SUMMARY OF CURRICULUM



UNDERGRADUATE PROGRAM OF BIOLOGY EDUCATION
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS NEGERI SURABAYA
2025

A. OBJECTIVE OF THE DEGREE PROGRAM

Undergraduate Program of Biology Education (UPBE) belongs to the Faculty of Mathematics and Natural Sciences (FMNS) at Universitas Negeri Surabaya (UNESA). This study program was established on 4 December 1968 as one of the original study programs managed by Surabaya Institute of Teacher and Educational Service (IKIP Surabaya) during its early years. Graduates of UPBE are expected to have profiles as biology teachers, researcher assistants, and entrepreneurs in related fields. Thus, UPBE curriculum is designed around the expected graduate profiles and shaped uniquely based on Indonesian educational and environmental climate. As Indonesia is located on the equator, resulting in tropical climate with high potential of biodiversity, UPBE integrates this unique feature into its curriculum to produce qualified graduates with competencies relevant to local conditions and communities. Objectives of UPBE are derived from the visions and missions of institution and faculty as detailed in the following paragraphs.

1. The Vision and Mission of Institution (Unesa)

Universitas Negeri Surabaya (Unesa) was established in 1964 in Surabaya, Indonesia as Surabaya Institute of Teacher and Educational Service (IKIP Surabaya) based on Presidential Decree No. 1 Year 1963. The institute converted into university to organize a wider mandate in 1999 based on Presidential Decree No. 99 Year 1999. In the year of 2022, Unesa has officially changed its legal institutional status from a Public Service Agency (*Badan Layanan Umum*/BLU) to a State University with Legal Entity (*Perguruan Tinggi Negeri Berbadan Hukum/*PTNBH) status. Following this transition, Unesa established new institutional vision and missions as a State University with Legal Entity status, in 2022 as follows.

Vision:
Becoming a strong, adaptive, and innovative educational university based on entrepreneurship

Mission

a. To provide education in both educational and non-educational fields that is strong, adaptive, and innovative, based on entrepreneurship;
b. To conduct research and enhance the quality of innovation in educational and non-educational fields with an entrepreneurial foundation;
c. To carry out community service and disseminating innovations in educational and non-educational fields with an entrepreneurial basis for the welfare of society;
d. To implement Tridharma of Indonesian higher education (education, research, and community service) through a multi-campus system in a synergistic, integrated, harmonious, and sustainable manner, while upholding Unesa's strengths;
e. To organize governance that is effective, efficient, transparent, and accountable, ensuring continuous quality improvement;
f. To establish productive national and international collaborations to create, develop, and disseminate innovations in educational and non-educational fields with an entrepreneurial foundation.

2. **The Vision and Mission of Faculty (FMNS)**

Faculty of Mathematics and Natural Sciences (FMNS) was established as one of faculties in IKIP Surabaya in 1964, originally named Faculty of Exact Science Education. Based on the vision and mission established by Unesa, FMNS has established its vision and mission in line with the university vision and missions. The vision and missions of FMNS are established as follows.

Vision

"Becoming a resilient, adaptive, innovative, and collaborative Faculty of Mathematics and Natural Sciences based on edu-ecopreneurship and gaining international recognition."

Mission:

a. To organize research-based education in the field of education and non-education of Mathematics and Natural Sciences that is adaptive, innovative, collaborative, and characterized by *edu-ecopreneurship*;
b. To conduct research and improving the quality of innovation in the field of MIPA education and non-education through global collaboration;
c. To organize community service and disseminating innovations in the field of MIPA education and non-education for community empowerment;
d. To organize effective, efficient, transparent and accountable governance in FMIPA;
e. To establish productive national and international cooperation to create, develop, and disseminate innovations in the fields of MIPA education and non-education.

3. Program Educational Objectives (PEO)

Vision of the Undergraduate Program of Biology Education

The scientific vision of UPBE is derived from the visions of both Unesa and FNMS, which is: a study program with academic excellence aimed at producing competent graduates in the field of biology education and technology, research-based, adaptive, and possessing global competitiveness.

Based on UPBE vision, graduates are expected to have one of the following profiles

a. Educator in Biology
Mastering basic knowledge in biology and pedagogy, as well as able to apply problem-solving in biology education and become a lifelong learner.

b. Researcher Assistant
Mastering basic knowledge in biology and pedagogy, as well as scientific methods to perform research in biology education.

c. Entrepreneur
Mastering basic knowledge of biology and pedagogy, and able to apply it in problem-solving.

Based on the graduate profiles, UPBE designed the following Program Educational Outcomes (PEO) (**Table 1**). **Table 2** presents the correlation of each UPBE PEO to the 6th level competence standard of Indonesian National Qualification Framework (NQF), the expected qualification level for bachelor degree graduates in Indonesia.

Table 1. Program Educational Objectives (PEO) of UPBE

No.	Program Educational Objectives (PEO)
1.	Graduates master the basic concepts of biology, pedagogy, and are able to apply them in solving problems related to Biology Education.
2.	Graduates have the ability to continuously develop themselves in the knowledge of biology and biology education, either formally or informally.
3.	Graduates master scientific methods to observe, experiment, and analyze problems in biology education, as well as master deduction and induction methods and their application to support careers.
4.	Graduates possess ethics, responsibility, leadership skills, and the ability to educate through advanced educational methodologies.
5.	Graduates are able to communicate in professional activities at both national and international levels.

Table 2. Correlation of UPBE PEOs to 6th level competences of Indonesian NQF

PEOs	6th level competences of IQF*			
	Able to apply expertise and utilize knowledge and technology in their respective fields of expertise to solve problems and adapt to encountered situations	Able to deeply understand general and specific theoretical concepts in certain fields of science and able to formulate problem solving procedurally	Able to make appropriate decisions based on analysis of information and data and provide guidance in choosing various alternative solutions both independently and in teams	Responsible for their own work and can be given responsibility for the achievement of organizational work results
1	S	S	S	M
2	S	S	S	S
3	S	S	S	S
4	M	S	S	S
5	S	M	S	S

*) Relevance, S = Strong, M = Moderate

B. PROGRAM LEARNING OUTCOMES (PLOs) OF UPBE

1. Specialist Competence and Social Competencies in UPBE

Based on the PEO of study program, UPBE designed its program learning outcomes (PLOs) expected of graduates to include social competencies including attitude and general skills, and specialist competence including knowledge and special skills (**Table 3**). In the Table below, PLO-1 to PLO-4 are learning outcomes expected to all graduates of Unesa.

Table 3. Program Learning Outcomes (PLO) of UPBE with Social competencies (attitude, general skills) and Specialist Competence (knowledge, special skills)

Competency SSC-ASIIN	Aspect	PLO	DESCRIPTION
Social competences	**Attitude (AT)**	PLO-1 /AT-1	Able to demonstrate religious, national, and cultural values, as well as academic ethics in carrying out task.
		PLO-2/ AT-2	Demonstrates resilience, collaboration, adaptability, innovation, inclusiveness, lifelong learning, and entrepreneurial spirit.
	General Skills (GS)	PLO-3/ GS-1	Able to develop logical, critical, systematic, and creative thinking in performing specific tasks in their field of expertise in accordance with the competency standards of the relevant work area.
		PLO-4/ GS-2	Able to develop themselves continuously and collaborate.
		PLO-5/ GS-3	Able to communicate ideas, concepts, and research results effectively, both orally and in writing.
		PLO-6/ GS-4	Able to make decisions based on data/information in order to complete tasks as part of their responsibility in the work performed.
Specialist competences	**Knowledge (KN)**	PLO-7/ KN-1	Able to demonstrate knowledge of biology at the molecular, cellular, and organism levels, as well as their interactions with the environment.
		PLO-8/ KN-2	Able to demonstrate the ability to apply biological concepts and environmental issues with relevant technology in the management of natural resources.
		PLO-9/ KN-3	Able to demonstrate pedagogical knowledge in designing, implementing, and evaluating biology learning.
		PLO-10/ KN-4	Able to demonstrate knowledge related to biology education research.
	Special Skills (SS)	PLO-11/ SS-1	Able to design, implement, and evaluate biology learning by utilizing ICT.
		PLO-12/ SS-2	Able to design and conduct experiments in biology learning to obtain, analyze, and interpret data for problem-solving.
		PLO-13/ SS-4	Able to design problem-solving strategies by implementing transferable skills in the field of biology to develop eco-preneurship (eco-innovation, eco-opportunity, eco-commitment).

