 2016. Special needs in mathematics education. Denmark: Danish School of Education Aarhus University. Jimenez, Bree Ann, Stanger, Carol. 2017. Math manipulatives for students with severe intellectual disability: a survey of special education teachers. Physical Disabilities: Education and Related Services, 2017, 36(1),1-12, doi:10.14434/pders.v36i1.22172*	3%
15	Designing simple science and mathematics tools for children with special needs Making simple science and mathematics experiment tools from used materials Preparing MBKM-based science and mathematics learning plans for ABK in Inclusion Classes	1. Demonstrating simple experimental tools in science learning: water; material and its changes, 2. Develop a science and mathematics learning plan based on MBKM for ABK	**Criteria:** 1.4: complete and correct content and attractive appearance 2.3: the content is complete and correct, the appearance is not attractive OR the appearance is attractive but there are inaccuracies in the content 3.2: the content is partly correct, the appearance is attractive 4.1: the content is incorrect and the appearance is not attractive **Form of Assessment** : Portfolio Assessment	AssignmentInquiry 2 X 50		**Material:** 1. How to teach Science and Mathematics to ABK in the classroom and/or in an accessible laboratory 2. Designing an inquiry-based class 3. How to prepare inquiry-based planning 4. Case study of challenges for educators in inquiry-based teaching **Reference:** *Jarrett, D. 1997. Inquiry strategies for science and mathematics learning*	3%
16	Meetings 1-15	Meetings 1-15	**Criteria:** 10 essay questions each weighing between 5-10 **Form of Assessment** : Test	Written Exam 2 X 50		**Material:** meeting material 1-15 **Reference:** *Jarrett, D. 1997. Inquiry strategies for science and mathematics learning*	35%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	12.5%
2.	Project Results Assessment / Product Assessment	11.5%
3.	Portfolio Assessment	15%
4.	Test	61%
		100%

Notes

1. **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.
2. **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.