2. Correlation between the PEOs and the PLOs

The correlation between the Program Educational Objectives (PEOs) and the Program Learning Outcomes (PLOs) illustrates the alignment between the long-term goals of the Biology Education Study Program and the specific competencies that graduates are expected to achieve (**Table 4**). This correlation ensures that the educational objectives are translated into measurable learning outcomes, thereby guaranteeing that graduates possess the necessary knowledge, skills, and attitudes to meet professional, academic, and societal needs.

Table 4. Correlation of PEOs and PLOs of Biology Teacher study program

PLO	Program Education Outcomes (PEO) No*				
	1	2	3	4	5
	Graduates who master the basic concepts of biology and pedagogy, and are able to apply them in solving problems related to Biology Education	Graduates who have the ability to continuously develop themselves in biology and biology education knowledge, both formally and informally.	Graduates master scientific methods to observe, experiment, and analyze problems in biology education, master deductive and inductive methods and their applications to support careers.	Graduates who possess ethics, responsibility, and leadership spirit, as well as the ability to educate through advanced educational methodologies.	Graduates who are able to communicate in professional activities at both national and international levels.
PLO -1	-	V	V	V	V
PLO-2	-	-	-	V	V
PLO-3	V	V	V	-	-
PLO-4	-	V	-	V	V
PLO-5	-	V	V	V	V
PLO-6	V	V	V	V	-
PLO-7	V	V	-	V	-
PLO-8	V	V	V	V	V
PLO-9	V	V	V	V	V
PLO-10	V	V	V	V	V
PLO-11	V	V	V	V	V
PLO-12	V	V	V	V	V
PLO-13	V	V	V	V	V

3. Correlation between PLO of UPBE and SSC ASIIN

As UPBE has complied to ASIIN standards, PLO expected of graduates has also been related to Subject-specific Criteria (SSC) of ASIIN. **Table 5** below presents the correlation of each UPBE PLO to SSC ASIIN.

Table 5. Correlation of UPBE PLO to SSC ASIIN

Subjec-specific Criteria	PLO-1/ AT-1	PLO-2/ AT-2	PLO-3/ GS-1	PLO-4/ GS-2	PLO-5/ GS-3	PLO-6/ GS-4	PLO-7/ KN-1	PLO-8/ KN-2	PLO-9/ KN-3	PLO-10/ KN-4	PLO-11/ SS-1	PLO-12/ SS-2	PLO-13/ SS-3
SPECIALIST COMPETENCES													
Have acquired sound fundamental biology relevant knowledge of mathematics and the natural sciences,							Relevant						
Have sound knowledge of the fundamentals of molecular, cell and organismic biology							Relevant						
Have gained methodological competence in bio sciences and are also able to apply this in other contexts			Relevant		Relevant	Relevant				Relevant			
Are able to carry out practical work in labs and outdoors independently as well as handle organisms												Relevant	
Have relevant knowledge of safety and environmental issues as well as the associated legal fundamentals													Relevant
Have gained sound knowledge in at least one special life science area of the degree programme								Relevant	Relevant				

Subjec-specific Criteria	PLO-1/ AT-1	PLO-2/ AT-2	PLO-3/ GS-1	PLO-4/ GS-2	PLO-5/ GS-3	PLO-6/ GS-4	PLO-7/ KN-1	PLO-8/ KN-2	PLO-9/ KN-3	PLO-10/ KN-4	PLO-11/ SS-1	PLO-12/ SS-2	PLO-13/ SS-3
Are able to recognize and solve subject relevant problems,								Relevant			Relevant		
Aare able to solve life science problems and present the results						Relevant						Relevant	
SOCIAL COMPETENCES													
Have trained conceptual, analytical and logical thinking			Relevant										
Have an awareness of possible social, ethical and environment-related effects of their actions,	Relevant												
Have acquired communication skills, also in a foreign language and can communicate scientific information to experts and laypersons in a suitable manner,					Relevant								
Have a capacity for teamwork, also on an intercultural basis		Relevant		Relevant									
Have acquired life-long learning strategies.		Relevant											

C. STRUCTURE OF UPBE DEGREE PROGRAM

The current curriculum of biology adopts a new paradigm of education; outcomes-based education, learner-centered learning, continuous improvement, and international benchmarking and accreditation. The curriculum is periodically updated every five years or if there is a change in policy of the authorities, i.e., presidential decree, ministry of education, directorate of higher education and/or rector of the university. Several aspects, such as the needs of study program association, stake holders, collaborative partners are also considered.

The development of the Biology Education curriculum refers to various standards. The government policies referred to in the development of the Biology Education curriculum include the implementation of Indonesia's NQF and national standards for higher education. Indonesian NQF was first stated in presidential decree No. 12, 2012, which placed the bachelor program at level 6. The level targets graduate to be capable of mastering and applying concepts, analyzing, making decisions, mastering and applying theories, and being responsible. Meanwhile, the established national education standards include Graduate Competency, Learning Content, Learning Process, Learning Assessment, Lecturer and Educational Staff, Learning Facilities and Infrastructure, Learning Management, and Learning Financing Standards. The vision and mission of Surabaya State University and the Faculty of Mathematics and Natural Sciences are referred to highlight the distinctive characteristics of the University and the Faculty.

Based on that reference, a group of courses is organized that includes **Core Personality Development Courses**, **Basic Skill Courses**, Subject Matter and Skill Courses, and **Final Year Project**. The determination of Subject Matter and Skill Courses refers to several standards. NSES (National Science Education Standards) and NGSS (Next Generation Science Standards) are applied to meet international education standards. National standards in the field of Biology Education are determined based on the study program association standards. In addition, the secondary school curriculum (Curriculum 2013 and Independent Curriculum) is essential for structuring the Biology Education study program courses, which will be implemented in the field when Biology Education graduates work. This also accommodates the needs of graduate users, stakeholders, and collaborative partners. In order to support the interests of the students and the completion of their final projects, several elective courses are also provided.

The description above shows that curriculum development integrates international, national, and local standards/needs and individual student needs, thus fulfilling the following principles illustrated in the image below (**Figure 1**).

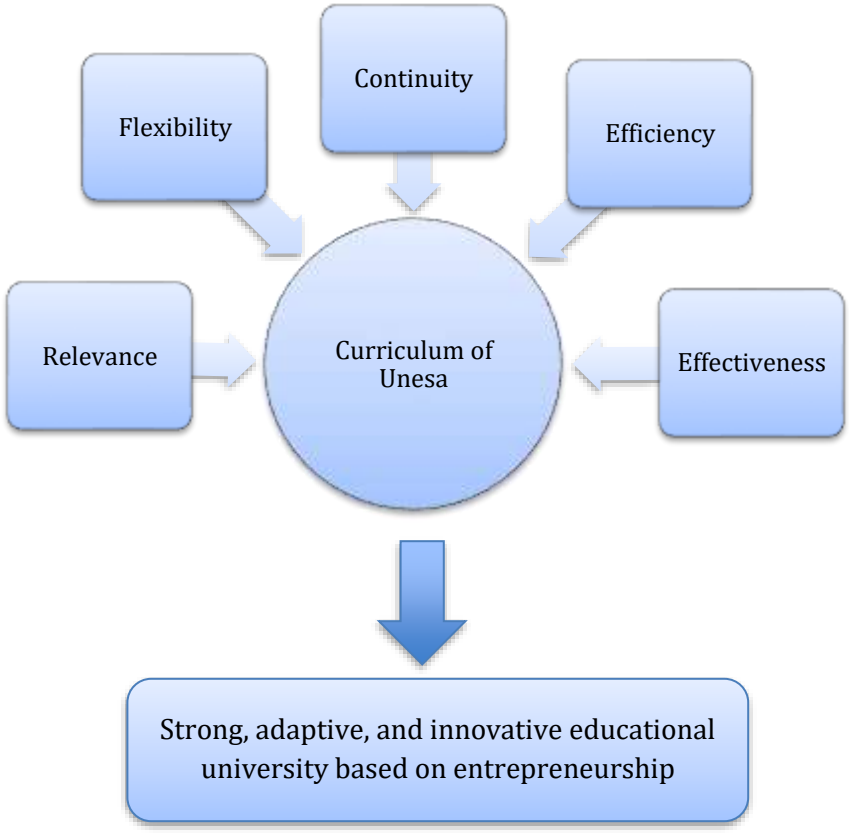


Figure 1. Principles of curriculum development in Unesa

Each Credit Unit (CU) in Unesa, referring to Guide of Unesa Curriculum 2024, for bachelor degree equals to 170 minutes per week (50' face to face learning, 60' structured learning, and 60' independent learning). In one semester, courses are conducted in 14 weeks (excluding mid- and end-term exam). Thus, 1 CU equals to 39.67 workhours per semester. One CU equals to 1.59 ECTS, assuming that 1 European Credit Transfer and Accumulation System (ECTS) equal to 28.56 workhours per semester (based on Rector Decree 736/HK/KM/2023).

The minimum workload of Undergraduate Programme at Unesa is 144 credit units (CU) which correspond to 5,712 hours or 228.48 ECTS, and are generally distributed in 8 regular semesters. On average, the total hour per semester is 714 hours. The normal workload for each regular semester is limited to 793.33 hours, corresponds to 20 CU (32 ECTS). **Table 6** below presents the distribution of course into each course category.

Table 6. Distribution of courses in UPBE

Competency Courses	Courses	Course Ratio (%)	Credit Units
Basic Skill Courses	a. Research Methodology [3 CU] b. Statistics [2 CU] c. Fundamentals of Education courses [14 CU]; and/or d. Faculty Compulsory Curriculum Subjects (i.e. FMNS: General Biology [3 CU], General Physics [3 CU], General Chemistry [3 CU, Basic Mathematics [2 CU], Conservation of Natural Resources and Environment [2 CU], in total 13 CU)	3 - 22	5 - 32
Core Personality Development Courses	a. National Compulsory Curriculum Subjects (Religion [2 CU], Study of Pancasila [2 CU], Civic Education [2 CU], Bahasa Indonesia [2 CU], in total 8 CU) b. Institutional Compulsory Curriculum Subjects (Physical Education [2 CU], Digital Literacy [2 CU], Entrepreneurship [2 CU], English [2 CU], in total 8 CU)	11	16
Subject Matter and Skill Courses	a. National Compulsory Curriculum Subjects (Religion [2 CU], Study of Pancasila [2 CU], Civic Education [2 CU], Bahasa Indonesia [2 CU], in total 8 CU) b. Institutional Compulsory Curriculum Subjects (Physical Education [2 CU], Digital Literacy [2 CU], Entrepreneurship [2 CU], English [2 CU], in total 8 CU)	35 -54	50 - 77
Final Year Project	a. Final Project Proposal [2 CU] b. Final Project [4 CU]	4	6

D. CURRICULUM ROADMAP OF UPBE

Graduates of UPBE are expected to finish 144 CU in 8 semesters, distributed into basic skill courses, core personality development courses, subject matter and skill courses, and final year project. **Table 7** below shows the mapping of learning outcomes as expected of graduates and course expected to be finished by students. Courses are categorized as mandatory courses, elective courses taken optionally by students organized by UPBE, academic special courses organized by Unesa based on *Merdeka Belajar* programs take by students, and special course in the Introduction to School program.

Table 7. Program Learning Outcomes of each course in UPBE

No.	Code	Course Name	CU	Program Learning Outcomes (PLO)												
				Social competences						Specialist competences						
				Attitude		*General Competences*				*Knowledge*				*Special competences*		
				AT 1	AT 2	GC 1	GC 2	GC 3	GC 4	KN 1	KN 2	KN 3	KN 4	SS 1	SS 2	SS 3
1	100000202x	Religion	2	√												
2	1000002033	Civic Education	2	√												
3	1000002018	Study of Pancasila	2	√												
4	1000002003	Bahasa Indonesia	2	√		√										
5	1000002047	Physical Education	2		√											
6	1000002046	Digital Literation	2			√	√									
7	1000002176	Entrepreneurship	2		√	√	√									
8	8420502034	English for Biology	2		√	√	√									
9	8420503056	General Biology	3		√					√						
10	8420503136	General Chemistry	3		√					√						
11	8420503100	General Physics	3		√					√						
12	8420502278	Mathematics	2				√	√								
13	8420502138	Conservation of Natural Resources and Environment	2		√	√	√	√		√	√					√
14	8420502012	Human Anatomy and Physiology	2			√				√						
15	8420502047	Biochemistry	2			√				√						
16	8420502318	Cellular and Molecular Biology	2							√	√					
17	8420502062	Biotechnology	2				√			√						√
18	8420504080	Ecology	4			√		√		√	√					√
19	8420502095	Evolution	2			√		√		√						
20	8420504101	Animal Physiology	4			√		√		√						
21	8420504102	Plant Physiology	4			√		√		√						
22	8420504322	Genetics and Genomics	4			√		√		√						
23	8420503164	Microbiology	3			√				√	√					
24	8420504221	Plant Systematics	4			√		√		√						

No.	Code	Course Name	CU	Program Learning Outcomes (PLO)												
				Social competences						Specialist competences						
				Attitude		*General Competences*				*Knowledge*				*Special competences*		
				AT 1	AT 2	GC 1	GC 2	GC 3	GC 4	KN 1	KN 2	KN 3	KN 4	SS 1	SS 2	SS 3
25	8420504220	Animal Systematics	4			√				√						
26	8420504226	Plant Structure and Development	4			√		√		√						
27	8420504271	Animal Structure and Development	4			√	√	√	√	√						
28	8420502316	Biodiversity	2					√		√						√
29	8420503158	Research Methodology in Biology Education	3			√	√	√	√				√		√	
30	8420502309	Biostatistics and Biocomputer	2			√	√		√						√	
31	1000002005	Fundamentals of Education	2			√						√				
32	8420502284	Learning Theories	2			√	√					√				
33	8420502294	School Curriculum	2									√		√		√
34	8420502290	Instructional Design	2									√		√	√	√
35	8420502292	Learning Evaluation	2									√		√		√
36	8420502291	Development of Learning Medium	2									√		√		√
37	8420502317	Microteaching	2									√	√	√		√
38	8420503293	Innovative Learning	2			√						√		√	√	√
39	1000020149	Professional Teaching Program Design	2	√	√	√	√									
40	MBKM0031	Professional Teaching Program Evaluation	2	√		√	√									
41	1000002104	Final Project Seminar	2			√	√	√	√		√	√	√	√	√	√
42	1000004105	Final Project	4			√	√	√	√		√	√	√	√	√	√
45	8420502046	Biogeography*	2			√				√						
46	8420503270	Conservation Biology*	2			√				√						
47	8420502055	Applied Biology*	2			√				√						
48	8420502063	Aquaculture*	2			√				√						
49	8420502079	Ecophysiology*	2			√				√						
50	8420502086	Ecotoxicology*	2			√				√						
51	8420502274	Aquatic Ecology*	2			√				√						
52	8420502110	Nutrition, Health, and Psychotropics*	2			√				√						
53	8420502111	Plant Pests and Diseases*	2			√				√						
54	8420502112	Histology*	2			√				√						
55	8420502113	Environmental Science*	2			√				√						
56	8420502114	Tissue Culture*	2			√				√						
57	8420502115	Mycology*	2			√				√						
58	8420502116	Applied Microbiology*	2			√				√						
59	8420502167	Microtechnology*	2			√				√						
60	8420502168	Biodiversity*	2			√				√						
61	8420502192	Waste Management*	2			√				√						
62	8420502213	Plant Reproduction*	2			√				√						
63	8420502211	Animal Reproduction*	2			√				√						

No.	Code	Course Name	CU	Program Learning Outcomes (PLO)												
				Social competences						Specialist competences						
				Attitude		*General Competences*				*Knowledge*				*Special competences*		
				AT 1	AT 2	GC 1	GC 2	GC 3	GC 4	KN 1	KN 2	KN 3	KN 4	SS 1	SS 2	SS 3
64	8420502212	Algae Systematics*	2			√				√						
65	8420502094	Curriculum Evaluation and Development*	2			√						√				
66	8420502149	Laboratory Management*	2			√				√						
67	8420502323	IT-Based Multi Media*	2			√						√				
68	8420502325	AI-Based Learning*	2			√						√				
69	8420502269	Instrument Development*	2			√						√				
70	8420502195	Development of Biology Education Research*	2			√						√				
71	8420502207	Problems and Innovations in Biology Education*	2			√						√				
72	1000002051	School Curriculum Analysis**	2									√	√	√	√	
73	1000002055	Learning Assessment Development**	2									√	√	√	√	
74	1000003053	Analysis of Teaching Materials**	3									√	√	√	√	
75	1000002054	Learning Media Development**	2									√	√	√	√	
76	1000003052	Learning Plan Development**	3									√	√	√	√	
77	1000020149	Teaching Practice**	4									√	√	√	√	
78	MBKM0051	Program Evaluation Research***	2			√	√									
79	MBKM0052	Program Planning Research***	2			√	√									
80	1000020150	Capita Selecta Biology Education***	3			√	√									
81	1000020151	Continuing Biology Education***	3			√	√									
82	1000020152	Application of Statistics in Biology Education***	4			√	√									
83	1000020164	Conference***	2			√	√	√								
84	8420502393	Critical Thinking***	2					√								
85	8420502401	Communication Skills***	2					√								
86	MBKM0041	Independent Study Program Evaluation***	2			√	√									
87	MBKM0042	Independent Study Program Planning***	2			√	√									
88	1000020156	Socio-Scientific Issue (SSI) in Society***	2			√	√									
89	8420504404	Community Biology***	4				√	√								√
90	8420504405	Biological reasoning***	4			√	√		√							
91	MBKM0033	Program Evaluation Teaching Assistant***	2									√		√	√	
92	MBKM0034	Program Planning Teaching Assistance***	2									√		√	√	
93	8420503374	Development of Biology-Based Literacy and Numeracy***	3			√						√			√	

No.	Code	Course Name	CU	Program Learning Outcomes (PLO)												
				Social competences						Specialist competences						
				Attitude		*General Competences*				*Knowledge*				*Special competences*		
				AT 1	AT 2	GC 1	GC 2	GC 3	GC 4	KN 1	KN 2	KN 3	KN 4	SS 1	SS 2	SS 3
94	8420503335	Design & Implementation of Student-centered Learning***	3									√		√	√	√
95	8420502372	School Environment Empowerment Through Biology Education***	2											√		√
96	8420502401	Public Communication***	2				√	√				√				
97	8420502407	Personality development***	2		√	√	√									
98	8420502408	Management and Leadership***	2		√	√	√									
99	8420502409	Interpersonal Communication***	2		√		√	√								
100	MBKM0007	Program Evaluation Internship***	2		√	√						√		√	√	
101	MBKM0012	Program Planning Internship***	2									√		√	√	
102	8420502410	Project Implementation***	3						√						√	√
103	8420502411	Applied Research Methodology***	2			√			√						√	
104	8420502412	Field Project Management***	2						√					√	√	
105	8420502413	Product Innovation***	3			√			√							√
106	8420502414	Scientific Communication & Dissemination***	2					√								
107	MBKM0039	Program Evaluation Village Project***	2				√									√
108	MBKM0018	Village Project Program Planning	2				√					√				√
109	8420502375	Local Potential Development and Social Entrepreneurship***	2		√	√										√
110	8420502363	Community Empowerment Program Management***	2		√	√										√
111	8420502355	Leadership in Community Empowerment***	2	√	√	√										
112	8420502356	Information Technology for Community Empowerment***	2				√		√							
113	8420502328	Village Program Administration***	2			√			√							
114	8420502344	Evaluation of Community Empowerment Programs***	2		√	√	√		√							
115	8420502345	Community Empowerment Program Planning***	2		√	√	√		√							√
116	MBKM0039	Humanitarian Project Program Evaluation***	2		√	√	√		√							
117	MBKM0040	Humanitarian Project Program Planning***	2		√	√	√		√							
118	8420502373	Multicultural Education***	2	√	√	√										
119	8420502354	Social Innovation and Local Education***	2		√	√	√							√	√	
120	8420502359	Event Management***	2		√		√	√								√

No.	Code	Course Name	CU	Program Learning Outcomes (PLO)												
				Social competences						Specialist competences						
				Attitude		*General Competences*				*Knowledge*				*Special competences*		
				AT 1	AT 2	GC 1	GC 2	GC 3	GC 4	KN 1	KN 2	KN 3	KN 4	SS 1	SS 2	SS 3
121	8420502385	Social Psychology and Humanities***	2	√	√											√
122	MBKM0041	Independent Study Program Evaluation***	2		√	√	√									√
123	MBKM0042	Independent Study Program Planning***	2		√	√	√									√
124	MBKM0007	Entrepreneurship Program Evaluation***	2		√	√	√									√
125	MBKM0012	Entrepreneurship Program Planning***	2		√	√	√									√
126	8420502386	Entrepreneurial Practices***	2		√		√									√

*) UPBE elective courses

**) Introduction to School (PLP) program special courses

***) Academic special courses

Table 8 below presents the curriculum structure of UPBE FMNS. Students can finish the curriculum in four years. In the 5th and 6th semester, students are required to program academic special course organized by Unesa and special course in Introduction to School Program. Students are able to take elective courses in 7th and 8th semester.

Table 8. Curriculum Structure of UPBE FMNS UNESA

1st semester			2nd semester		
No.	**Course**	**Credit**	**No.**	**Course**	**Credit**
1	General Biology	3	1	Animal Structure and Development	4
2	Biochemistry	2	2	Conservation of Natural Resources and Environment	2
3	General Chemistry	3	3	Biostatistics and Biocomputer	2
4	General Physics	3	4	Religion	2
5	Mathematics	2	5	Physical Education	2
6	Study of Pancasila	2	6	English	2
7	Fundamentals of Education	2	7	Entrepreneurship	2
8	Learning Theories	2	8	School Curriculum	2
			9	Development of Learning Medium	2
Total Credits		**19**		**Total Credits**	**20**

3rd semester			4th semester		
No.	**Course**	**Credit**	**No.**	**Course**	**Credit**
1	Animal Physiology	4	1	Ecology	4
2	Plant Physiology	4	2	Genetics and Genomics	4
3	Plant Structure and Development	4	3	Plant Systematics	4
4	Microbiology	3	4	Animal Systematics	4
5	Bahasa Indonesia	2	5	Research Methodology in Biology Education	3
6	Digital Literation	2			
7	Learning Evaluation	2	6	Instructional Design	2
8	Innovative Learning	2	7	Evolution	2
Total Credits		**24**		**Total Credits**	**23**

5st semester			6nd semester		
No.	**Course**	**Credit**	**No.**	**Course**	**Credit**
1	Human Anatomy and Pgysiology	2	1	Civic Education	2
2	Cellular and Molecular Biology	2	2	Intro to School Program Design	2
3	Microteaching	2	3	Intro to School Evaluation	2
4	Elective Course*/***	16	4	Elective Course**	16
Total Credits		**22**			**22**

7st semester			8nd semester		
No.	**Course**	**Credit**	**No.**	**Course**	**Credit**
1	Biotechnology	2	1	Final Project Proposal	2
2	Biodiversity	2	2	Final Project	4
3	Electives*	4			
Total Credits		**8**			**6**

*) UPBE elective Courses
***) Special courses of Introduction to School Program (PLP)*
****)Academic Special courses*

PLO ROADMAP

Figure 2 below presents the design of PLO roadmap to complete the curriculum of UPBE FMNS. Roadmap to complete each PLO are presented in the subsequent pages.

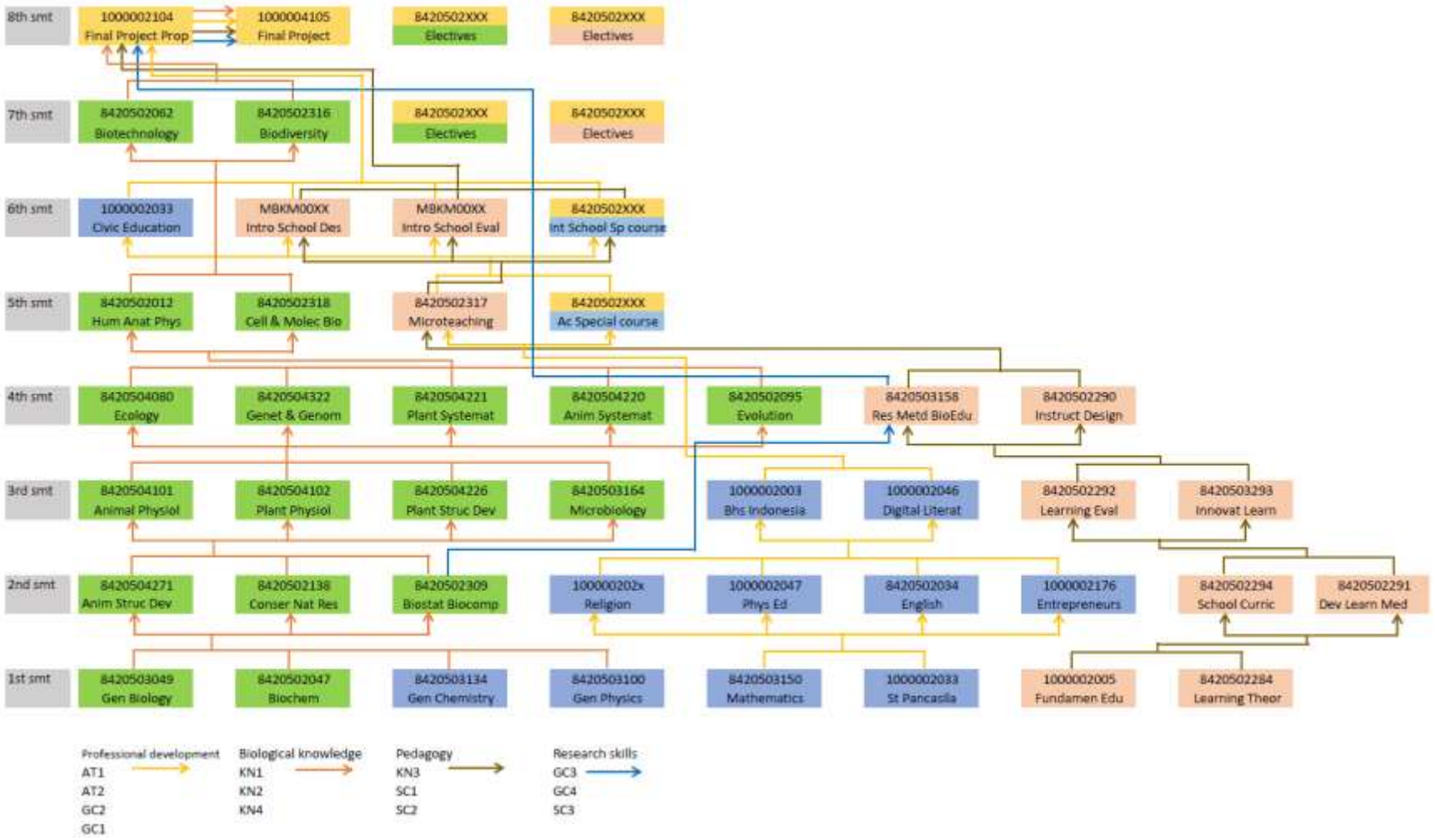
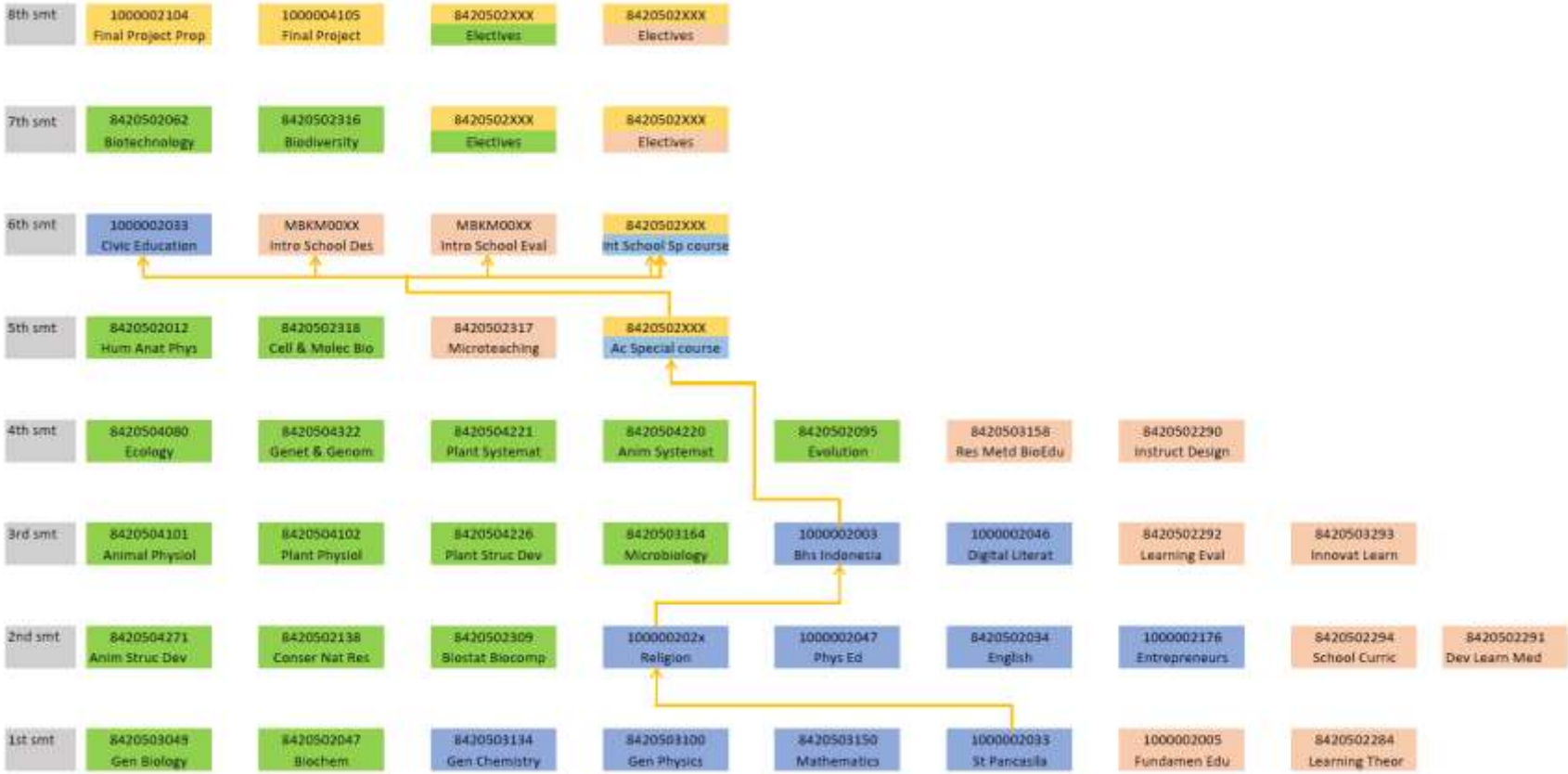
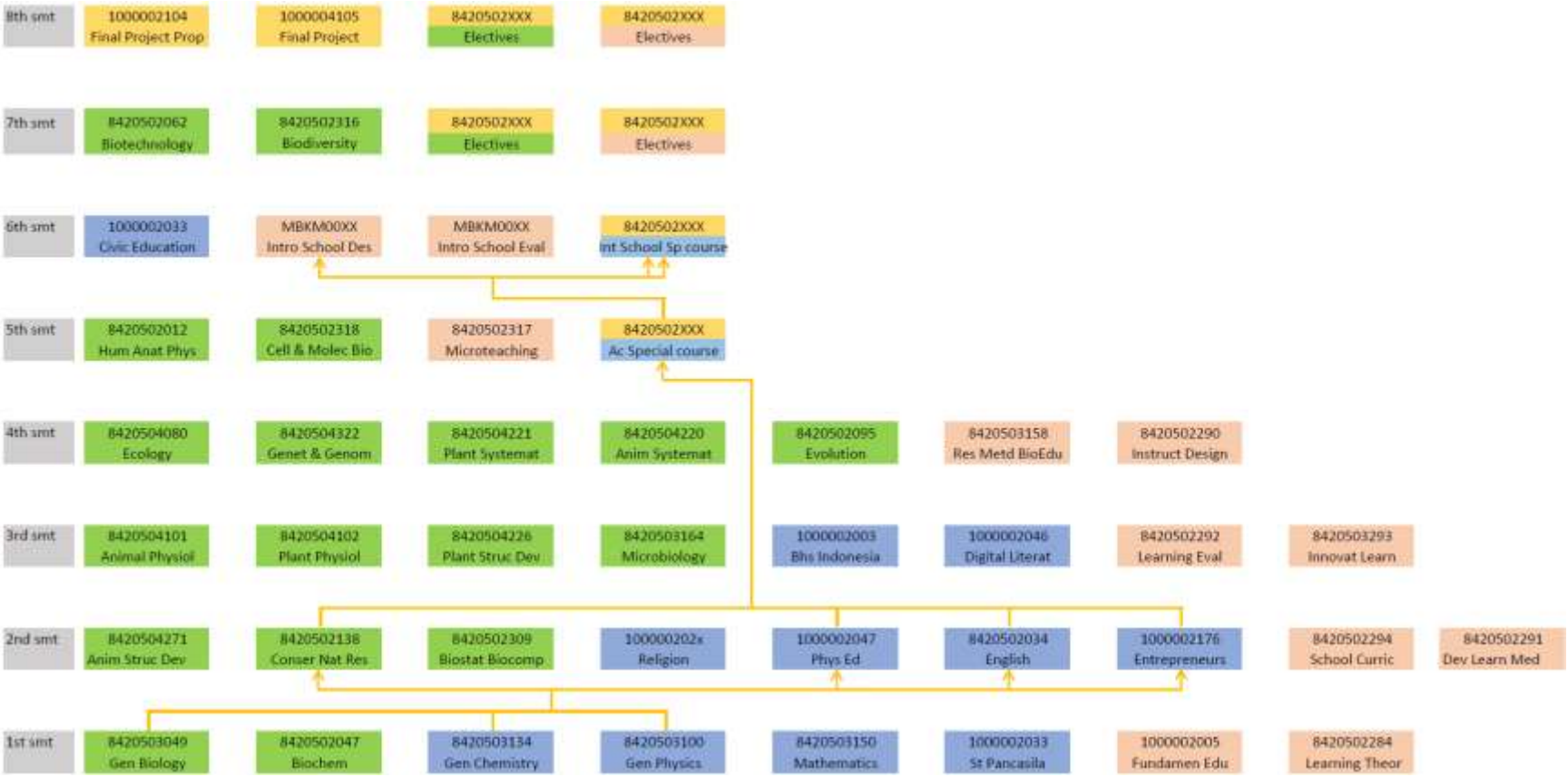


Figure 2. PLO Roadmap of UPBE FMNS

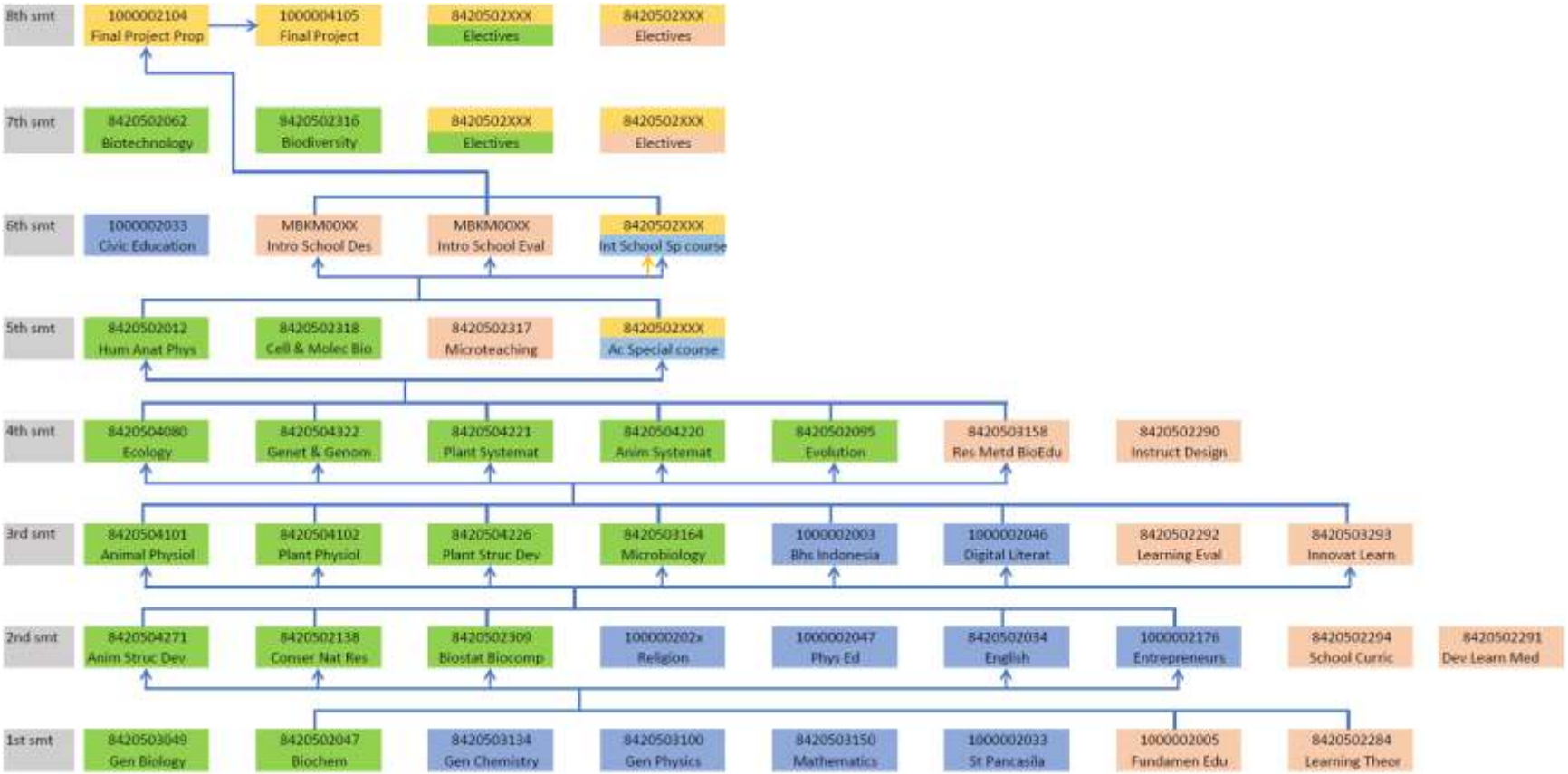
PLO-1/AT-1: Able to demonstrate religious, national, and cultural values, as well as academic ethics in carrying out task.



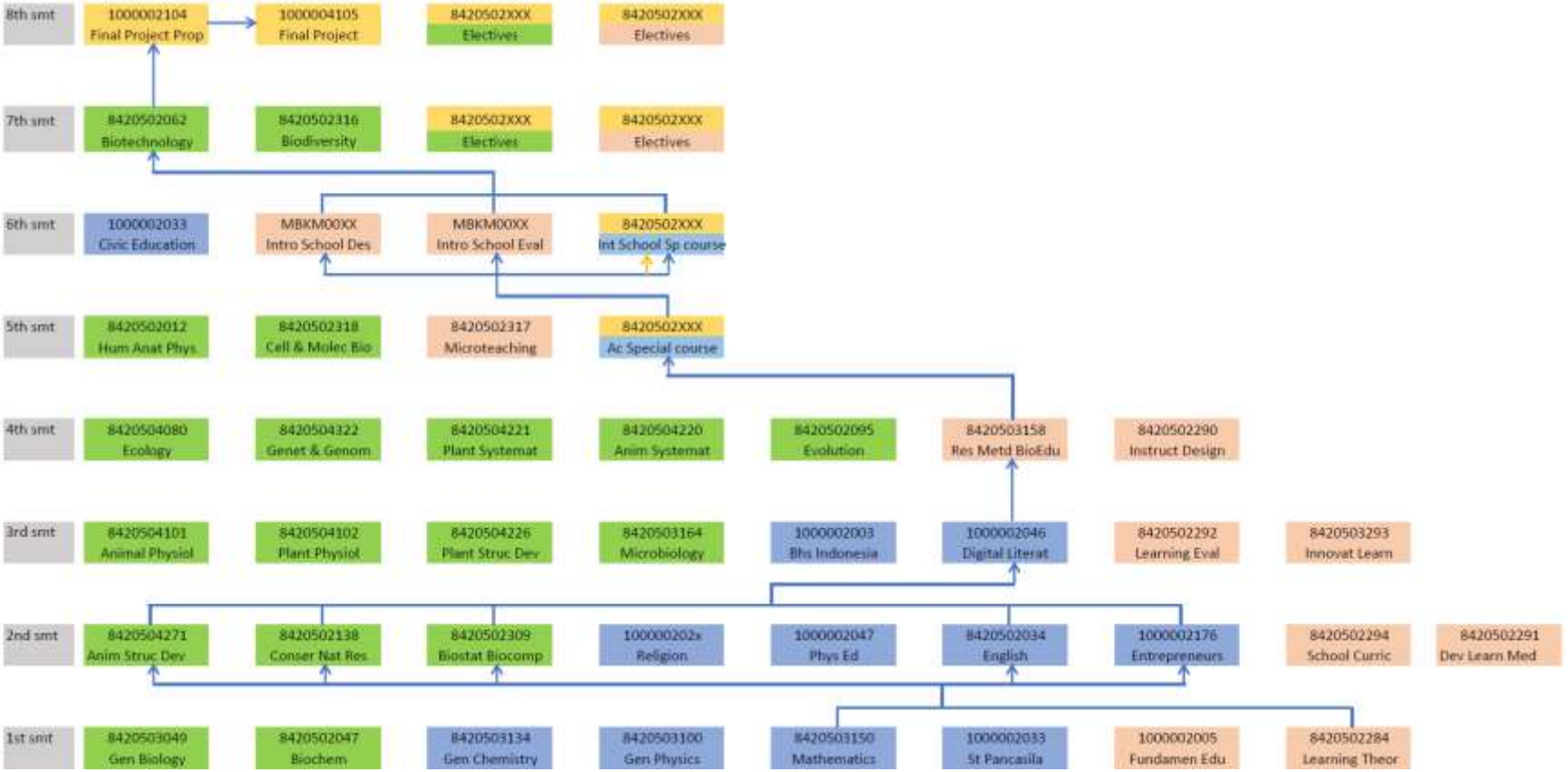
PLO-2/AT-2: Demonstrates resilience, collaboration, adaptability, innovation, inclusiveness, lifelong learning, and entrepreneurial spirit.



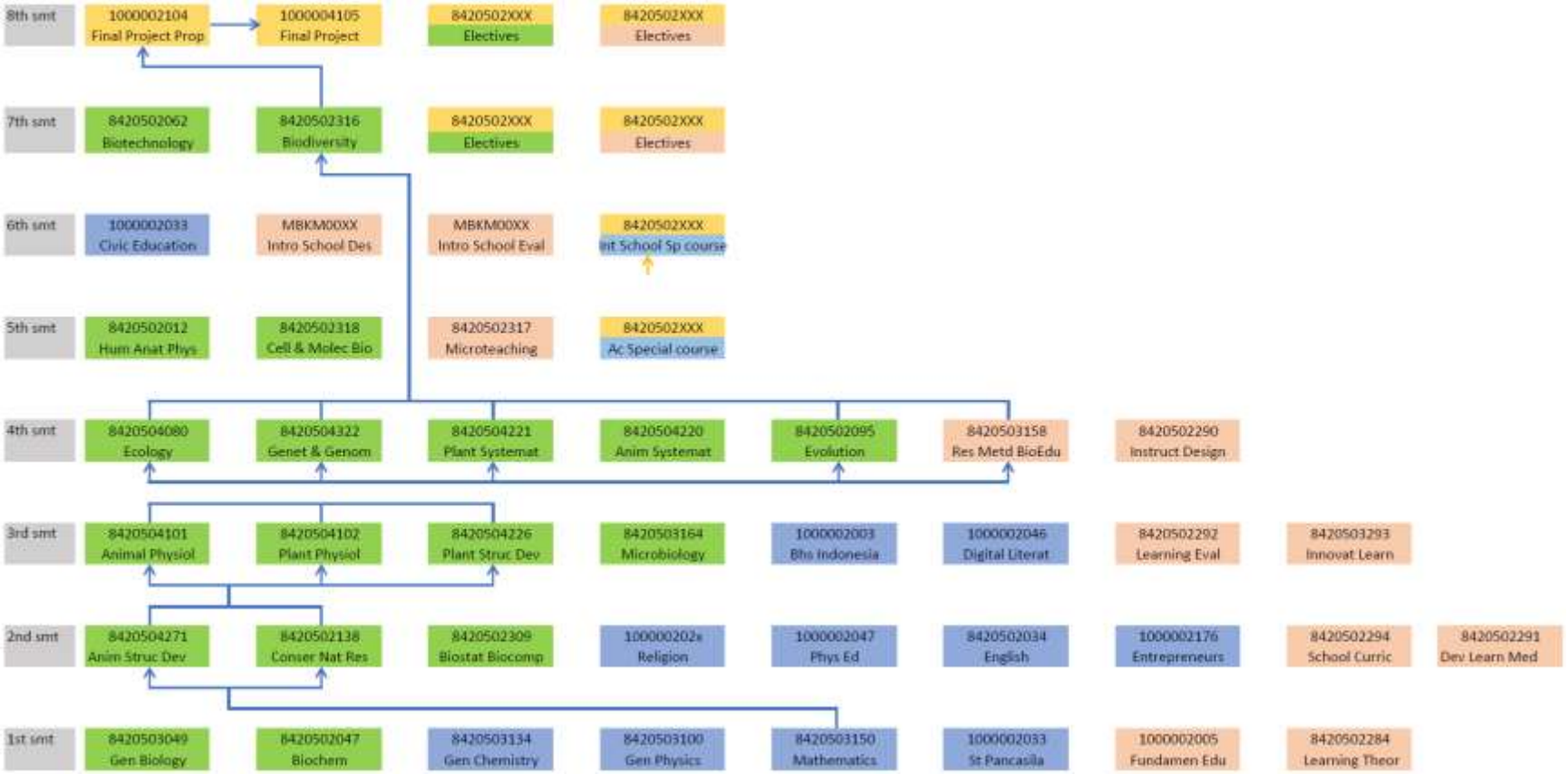
PLO-3/GC-1: Able to develop logical, critical, systematic, and creative thinking in performing specific tasks in their field of expertise in accordance with the competency standards of the relevant work area.



PLO-4/ GC-2: Able to develop themselves continuously and collaborate.



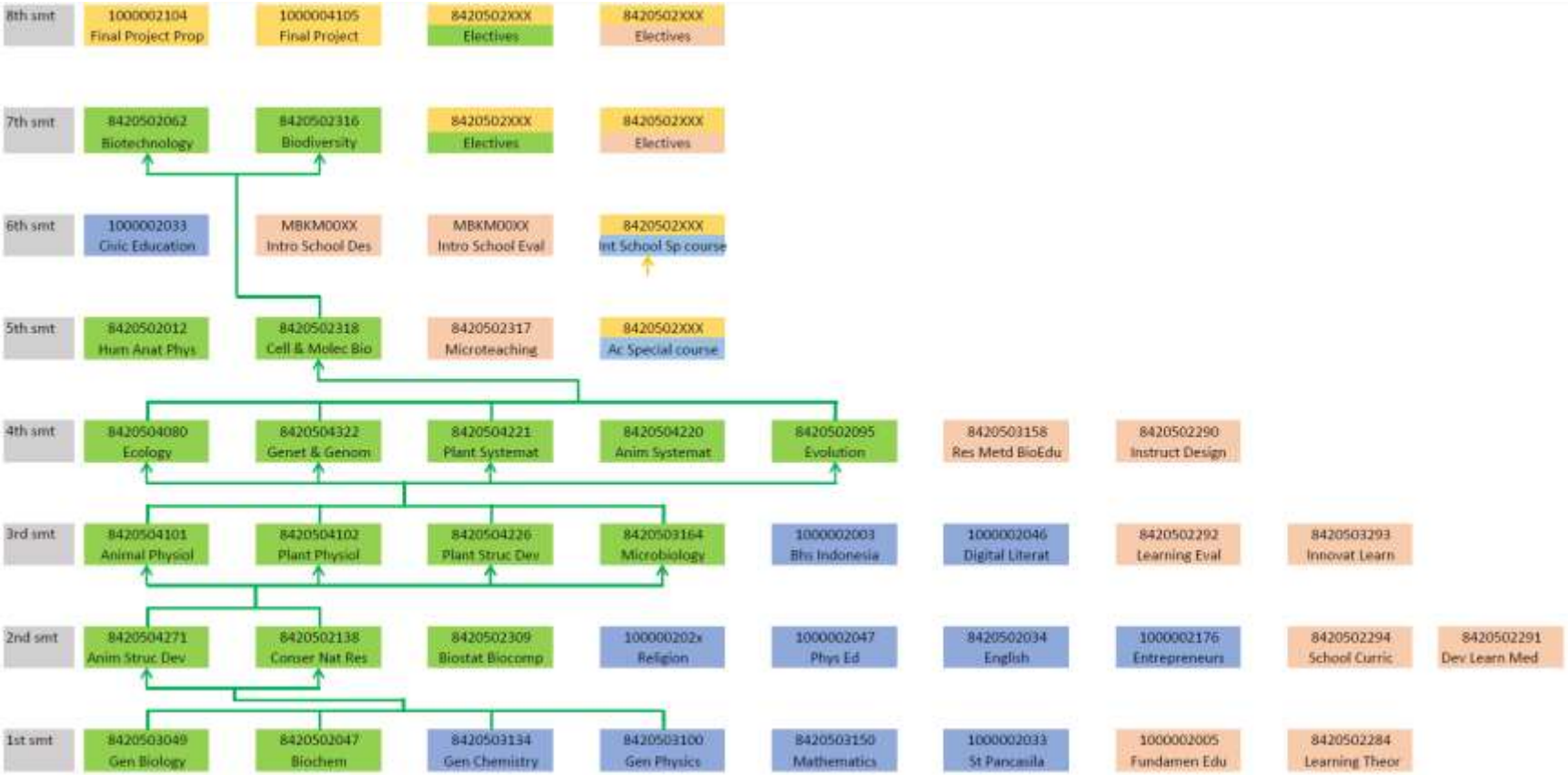
PLO-5/GC-3: Able to communicate ideas, concepts, and research results effectively, both orally and in writing.



PLO-6/GC-4: Able to make decisions based on data/information in order to complete tasks as part of their responsibility in the work performed.



PLO-7/ KN-1: Able to demonstrate knowledge of biology at the molecular, cellular, and organism levels, as well as their interactions with the environment.



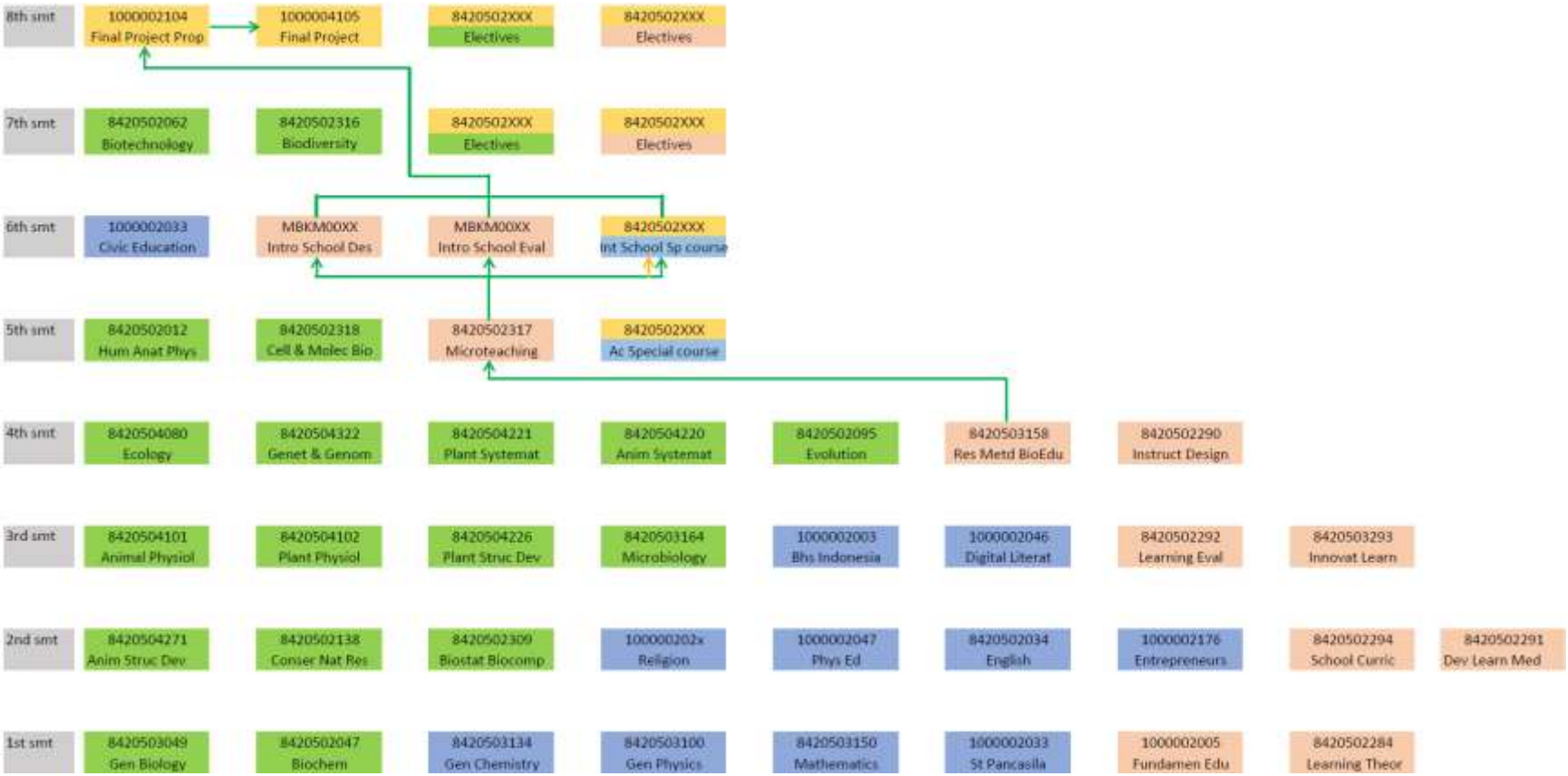
PLO-8/KN-2: Able to demonstrate the ability to apply biological concepts and environmental issues with relevant technology in the management of natural resources.



PLO-9 / KN-3: Able to demonstrate pedagogical knowledge in designing, implementing, and evaluating biology learning.



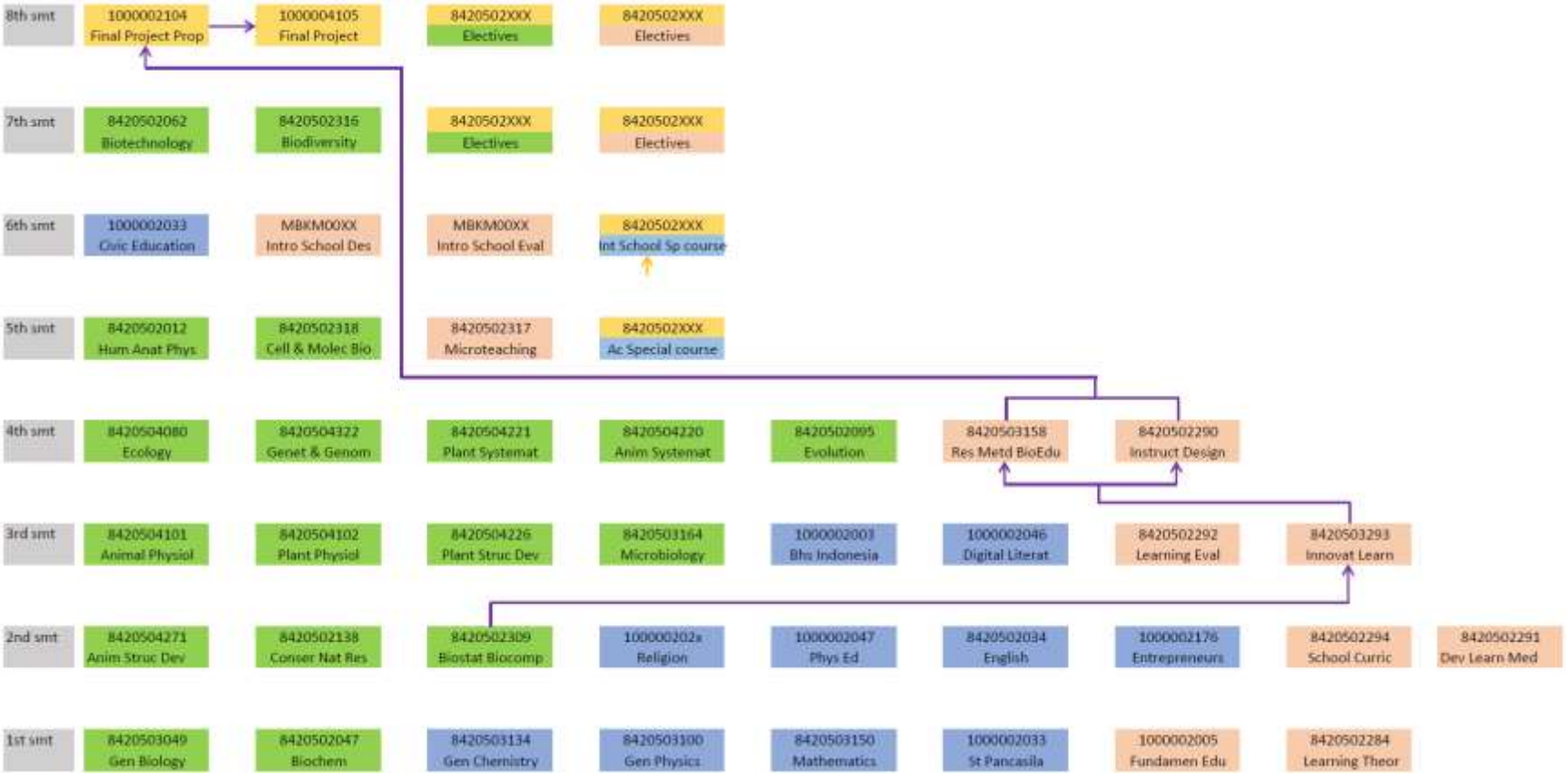
PLO-10 / KN-4: Able to demonstrate knowledge related to biology education research.



PLO-11 / SS-1: Able to design, implement, and evaluate biology learning by utilizing ICT.



PLO-12 / SS-2: Able to design and conduct experiments in biology learning to obtain, analyze, and interpret data for problem-solving.



PLO-13 /SS-3: Able to design problem-solving strategies by implementing transferable skills in the field of biology to develop eco-preneurship (eco-innovation, eco-opportunity, eco-commitment).

